Exhibit R

Scenic and Aesthetic Values

Biglow Canyon Wind Farm
February 2025

Prepared for

Portland General Electric Company

Prepared by

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Table of Contents

1.0 Introduction 1
2.0 Analysis Area 2
3.0 Identification of Significant or Important Scenic Resources – OAR 345-021-0010(1)(r)(A)(B) 2
3.1 Counties 9
3.1.1 Sherman County 9
3.1.2 Klickitat County 9
3.2 Municipalities 9
3.2.1 Wasco 9
3.2.2 Moro 9
3.2.3 Rufus 10
3.3 State 10
3.3.1 Oregon Department of Transportation 10
3.4 Federal Lands 11
3.4.1 Bureau of Land Management 11
3.4.2 National Park Service 11
4.0 Methods – OAR 345-021-0010(1)(r)(C) 11
5.0 Impact Assessment – OAR 345-021-0010(1)(r)(D)(E) 15
5.1 Loss of Vegetation 15
5.2 Facility Structures 15
5.2.1 Deschutes River Canyon 16
5.2.2 John Day River Canyon 16
5.2.3 Interstate 84 16
5.2.4 Interstate 97 16
5.2.5 Oregon State Highway 206 17
5.2.6 WSH-14 17
5.3 Glare Analysis Results 18
5.3.1 South Array Analysis 1 – First-Story Receptors 18
5.3.2 South Array Analysis 2 – Second-Story Receptors 18
5.3.3 South Array Analysis 3 – Federal Aviation Administration Receptors 19
5.3.4 North Array Analysis 1 – First-Story Receptors 19

5.3.5 North Array Analysis 2 – Second-Story Receptors 20
5.3.6 North Array Analysis 3 – FAA Receptors 20
5.3.7 Summary of Glare Analysis Results 21
5.4 Plumes and Air Emissions 21
5.5 Conclusion 21
6.0 Avoidance and Mitigation – OAR 345-021-0010(1)(r)(F) 22
7.0 Monitoring – OAR 345-021-0010(1)(r)(F) 22
8.0 References 22

List of Tables

Table R-1. Important Scenic Resources Inventory 5

List of Figures

Figure R-1. Scenic Resources

Figure R-2. Viewshed Analysis Solar Array ZVI Map

Figure R-3. Viewshed Analysis Gen-Tie Lines ZVI Map

Figure R-4. Key Observation Points

List of Attachments

Attachment R-1. Land Use Management Plan Excerpts

Attachment R-2. Glare Analysis Reports

Attachment R-3. Photolog

Acronyms and Abbreviations

AC	alternating current
BCWF or Existing Facility	Biglow Canyon Wind Farm
BIGL or Project Developer	BIGL bn, LLC
BLM	Bureau of Land Management
Certificate Holder or PGE	Portland General Electric Company
Council or EFSC	Oregon Energy Facility Siting Council
FAA	Federal Aviation Administration
gen-tie	generation tie
KOP	Key Observation Point (Visual Analysis)
MW	megawatt
NPS	National Park Service
OAR	Oregon Administrative Rules
ODOE	Oregon Department of Energy
ODOT	Oregon Department of Transportation
OP	Observation Point (Glare Analysis)
PV	photovoltaic
ONHT	Oregon National Historic Trail
RFA	Request for Amendment
Site Certificate	Site Certificate for Amendment 3
Solar Components	photovoltaic solar energy generation and battery storage
SGHAT	Solar Glare Hazard Analysis Tool
ZVI	zone of visual influence

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1.0 Introduction

The Portland General Electric Company (PGE or Certificate Holder) submits this Request for Amendment (RFA) 4 to the Site Certificate on Amendment 3, issued October 31, 2008 (Site Certificate) for the Biglow Canyon Wind Farm (BCWF or Existing Facility) to add photovoltaic (PV) solar energy generation and battery storage (Solar Components) to the operating BCWF.

BCWF, owned and operated by PGE, is located within an approved site boundary comprising approximately 25,000 acres, approximately 2.5 miles northeast of the town of Wasco in Sherman County, Oregon. The BCWF operates under the Site Certificate from the Oregon Energy Facility Siting Council (Council or EFSC) as administered by the Oregon Department of Energy (ODOE). BCWF currently consists of 217 wind turbines, with a maximum blade tip height of 445 feet, and a peak generating capacity of 450 megawatts (MW).

In RFA 4, PGE proposes to add up to 385 MW alternating current (AC) generating capacity from PV solar arrays and 375 MW in battery storage capacity. RFA 4 seeks to expand the BCWF site boundary to include the Solar Components in portions of the existing site boundary and in the proposed expanded site boundary (together, Solar Micrositing Area or RFA 4 Site Boundary[1]).

The Solar Micrositing Area is approximately 3,980 acres and provides a conservative estimate of the maximum area needed for development, micrositing, and temporary disturbances from the Solar Components during construction, rather than the anticipated disturbance footprint. Solar Components will include solar arrays, inverters, battery energy storage system facilities and their subcomponents (i.e., inverters), two collector substations, a total of approximately 3 miles of 230-kilovolt generation tie (gen-tie) transmission lines, medium voltage collector lines, operations and maintenance structures, site access roads, internal roads, perimeter fencing, facility entry gates, and temporary laydown areas. The maximum generating capacity from the Solar Components will be 385 MW AC and construction may take place in phases.

PGE will own and operate the Solar Components as a part of the BCWF (together, Amended Facility or Facility), which, to date, have been developed by BIGL bn, LLC (BIGL or Project Developer). BIGL, in its capacity as the project developer, supports PGE in this RFA 4 and may construct and temporarily operate the Solar Components on behalf of PGE under a Build-Transfer Agreement.

The Council previously found in the Final Order on RFA 3 that the BCWF complies with the Council's Scenic Resources standard.[2] Exhibit R provides the information required by Oregon Administrative Rules (OAR) 345-021-0010(1)(r) in support of RFA 4. The information summarized in this exhibit and described in RFA 4 demonstrate that the Facility, as proposed, can be designed, engineered, constructed, operated, and retired in a manner that satisfies the applicable Council

[1] Note, as described in further detail in Section 4.1.1.2 of the RFA 4 Division 27 document, the Solar Micrositing Area is the equivalent of the RFA 4 Site Boundary.
[2] Final Order on Request for Amendment 3, p. 26 (October 2008).

standards. The proposed changes in RFA 4 do not alter the Certificate Holder's ability to comply with applicable Site Certificate Conditions and the approval standard in OAR 345-022-0080.

2.0 Analysis Area

Consistent with OAR 345-027-0360(3), ODOE concurred with the Certificate Holder's use of a defined portion of the approved BCWF site boundary and the proposed expanded site boundary (i.e., Solar Micrositing Area/RFA 4 Site Boundary) to establish study area boundaries for RFA 4 under OAR 345-001-0010(35). The RFA 4 Site Boundary reflects the Solar Micrositing Area, and all study areas within the meaning of ORS 345-001-0010(35) are measured from the RFA 4 Site Boundary. In accordance with OAR 345-001-0010(35)(b), the analysis area for scenic resources is the area within and extending 10 miles from the Solar Micrositing Area[3] (Figure R-1).

3.0 Identification of Significant or Important Scenic Resources – OAR 345-021-0010(1)(r)(A)(B)

OAR 345-021-0010(1)(r) An analysis of potential visual impacts of the proposed facility, if any, on significant or important scenic resources within the analysis area, providing evidence to support a finding by the Council under OAR 345-022-0080, including:

OAR 345-021-0010(1)(r)(A) An inventory of the scenic resources identified as significant or important in a land use management plan adopted by one or more local, tribal, state, or federal government or agency applicable to lands within the analysis area for scenic resources. The applicant must provide a list of the land management plans reviewed in developing the inventory and a copy of the relevant portion of the plans;

OAR 345-021-0010(1)(r)(B) A map or maps showing the location of the scenic resources described under paragraph (A). in relation to the site of the proposed facility;

Response: This section inventories scenic resources identified as significant or important in local, state, tribal, and federal land use plans within the analysis area, as required to demonstrate compliance with the approval standard in OAR 345-022-0080. The 10-mile analysis area includes parts of one Oregon county (Sherman), three Oregon municipalities (Wasco, Rufus, and Moro), highway right-of-way administered by the Oregon Department of Transportation (ODOT), the Oregon National Historic Trail (ONHT) managed by the National Park Service (NPS), one Washington county (Klickitat), and federal land administered by the Bureau of Land Management (BLM).

[3] ODOE concurred with excluding the remaining BCWF site boundary that does not overlap with the Solar Micrositing Area from analysis in RFA 4 because no changes are proposed to any BCWF components in the remaining BCWF site boundary as part of RFA 4.

Table R-1 provides an inventory of the scenic resources identified by land management plans within the analysis area and indicates the proximity and viewing direction of each scenic resource relative to the Solar Micrositing Area/RFA 4 Site Boundary in compliance with OAR 345-021-0010(1)(r)(A). Figure R-1 shows the scenic resources in compliance with OAR 345-021-0010(1)(r)(B).

Corresponding with the analysis area, the Certificate Holder evaluated nine land use management plans listed in Table R-1 to determine whether scenic resources were identified as significant or important. See Attachment R-1 for excerpts of the relevant plans that were reviewed for scenic resources. We also summarize below, for each jurisdiction, the scenic resources identified in the analysis area.

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Table R-1. Important Scenic Resources Inventory

Jurisdiction	Plan	Scenic Resources Specified in Plan	Important or Significant Scenic Resources Identified in Analysis Area	Scenic Resource Description	Distance from Solar Array (miles)	Direction from Solar Array	Distance from Gen-Tie Line (miles)	Direction from Gen-Tie Line
Counties								
Sherman County	Sherman County Oregon Comprehensive Land Use Plan (Sherman County 2007)	John Day River Canyon Deschutes River Canyon I-84 (Milepost 99.85 to 106.46 and 110.1 to 114.23) US-97 (Milepost 0.05 to 5.00, 10 to 16, 22 to 27, 30 to 48.81) OR-206 (Milepost 5 to 14.91) OR-216 (8.3 to 11)	John Day River Canyon Deschutes River Canyon I-84 (Milepost 100-106, 110-114) US-97 (Milepost 1-5, 10-16) OR-206	Views from Rivers and Scenic Highways	John Day River Canyon – 3.63 Deschutes River Canyon – 9.66 I-84 – 3.39 US-97 – 2.39 OR-206 – 2.75	John Day River Canyon – East Deschutes River Canyon - West I-84 – North US-97 – West OR-206 – East	John Day River Canyon – 5.03 Deschutes River Canyon – 11.70 I-84 – 5.47 US-97 – 4.05 OR-206 – 3.64	John Day River Canyon – East Deschutes River Canyon - West I-84 – North US-97 – West OR-206 – East
Klickitat County	Klickitat County Washington Comprehensive Land Use Plan (Klickitat County 1977, last amended 2013)	White Salmon Urban Exempt Area Columbia River Gorge Scenic Area WSH-14	WSH-14	Views from Scenic Highway	WSH-14 – 4.63	WSH-14 – North	WSH-14 – 6.69	WSH-14 – North
Incorporated Cities and Towns								
Wasco	City of Wasco Comprehensive Land Use Plan (City of Wasco 2003)	John Day River Canyon Deschutes River Canyon I-84 (Milepost 99.85 to 106.46 and 110.1 to 114.23) US-97 (Milepost 0.05 to 5.00, 10 to 16, 22 to 27, 30 to 48.81) OR-206 (Milepost 5 to 14.91) OR-216 (8.3 to 11)	John Day River Canyon Deschutes River Canyon I-84 (Milepost 100-106, 110-114) US-97 (Milepost 1-5, 10-16) OR-206	Views from Rivers and Scenic Highways	John Day River Canyon – 3.63 Deschutes River Canyon – 9.66 I-84 – 3.39 US-97 – 2.39 OR-206 – 2.75	John Day River Canyon – East Deschutes River Canyon - West I-84 – North US-97 – West OR-206 – East	John Day River Canyon – 5.03 Deschutes River Canyon – 11.70 I-84 – 5.47 US-97 – 4.05 OR-206 – 3.64	John Day River Canyon – East Deschutes River Canyon - West I-84 – North US-97 – West OR-206 – East
Moro	City of Moro Comprehensive Land Use Plan (City of Moro 1978)	John Day River Canyon Deschutes River Canyon I-84 (Milepost 99.85 to 106.46 and 110.1 to 114.23) US-97 (Milepost 0.05 to 5.00, 10 to 16, 22 to 27, 30 to 48.81) OR-206 (Milepost 5 to 14.91) OR-216 (8.3 to 11)	John Day River Canyon Deschutes River Canyon I-84 (Milepost 100-106, 110-114) US-97 (Milepost 1-5, 10-16) OR-206	Views from Rivers and Scenic Highways	John Day River Canyon – 3.63 Deschutes River Canyon – 9.66 I-84 – 3.39 US-97 – 2.39 OR-206 – 2.75	John Day River Canyon – East Deschutes River Canyon - West I-84 – North US-97 – West OR-206 – East	John Day River Canyon – 5.03 Deschutes River Canyon – 11.70 I-84 – 5.47 US-97 – 4.05 OR-206 – 3.64	John Day River Canyon – East Deschutes River Canyon - West I-84 – North US-97 – West OR-206 – East
Rufus	City of Rufus Comprehensive Land Use Plan (City of Rufus 1978)	John Day River Canyon Deschutes River Canyon I-84 (Milepost 99.85 to 106.46 and 110.1 to 114.23) US-97 (Milepost 0.05 to 5.00, 10 to 16, 22 to 27, 30 to 48.81) OR-206 (Milepost 5 to 14.91) OR-216 (8.3 to 11)	John Day River Canyon Deschutes River Canyon I-84 (Milepost 100-106, 110-114) US-97 (Milepost 1-5, 10-16) OR-206	Views from Rivers and Scenic Highways	John Day River Canyon – 3.63 Deschutes River Canyon – 9.66 I-84 – 3.39 US-97 – 2.39 OR-206 – 2.75	John Day River Canyon – East Deschutes River Canyon - West I-84 – North US-97 – West OR-206 – East	John Day River Canyon – 5.03 Deschutes River Canyon – 11.70 I-84 – 5.47 US-97 – 4.05 OR-206 – 3.64	John Day River Canyon – East Deschutes River Canyon - West I-84 – North US-97 – West OR-206 – East

Jurisdiction	Plan	Scenic Resources Specified in Plan	Important or Significant Scenic Resources Identified in Analysis Area	Scenic Resource Description	Distance from Solar Array (miles)	Direction from Solar Array	Distance from Gen-Tie Line (miles)	Direction from Gen-Tie Line
State								
ODOT	Journey Through Time Tour Route Management Plan (ODOT 1996)	Portions of US-97,OR-218, OR-19, US-26, and OR 7	US-97	Views of the Mt. Jefferson, Mt. Hood, and Mt. Adams from US Highway 97	US-97 – 2.45	US-97 - West	US-97 – 4.65	US-97 - West
Federal								
BLM, Prineville District	Two Rivers Resource Management Plan Record of Decision (BLM 1986) Two Rivers Resource Management Plan Amendment Record of Decision (BLM 2001)	John Day River Canyon Deschutes River Canyon	John Day River Canyon Deschutes River Canyon	Deschutes River Canyon - river and canyon views	John Day River Canyon – 3.63 Deschutes River Canyon – 9.66	John Day River Canyon – East Deschutes River Canyon - West	John Day River Canyon – 5.03 Deschutes River Canyon – 11.70	John Day River Canyon – East Deschutes River Canyon - West
	Lower Deschutes River Management Plan Record of Decision (BLM 1997)	No	N/A	N/A	N/A	N/A	N/A	N/A
National Park Service (NPS)	Oregon Trail Comprehensive Management and Use Plan (NPS 1999)	The Oregon National Historic Trail was one of the main overland migration routes on the North American continent, leading from locations on the Missouri River to the Oregon Country.	The Oregon National Historic Trail traverses the north portion of the analysis area. In the Management and Use Plan, identification of scenic and aesthetic values is restricted to a selected number of "high-potential sites." The locations of the high-potential sites lie outside of the analysis area.	N/A	N/A	N/A	N/A	N/A

I = Interstate
OR = Oregon State Route
US = U.S. Highway
WSH = Washington State Highway

3.1 Counties

3.1.1 Sherman County

The Sherman County Comprehensive Land Use Plan (Sherman County 2007) was drafted to conform with the State-wide planning goals relating to open spaces, scenic sites/areas and natural resources (Goal 5). The Sherman County Comprehensive Land Use Plan finds that: rock outcroppings, trees, the John Day River Canyon, and the Deschutes River Canyon are all-important features of the County's landscape; and that ODOT has designated certain segments of Interstate (I)-84, U.S. Highway (US)-97, Oregon State Route (OR)-206, and OR-216 as Scenic Highways. Of these resources, only OR-216 is not located in the analysis area and as such is not addressed.

3.1.2 Klickitat County

References to aesthetic values in the Klickitat Comprehensive Land Use Plan (Klickitat 1977, 2013) are limited to those that exist in an urban exempt area outside of White Salmon and the Columbia River Gorge Scenic Area, which are outside of the analysis area, and Washington State Highway (WSH)-14. WSH-14 provides the most readily accessible views toward the Solar Components site.

3.2 Municipalities

3.2.1 Wasco

The City of Wasco Comprehensive Land Use Plan (1978) states that the Deschutes and John Day Rivers are both designated scenic waterways. The Health and Recreational Facilities section designated the following state and federal roads as scenic highways:

- I-84 (Milepost 99.85 to 106.46 and 110.1 to 114.23); Milepost 100-106, 110-114 are within the analysis area.
- US-97 (Milepost 0.05 to 5.00, 10 to 16, 22 to 27, 30 to 48.81); Milepost 1-5, 10-16 are within the analysis area.
- OR-206 (Milepost 5 to 14.91); all within the analysis area.
- OR-216 (Milepost 8.3 to 11); not located within the analysis area.

The Plan does not contain any specific scenic resource goals or policies.

3.2.2 Moro

The City of Moro Comprehensive Land Use Plan (1978) Health and Recreational Facilities section designated the following state and federal roads as scenic highways:

- I-84 (Milepost 99.85 to 106.46 and 110.1 to 114.23); Milepost 100-106, 110-114 are within the analysis area.

- US-97 (Milepost 0.05 to 5.00, 10 to 16, 22 to 27, 30 to 48.81); Milepost 1-5, 10-16 are within the analysis area.
- OR-206 (Milepost 5 to 14.91); all within the analysis area.
- OR-216 (Milepost 8.3 to 11)); not located within the analysis area.

The Plan does not contain any specific scenic resource goals or policies.

3.2.3 Rufus

The City of Rufus Comprehensive Land Use Plan (1978) states that the Deschutes and John Day Rivers are both designated scenic waterways. The Health and Recreational Facilities section designated the following state and federal roads as scenic highways:

- I-84 (Milepost 99.85 to 106.46 and 110.1 to 114.23); Milepost 100-106, 110-114 are within the analysis area.
- US-97 (Milepost 0.05 to 5.00, 10 to 16, 22 to 27, 30 to 48.81); Milepost 1-5, 10-16 are within the analysis area.
- OR-206 (Milepost 5 to 14.91); all within the analysis area.
- OR-216 (Milepost 8.3 to 11); not located within the analysis area.

The Plan does not contain any specific scenic resource goals or policies.

3.3 State

3.3.1 Oregon Department of Transportation

The ODOT Oregon Scenic Byway Program (ODOT 2024) assists in the designation, protection, and promotion of Oregon's scenic byways. The Oregon Scenic Byway Program pre-dates the federal Scenic Byways program, with concern for enhancing Oregon's natural beauty apparent dating back to 1913 with the formalization of a state highway system.

In 1961, Oregon created a seven-member Scenic Area Board and, in 1983 and 1985, the Oregon Legislature directed the study of historic elements of the State highway system and the protection of scenic and historical corridors. Oregon continually prioritizes maintaining and preserving scenic byways for the enjoyment of future generations.

The only Oregon Scenic Byway management plan within the analysis area is for the Journey Through Time Scenic Byway. It spans five Oregon counties and comprises portions of US-97, OR-218, OR-19, US-26, and OR-7. Specific scenic resources identified in the Journey Through Time Tour Route Management Plan (ODOT 1996) in the analysis area are unsurpassed and unobstructed views of the Mt. Jefferson, Mt. Hood, and Mt. Adams from US-97.

3.4 Federal Lands

3.4.1 Bureau of Land Management

The Two Rivers Resource Management Plan Record of Decision (BLM 1986, 2001) states under Chapter 2, Visual Resources that before the BLM initiates or permits any major surface-disturbing activities on public land, an analysis will be completed to determine adverse effects on visual qualities. Activities that will result in significant, long-term adverse effects on the visual resources of the John Day or Deschutes River canyons in areas normally seen from these rivers will not be permitted.

Activities within other areas of high visual quality that may be seen might be permitted if they do not attract attention or leave long-term visual changes on the land. Activities in other areas may change the landscape but will be designed to minimize any adverse effect on visual quality.

Map 6 of the Two Rivers Resource Management Plan identifies the John Day or Deschutes River canyons as Areas of High Visual Quality.

3.4.2 National Park Service

The focus of the Oregon Trail Comprehensive Management and Use Plan (NPS 1999) is to identify, preserve, and interpret the sites, route, and history of the ONHT for all people to experience and understand. In the Oregon Trail Comprehensive Management and Use Plan, identification of scenic and aesthetic values is restricted to a selected number of "high-potential sites." The locations of the high-potential sites lie outside of the analysis area.

4.0 Methods – OAR 345-021-0010(1)(r)(C)

OAR 345-021-0010(1)(r)(C) A description of the methodology the applicant used to identify and assess potential visual impacts to the scenic resources identified in paragraph (A);

Response: The potential for visual impacts from the Solar Components are primarily related to the components that will be the most prominent in terms of size and scale. The two most prominent components in terms of height off the ground and overall surface area include the solar arrays and the gen-tie lines. Thus, these two components were the focus of the visual impact assessment.

A zone of visual influence (ZVI) analysis, also known as a viewshed analysis, was performed using Esri geographic information system software and a bare-earth 10-meter digital elevation model to identify those areas from which the solar array areas and the 230-kilovolt gen-tie lines might be visible (Figures R-2 and R-3). The ZVI analysis assumed a maximum height of 15 feet for the solar modules and a maximum height of 160 feet for the aboveground collector line. All other components proposed with RFA 4 were deemed less visually impactful (due to height, being dispersed throughout the Solar Micrositing Area/RFA 4 Site Boundary, or adjacent to taller infrastructure, etc.) and addressed by the assessment of the solar areas and aboveground collector

line. A typical viewing height of 1.8 meters (6 feet) was assumed. Visibility of the two components was defined by visible or not visible, indicated by color coding (see Figures R-2 and R-3), and by proximity, i.e., foreground (less than 0.5 mile), middleground (0.5 to 5 miles), or background distances (more than 5 miles).

Based on these ZVI analyses, Visual Analysis Key Observation Points (KOPs) were identified based on locations from which the Solar Components would potentially be visible and noticeable to the casual observer (see Figure R-4). The "casual observer" is considered an observer who is not actively looking or searching for the Solar Components, but who is engaged in activities at locations with potential views of the Facility, such as hiking or driving along a scenic road. If the Solar Components infrastructure is not noticeable to the casual observer, visual impacts can be considered minor to negligible.

It should be noted that this bare-earth modeling approach (based only on the effects of terrain on visibility) results in a highly conservative assessment of potential visibility for several reasons. First, a bare-earth analysis does not take into account the effects of vegetation or buildings, which will in practice block or screen views in some places. Finally, the model does not account for distance, lighting, weather, and atmospheric attenuation factors that diminish visibility under actual field conditions.

The solar modules will be the most visible components within the solar array areas and will consist of solar module strings, the vast majority of which will be mounted on single-axis tracker systems. The visibility of the solar modules within the solar array areas will depend primarily on topographic or other view obstructions and the distance from the viewer to the solar areas. With a maximum height of 15 feet to the top edge of the solar module when fully tilted, the modules will not be visible from sites lower in elevation than the area on which the solar modules are constructed. From sites that are similar in elevation to the solar modules, viewers will see only a line on the horizon and not individual solar panels. Depending on the viewing distance, viewers at sites higher in elevation may have views of the modules, especially if the view direction is toward the angle at which the module is tilted toward the sun. To the extent practicable, reflectivity of solar modules will be minimized. Antireflective coating will be used to reduce glare, and the surface of the modules will have high transmittance to increase the amount of light reaching the photovoltaic cells. With these methods, the modules will be less reflective than a natural water body or a coated glass surface that is not antireflective.

A glare analysis was performed using the Sandia Laboratories Solar Glare Hazard Analysis Tool (SGHAT), a modeling/compliance analysis tool now licensed for public use within the ForgeSolar GlareGauge cloud software application. The SGHAT is considered to be an industry best practice for analysis of glare and glint related to solar energy generating facilities. It is a web-based tool and methodology to evaluate potential glint/glare associated with solar energy installations. The validated tool provides a quantified assessment of when and where glare will occur, as well as information about potential ocular impacts. The calculations and methods are based on analyses, test data, a database of different photovoltaic module surfaces (e.g., anti-reflective coating, texturing), and models developed over several years at Sandia. The results are presented in a

simple easy-to-interpret plot that specifies when glare will occur throughout the year, with color indicating the potential ocular hazard. Note, however, that technology changes continue to occur to address issues such as reflectivity. The model, therefore, presents a conservative assessment based upon simplifying assumptions inherent in the model as well as industry improvements since the most recent update of such assumptions.

Based on the predicted retinal irradiance (intensity) and subtended angle (size/distance) of the glare source to receptor, the GlareGauge categorizes potential glare where it is predicted by the model to occur in accordance with three tiers of severity (ocular hazards) that are shown by different colors in the model output:

- Red glare: glare predicted with a potential for permanent eye damage (retinal burn);
- Yellow glare: glare predicted with a potential for temporary after-image; and
- Green glare: glare predicted with a low potential for temporary after-image.

These categories of glare are calculated using a typical observer's blink response time, ocular transmission coefficient (the amount of radiation absorbed in the eye prior to reaching the retina), pupil diameter, and eye focal length (the distance between where rays intersect in the eye and the retina). As a point of comparison, direct viewing of the sun without a filter is considered to be on the border between yellow glare and red glare, while typical camera flashes are considered to be lower tier yellow glare (approximately three orders of magnitude less than direct viewing of the sun). Upon exposure to yellow glare, the observer may experience a temporary spot in their vision temporarily lasting after the exposure. Upon exposure to green glare, the observer may experience a bright reflection but typically no spot lasting after exposure.

The SGHAT was used to evaluate the potential for glint and glare when driving along 1) proximal segment of Emigrant Springs Lane, Herin Lane, OR-206, I-97, Klondike Road, Medler Lane, N Klondike Road, Oehman Road, Old Wasco-Heppner Highway, and Webfoot Road; 2) 21 nearby locations selected to represent observer views at neighboring properties; and 3) the two 2-mile final approach paths for the Wasco State Airport (35S) located approximately 1 mile to the southwest from the southern limit of the Solar Micrositing Area/RFA 4 Site Boundary. The analysis reports are included as Attachment R-2.

The analyses reviewed 30 PV array areas that were separated between the Southern (PV arrays 1 to 20) and Northern (PV arrays 21 to 30) Array areas. The panels to be used at the Solar Components are smooth glass surface material with an anti-reflection coating, which is noted in the glare analysis. Three analyses were performed to simulate single axis tracking panels with a 60-degree tilt. The analyses were conducted for a panel height of 8 feet above ground surface (centroid/axis height) with applicable panel specifications. Backtracking was simulated with a resting angle of 5 degrees. Backtracking is the programmed strategy that rotates the modules away from the sun to reduce shading to other panels. This typically is put into effect when the sun's position lies outside the range of rotation defined by the maximum tracking angle (60 degrees) of the PV panels, or when substantial shading occurs. The resting angle is the programmed in tilt that

the panels stay at while the sun's position is outside the defined tracking angle. The analysis includes calculations to predict potential glare minutes at the following specified receptors:

- Viewing height of observer in standard first-floor building at 6 feet above ground surface and standard vehicle at 5 feet above ground surface (Analysis 1);
- Viewing height of observer in standard second-floor building at 16 feet above ground surface and typical semi-tractor-trailer truck at 9 feet above ground surface (Analysis 2); and
- The 2-mile final approach paths for Wasco State Airport, Runways 07 and 25 (Analysis 3).

On May 11, 2021, 14 Code of Federal Regulations Part 77 was updated with final Federal Aviation Administration (FAA) policy (86 *Federal Register* 25801), designed to ensure that solar projects on airport property do not produce hazardous glare. The updated policy includes narrative stating:

> *Initially, FAA believed that solar energy systems could introduce a novel glint and glare effect to pilots on final approach. FAA has subsequently concluded that in most cases, the glint and glare from solar energy systems to pilots on final approach is similar to glint and glare pilots routinely experience from water bodies, glass façade buildings, parking lots, and similar features. However, FAA has continued to receive reports of potential glint and glare from on-airport solar energy systems on personnel working in Air Traffic Control Tower (ATCT) cabs. Therefore, FAA has determined the scope of agency policy should be focused on the impact of on-airport solar energy systems to federally-obligated towered airports, specifically the airport's ATCT cab.* (FAA 2021)

Therefore, the FAA has developed the following criteria for analysis of solar energy projects located near jurisdictional airports:

- No potential for glint or glare in the existing or planned ATCT cab for federally obligated airports.
- Glare with a "low potential for after-image" along the final approach path for any existing landing threshold or future landing thresholds (including any planned interim phases of the landing thresholds) as shown on the current FAA-approved Airport Layout Plan is allowed. The final approach path is defined as 2 miles from 50 feet above the landing threshold using a standard 3-degree glidepath.

The GlareGauge model does not account for varying ambient conditions (i.e., cloudy days, precipitation), atmospheric attenuation, screening due to existing vegetation or structures unless specified through obstruction modeling, and screening due to existing topography not located within the defined array layouts. As such, the predicted results are considered conservative and likely significantly lower than predicted. In addition, proposed grading within the model PV array areas was not accounted for at this stage. A leveled topography within the defined PV array areas could result in less predicted glare.

5.0 Impact Assessment – OAR 345-021-0010(1)(r)(D)(E)

OAR 345-021-0010(1)(r)(D) Identification of potential visual impacts to the scenic resources identified in paragraph (A), including, but not limited to:

(i) Loss of vegetation or alteration of the landscape as a result of construction or operation;

(ii) Visual impacts of facility structures or plumes, including but not limited to, changes in landscape character or quality; and

(iii) Loss of visibility due to air emissions or other pollution resulting from the construction or operation of the proposed facility;

OAR 345-021-0010(1)(r)(E) An assessment of the significance of the visual impacts described under paragraph (D);

Response: The analysis area for RFA 4 incorporates the same jurisdictions and land management plans identified and evaluated previously for the Existing Facility. Three additional land use management plans were evaluated that were not identified and evaluated previously for the Existing Facility; however, these plans did not included identification of any scenic resources not previously identified in regional plans and did not include any specific scenic resource goals or policies. Accordingly, no new resources are identified or discussed as a result of RFA 4.

5.1 Loss of Vegetation

The changes proposed to the Existing Facility are in an agricultural area devoted primarily to dry land winter wheat production where there is little natural vegetation or significant rock outcrops. The changes at the Solar Components will result in temporary and permanent vegetation loss. Temporary vegetation loss will be restored through the Certificate Holder's implementation of the Revegetation and Noxious Weed Control Plan. The operation of the Solar Components will result in permanent vegetation loss from the footprint of the proposed components. Of the resources identified, Oregon Scenic Byway US-97 is the closest to the Solar Micrositing Area/RFA 4 Site Boundary, at 2.38 miles. Based on this distance, visibility of temporary and permanent vegetation loss is not expected. There are no changes in fact or law since the Final Order on RFA 3 that would change those findings.

5.2 Facility Structures

The overall visual impact from the solar areas and aboveground collector line on the scenic resource would be negligible. The ZVI analysis demonstrates either no visibility or sporadic visibility at the scenic resources. The following discussion focuses on the scenic resources where there is potential for views of the solar array or gen-tie lines.

5.2.1 Deschutes River Canyon

The Deschutes River Canyon is located approximately 9.66 and 11.70 miles west of the solar array and gen-tie lines, respectively. The visibility analysis demonstrates that from Deschutes River Canyon, the Solar Components will not be visible and, therefore, there will be no visual impacts from the Facility.

5.2.2 John Day River Canyon

The John Day River Canyon is located approximately 3.64 and 5.03 miles east of the solar array and gen-tie lines, respectively. The visibility analysis demonstrates that from almost all of the John Day River Canyon, the Solar Components will not be visible. The small location from where the Solar Components are potentially visible is not easily accessed by the public. If visible, because of distance and the hilly terrain, the solar array and gen-tie lines will be barely visible from this location and will not attract the attention of a casual observer. The river and canyon terrain will dominate the view and what little can be seen of the solar array and gen-tie lines will blend into the landscape setting; therefore, visual impacts from the Solar Components within the analysis area are anticipated to be negligible.

5.2.3 Interstate 84

I-84 is located approximately 3.39 and 5.47 miles north of the solar array and gen-tie lines, respectively. The visibility analysis demonstrates that from I-84, the Solar Components will not be visible and, therefore, there will be no visual impacts from the Solar Components.

5.2.4 Interstate 97

US-97 is located approximately 2.39 and 4.05 miles west of the solar array and gen-tie lines, respectively. The visibility analysis demonstrates that from the majority of US-97, the Solar Components will rarely be visible. A site visit was undertaken to two locations along and near US-97 where the Solar Components are potentially visible (Attachment R-3, Photos 15 and 16). The visibility analysis demonstrates that solar array and gen-tie line visibility at the sites will be northeast and east at a middleground viewing distance at these viewing locations (KOPs 15 and 16). The solar array will introduce dark colors, geometric shapes, and horizontal and vertical lines into the landscape setting. Views of the gen-tie lines will be similar to the other power lines in the area. Because of distance and the hilly terrain, the solar array and gen-tie lines will be barely visible from this location and will not attract the attention of a casual observer. The agricultural land with hilly terrain dominates the view with the existing wind turbines and what little can be seen of the solar array and gen-tie lines will blend into the landscape setting. These viewpoints reflects the views of drivers traveling along US-97, likely traveling at a high rate of speed. These impacts will be short term for travelers because the area where the solar array and gen-tie lines is potentially visible is very limited and their focus will be on the road ahead.

Due to the distance to the Solar Components and existing views of other utility infrastructure in the direction of the Solar Components from US-97, visual impacts from the Solar Components within the analysis area are anticipated to be negligible.

5.2.5 Oregon State Highway 206

OR-206 is located approximately 1.42 and 3.64 miles south of the solar array and gen-tie lines, respectively. The visibility analysis demonstrates that from the majority of OR-206, the Solar Components will be visible sporadically. A site visit was undertaken to one location along OR-206 where the Solar Components are potentially visible (Attachment R-3, Photo 14). The visibility analysis demonstrates that solar array and gen-tie lines visibility at the site will be north at a middleground viewing distance at these viewing locations (KOP 14). The solar array will introduce dark colors, geometric shapes, and horizontal and vertical lines into the landscape setting. Views of the gen-tie lines will be similar to the other power lines in the area. Because of distance and the hilly terrain, the solar array and gen-tie lines will be barely visible from this location and will not attract the attention of a casual observer. The agricultural land with hilly terrain dominates the view with the existing wind turbines and what little can be seen of the solar array and gen-tie lines will blend into the landscape setting.

These viewpoints reflects the views of drivers traveling along OR-206, likely traveling at a high rate of speed. These impacts will be short term for travelers because the area where the solar array and gen-tie lines is potentially visible is very limited and their focus will be on the road ahead.

Due to the distant proximity to the Solar Components, and existing views of other utility infrastructure in the direction of the Solar Components from OR-206, visual impacts from the Solar Components within the analysis area are anticipated to be negligible.

5.2.6 WSH-14

WSH-14 is located approximately 4.63 and 6.69 miles north of the solar array and gen-tie lines, respectively. The visibility analysis demonstrates that from most of WSH-14, the Solar Components will rarely be visible.

A site visit was undertaken to three locations along and near WSH-14 where the Facility is potentially visible (Attachment R-3, Photos 19, 20, and 21). The visibility analysis demonstrates that solar array and gen-tie lines visibility at the sites will be north at a middleground to background viewing distance at these viewing locations (KOPs 19, 20, and 21). The solar array will introduce dark colors, geometric shapes, and horizontal and vertical lines into the landscape setting. Views of the gen-tie lines will be similar to the other power lines in the area. Because of distance and the hilly terrain, the solar array and gen-tie lines will be barely visible from this location and will not attract the attention of a casual observer. The river and hilly terrain dominates the view and what little, if any, that can be seen of the solar array and gen-tie lines will blend into the landscape setting. These viewpoints reflects the views of drivers traveling along WSH-14, likely traveling at a high rate of speed. These impacts will be short term for travelers because the area

where the solar array and gen-tie lines is potentially visible is very limited and their focus will be on the road ahead.

Due to the distant proximity to the Solar Components, and existing views of other utility infrastructure in the direction of the Solar Components from WSH-14, visual impacts from the Solar Components within the analysis area are anticipated to be negligible.

5.3 Glare Analysis Results

5.3.1 South Array Analysis 1 – First-Story Receptors

As part of South Array Analysis 1, 20 PV array areas for 21 first-story receptors (Glare Analysis Observation Points [OP]-1 through OP-21) and 11 proximal route receptors were analyzed from the height of a driver in a standard commuter vehicle along segments of Emigrant Springs Lane, Herin Lane (two sections), OR-206, I-97, Klondike Road, Medler Lane, N Klondike Road, Oehman Road, Old Wasco-Heppner Highway, and Webfoot Road. The SGHAT GlareGauge modeled the results for the Solar Components. The simulation predicted PV arrays 3, 4, and 10 will result in minor amounts of green glare to select sections of Emigrant Springs Lane, Herin Lane (1 and 2), Medler Lane, N Klondike Road, Oehman Road, and Webfoot Road, and for OP-4 through OP-11 and OP-14 through OP-16. Minor amounts of yellow glare were predicted for select sections of Medler Lane, N Klondike Road, and Webfoot Road and for OP-6. On average, glare was predicted to occur in September through March with a duration ranging from less than 10 minutes to less than 60 minutes per day. Predicted glare for all points will occur during intervals between 7:00 AM to 6:00 PM. A total of 1,561 hours of annual green glare and 92 hours of annual yellow glare were predicted in the model. Based on 12 hours of daylight, this equates to green glare approximately 35 percent of the time and yellow glare 2 percent of the time. Due to a low potential for temporary after-image, green glare is not expected to result in significant glare impacts. The amount of yellow is considered insignificant. In addition, this is a conservative prediction as the GlareGauge model does not account for varying ambient conditions (i.e., cloudy days, precipitation), atmospheric attenuation, screening due to existing vegetation or structures unless specified through obstruction modeling, and screening due to existing topography not located within the defined array layouts. As such, the predicted results are considered conservative and likely significantly lower than predicted.

5.3.2 South Array Analysis 2 – Second-Story Receptors

As part of South Array Analysis 2, 20 PV array areas for 21 second story receptors (OP-1 through OP-21) and 11 proximal route receptors were analyzed from the height of a driver in a typical tractor trailer along segments of Emigrant Springs Lane, Herin Lane (two sections), OR-206, I-97, Klondike Road, Medler Lane, N Klondike Road, Oehman Road, Old Wasco-Heppner Highway, and Webfoot Road. The SGHAT GlareGauge modeled the results for the Solar Components. The simulation predicted PV arrays 3, 4, and 10 will result in minor amounts of green glare to select sections of Emigrant Springs Lane, Herin Lane (1 and 2), Medler Lane, N Klondike Road, Oehman Road, and Webfoot Road, and for OPs 4 through 11 and 14 through 16. Minor amounts of yellow

glare were predicted for select sections of Medler Lane, N Klondike Road, and Webfoot Road and for OP-6. On average, glare was predicted to occur in September through March with a duration ranging from less than 10 minutes to less than 60 minutes per day. Predicted glare for all points would occur during intervals between 7:00 AM to 6:00 PM. A total of 1,569 hours of annual green glare and 94 hours of annual yellow glare were predicted in the model. Based on 12 hours of daylight, this equates to green glare approximately 36 percent of the time and yellow glare 2 percent of the time. Due to a low potential for temporary after-image, green glare is not expected to result in significant glare impacts. The amount of yellow is considered insignificant. In addition, this is a conservative prediction as the GlareGauge model does not account for varying ambient conditions (i.e., cloudy days, precipitation), atmospheric attenuation, screening due to existing vegetation or structures unless specified through obstruction modeling, and screening due to existing topography not located within the defined array layouts. As such, the predicted results are considered conservative and likely significantly lower than predicted.

5.3.3 South Array Analysis 3 – Federal Aviation Administration Receptors

As part of South Array Analysis 3, 20 PV Array Areas were analyzed for the two 2-mile final approach paths for the Wasco State Airport. Specifications for the runways were taken from the FAA Aeronautical Data resource database. A typical 30-degree maximum downward viewing angle and 50-degree maximum azimuthal viewing angle from the aircraft cockpit were included. SGHAT GlareGauge modeled the results for the Solar Components. The simulation predicted minor amounts of green glare along a specific section of the flightpath for Runway 25. Predicted glare for the flight path occurs from PV arrays 1 and 2, occurring in April to August with a duration of less than 15 minutes between the hours of 6:00 PM and 8:00 PM. A total of 16 hours of annual green glare and 16 hours of annual yellow glare were predicted in the model. Based on 12 hours of daylight, this equates to green glare and yellow glare approximately 0.4 percent of the time. This amount of green and yellow is considered insignificant. In addition, this is a conservative prediction as the GlareGauge model does not account for varying ambient conditions (i.e., cloudy days, precipitation), atmospheric attenuation, screening due to existing vegetation or structures unless specified through obstruction modeling, and screening due to existing topography not located within the defined array layouts. As such, the predicted results are considered conservative and likely significantly lower than predicted.

5.3.4 North Array Analysis 1 – First-Story Receptors

As part of North Array Analysis 1, 10 PV array areas for 21 first-story receptors (OP-1 through OP-21) and 11 proximal route receptors were analyzed from the height of a driver in a standard commuter vehicle along segments of Emigrant Springs Lane, Herin Lane (two sections), OR-206, I-97, Klondike Road, Medler Lane, N Klondike Road, Oehman Road, Old Wasco-Heppner Highway, and Webfoot Road. The SGHAT GlareGauge modeled the results for the Project. The simulation predicted PV arrays 22, 24, 26, and 30 will result in minor amounts of green glare to select sections of Herin Lane (1) and for OP-8 through OP-10. Minor amounts of yellow glare were predicted for

select sections of Herin Lane (1) and for OP-8. On average, glare was predicted to occur in November through February with a duration ranging from less than 10 minutes to less than 120 minutes per day. Predicted glare for all points would occur during intervals between 6:00 AM to 5:00 PM. A total of 205 hours of annual green glare and 153 hours of annual yellow glare were predicted in the model. Based on 12 hours of daylight, this equates to green glare approximately 5 percent of the time and yellow glare approximately 3 percent of the time. This amount of green and yellow is considered insignificant. In addition, this is a conservative prediction as the GlareGauge model does not account for varying ambient conditions (i.e., cloudy days, precipitation), atmospheric attenuation, screening due to existing vegetation or structures unless specified through obstruction modeling, and screening due to existing topography not located within the defined array layouts. As such, the predicted results are considered conservative and likely significantly lower than predicted.

5.3.5 North Array Analysis 2 – Second-Story Receptors

As part of North Array Analysis 2, 10 PV array areas for 21 second-story receptors (OP-1 through OP-21) and 11 proximal route receptors were analyzed from the height of a driver in a typical tractor trailer along segments of Emigrant Springs Lane, Herin Lane (two sections), OR-206, I-97, Klondike Road, Medler Lane, N Klondike Road, Oehman Road, Old Wasco-Heppner Highway, and Webfoot Road. The SGHAT GlareGauge modeled the results for the Solar Components. The simulation predicted PV arrays 22, 24, 26, and 30 will result in minor amounts of green glare to select sections of Herin Lane (1) and for OP-8 through OP-10. Minor amounts of yellow glare were predicted for select sections of Herin Lane (1) and for OP-8. On average, glare was predicted to occur in November through February with a duration ranging from less than 10 minutes to less than 120 minutes per day. Predicted glare for all points would occur during intervals between 6:00 AM to 5:00 PM. A total of 219 hours of annual green glare and 181 hours of annual yellow glare were predicted in the model. Based on 12 hours of daylight, this equates to green glare approximately 5 percent of the time and yellow glare approximately 4 percent of the time. This amount of green and yellow is considered insignificant. In addition, this is a conservative prediction as the GlareGauge model does not account for varying ambient conditions (i.e., cloudy days, precipitation), atmospheric attenuation, screening due to existing vegetation or structures unless specified through obstruction modeling, and screening due to existing topography not located within the defined array layouts. As such, the predicted results are considered conservative and likely significantly lower than predicted.

5.3.6 North Array Analysis 3 – FAA Receptors

As part of North Array Analysis 3, 10 PV array areas were analyzed for the two 2-mile final approach paths for the Wasco State Airport. Specifications for the runways were taken from the FAA's Aeronautical Data resource database. A typical 30-degree maximum downward viewing angle and 50-degree maximum azimuthal viewing angle from the aircraft cockpit were included.

SGHAT GlareGauge modeled the results for the Solar Components. No glare was predicted for the model.

5.3.7 Summary of Glare Analysis Results

No glare was predicted for the two 2-mile final approach paths for the Wasco State Airport. No instances of red glare are predicted for any OP or route segments. The Southern Arrays were predicted to result in an average annual amount of 1,565 hours of green and 51 hours of yellow glare. The Northern Arrays were predicted to result in an average annual amount of 212 hours of green and 167 hours of yellow glare. Based on 12 hours of daylight, this equates to green glare approximately 5 percent of the time and yellow glare approximately 4 percent of the time. This amount of green and yellow is considered insignificant. In addition, this is a conservative prediction as the GlareGauge model does not account for varying ambient conditions (i.e., cloudy days, precipitation), atmospheric attenuation, screening due to existing vegetation or structures unless specified through obstruction modeling, and screening due to existing topography not located within the defined array layouts. As such, the predicted results are considered conservative and likely significantly lower than predicted.

5.4 Plumes and Air Emissions

As a renewable energy resource, the changes proposed with RFA 4 will not generate any significant plumes or air emissions with the potential to result in significant visual impacts. Potential visual impacts due to dust created during construction will be largely prevented by following best management practices for erosion and sediment control as described in Exhibit I.

5.5 Conclusion

The Council previously imposed Site Certificate Condition 50, which includes measures to reduce potential visual impacts from construction equipment, to paint facility buildings and structures with low-reflectivity neutral colors to blend with the surrounding landscape, and to limit nighttime lighting. RFA 4 does not change the ability of the Certificate Holder to comply with the existing Site Certificate conditions imposed to reduce potential visual impacts. Therefore, the Council may conclude that the BCWF, as amended by RFA 4, will continue to comply with OAR 345-022-0080.

Predicted glare from the GlareGauge model is considered conservative as it does not account for varying ambient conditions (i.e., cloudy days, precipitation), atmospheric attenuation, screening due to existing vegetation or structures unless specified through obstruction modeling, and screening due to existing topography not located within the defined array layouts. As such, the predicted results are likely significantly higher than what would be experienced. In addition, proposed grading within the modeled PV array areas was not accounted for at this stage. A leveled topography within the defined PV array areas could result in less predicted glare.

6.0 Avoidance and Mitigation – OAR 345-021-0010(1)(r)(F)

OAR 345-021-0010(1)(r)(F) A description of the measures the applicant proposes to avoid, reduce or otherwise mitigate any potential significant adverse visual impacts;

Response: The changes at the amended BCWF under RFA 4 will have no significant adverse impacts on identified scenic resources. Therefore, no additional measures will be necessary to avoid or minimize impacts.

7.0 Monitoring – OAR 345-021-0010(1)(r)(F)

OAR 345-021-0010(1)(r)(G) The applicant's proposed monitoring program, if any, for impacts to scenic resources.

Response: No significant adverse impacts will occur to identified scenic resources from the amended BCWF; therefore, the Certificate Holder does not propose a monitoring program.

8.0 References

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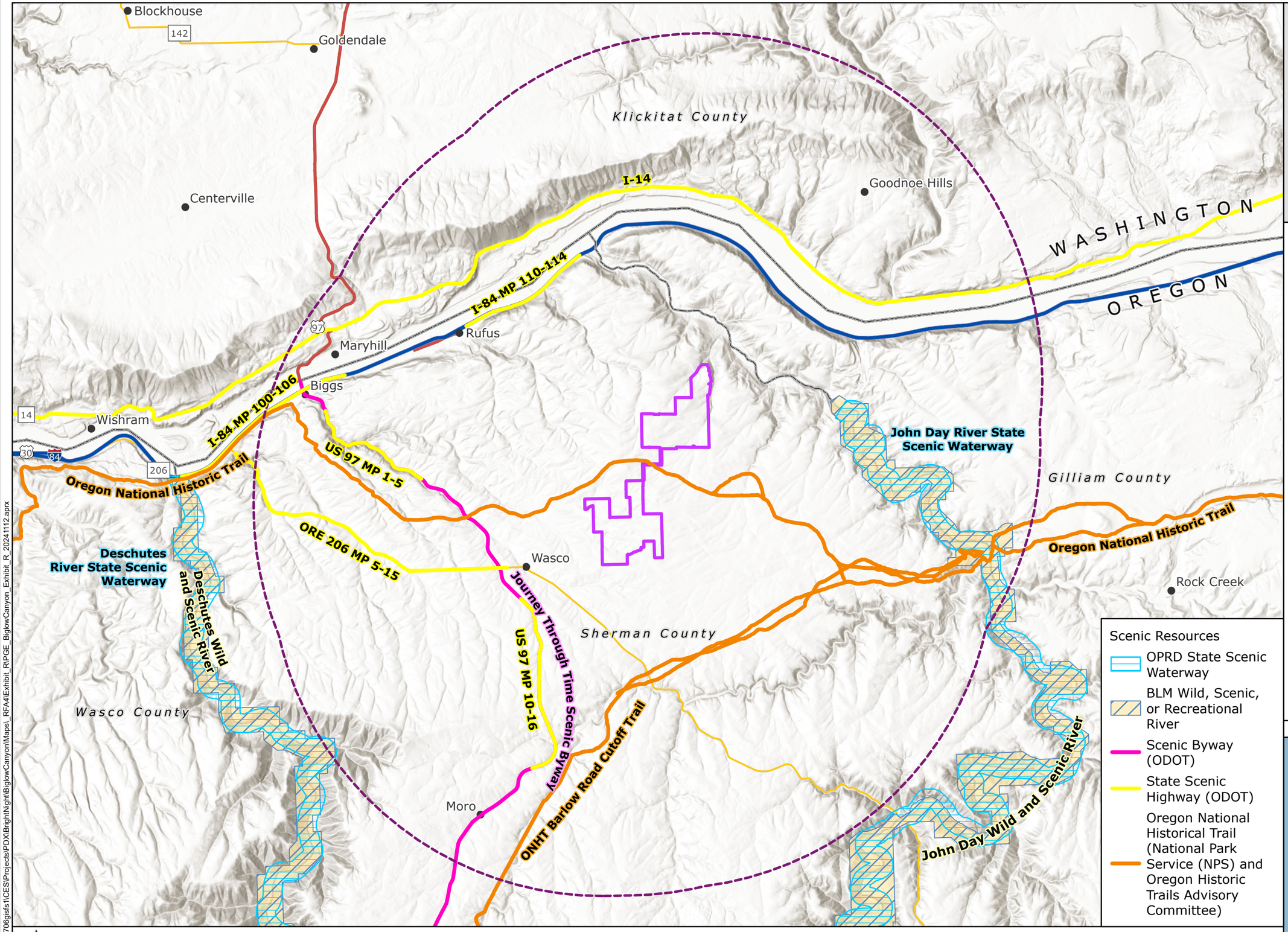
Figures

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Biglow Canyon Wind Farm Request for Amendment #4

Figure R-1
Scenic Resources

SHERMAN COUNTY, OR



Scenic Resources
- OPRD State Scenic Waterway
- BLM Wild, Scenic, or Recreational River
- Scenic Byway (ODOT)
- State Scenic Highway (ODOT)
- Oregon National Historical Trail (National Park Service (NPS) and Oregon Historic Trails Advisory Committee)

- Solar Micrositing Area
- Scenic Resources Analysis Area (10-mile buffer)
- State Boundary
- County Boundary
- City/Town
- Interstate Highway
- US Highway
- State Highway

1:175,000 WGS 1984 UTM Zone 10N 0 2.5 5 10 15 20 Miles

NOT FOR CONSTRUCTION

TETRA TECH PGE

Reference Map



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Biglow Canyon Wind Farm Request for Amendment #4

Figure R-2
Viewshed Analysis
Solar Array ZVI Map

SHERMAN COUNTY, OR

Blockhouse
142
Goldendale
Klickitat County
Centerville
I-14
Goodnoe Hills
WASHINGTON
OREGON
I-84 MP 110-114
97
Maryhill
Rufus
Biggs
I-84 MP 100-106
14
Wishram
30
84
206
Oregon National Historic Trail
US 97 MP 1-5
John Day River State Scenic Waterway
Gilliam County
Deschutes River State Scenic Waterway
Deschutes Wild and Scenic River
ORE 206 MP 5-15
Wasco
Journey Through Time Scenic Byway
US 97 MP 10-16
Sherman County
Rock Creek
Wasco County
ONHT Barlow Road Cutoff Trail
John Day Wild and Scenic River
Moro

Solar Micrositing Area
Scenic Resources Analysis Area (10-mile buffer)
Fenceline
State Boundary
County Boundary
City/Town
Interstate Highway
US Highway
State Highway

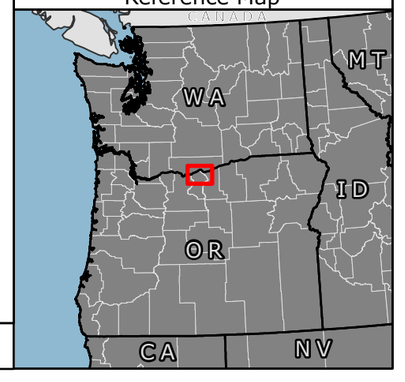
Viewshed*
Solar Array Not Visible
Solar Array Potentially Visible

*Potential solar array visibility calculated using a 10 meter bare-earth digital elevation model with panel heights of 15 feet (4.572 meters) and a viewing height of 6 feet (1.8 meters).

Scenic Resources
OPRD State Scenic Waterway
BLM Wild, Scenic, or Recreational River
Scenic Byway (ODOT)
State Scenic Highway (ODOT)
Oregon National Historical Trail (National Park Service (NPS) and Oregon Historic Trails Advisory Committee)

TETRA TECH
PGE

Reference Map



1:175,000
WGS 1984 UTM Zone 10N
0 2.5 5 10 15 20 Miles
NOT FOR CONSTRUCTION

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Biglow Canyon Wind Farm Request for Amendment #4

Figure R-3 Viewshed Analysis Gen-tie Lines ZVI Map

SHERMAN COUNTY, OR

Blockhouse
142
Goldendale
Klickitat County
Centerville
I-14
Goodnoe Hills
WASHINGTON
OREGON
I-84 MP 110-114
97
Maryhill
Rufus
Biggs
14
Wishram
I-84 MP 100-106
30
84
206
Oregon National Historic Trail
Journey Through Time Scenic Byway
US 97 MP 1-5
John Day River State Scenic Waterway
Gilliam County
Oregon National Historic Trail
ORE 206 MP 5-15
Wasco
Sherman County
Rock Creek
Deschutes River State Scenic Waterway
Deschutes Wild and Scenic River
US 97 MP 10-16
Wasco County
ONHT Barlow Road Cutoff Trail
Moro
John Day Wild and Scenic River

- Solar Micrositing Area
- Scenic Resources Analysis Area (10-mile buffer)
- State Boundary
- County Boundary
- City/Town
- Interstate Highway
- US Highway
- State Highway
- Northern Solar Area Gen-Tie Line (230 kV)
- Southern Solar Area Gen-Tie Line (230 kV)

Viewshed*

- Transmission Line Not Visible
- Transmission Line Potentially Visible

*Potential transmission line visibility calculated using a 10 meter bare-earth digital elevation model with gen-tie structure heights of 160 feet (48.768 meters) and a viewing height of 6 feet (1.8 meters).

Scenic Resources

- OPRD State Scenic Waterway
- BLM Wild, Scenic, or Recreational River
- Scenic Byway (ODOT)
- State Scenic Highway (ODOT)
- Oregon National Historical Trail (National Park Service (NPS) and Oregon Historic Trails Advisory Committee)

TETRA TECH

PGE

Reference Map

CANADA
MT
WA
ID
OR
CA
NV

1:175,000 WGS 1984 UTM Zone 10N 0 2.5 5 10 15 20 Miles

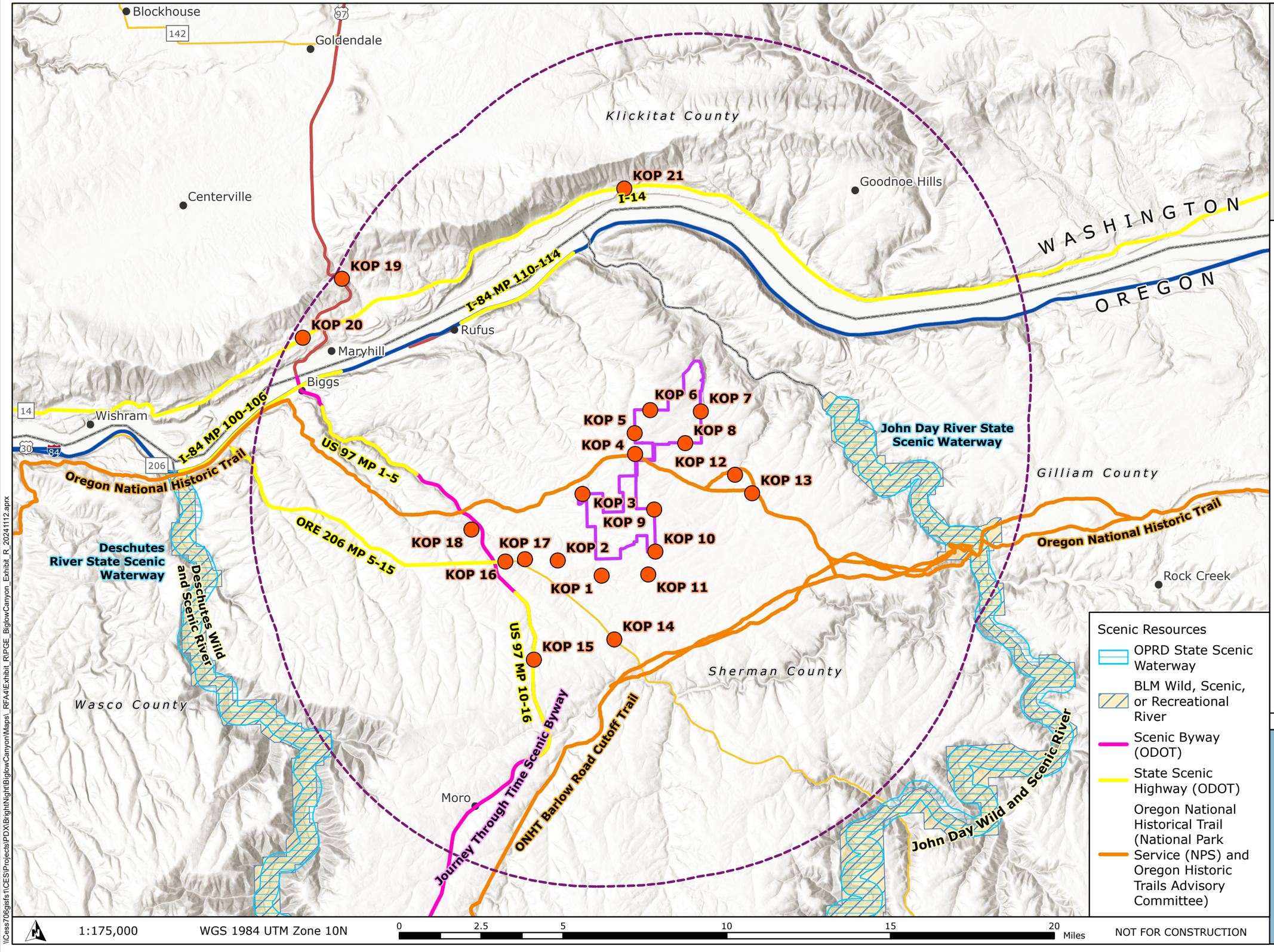
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Biglow Canyon Wind Farm Request for Amendment #4

Figure R-4
Key Observation Points

SHERMAN COUNTY, OR



- Solar Micrositing Area
- Scenic Resources Analysis Area (10-mile buffer)
- State Boundary
- County Boundary
- City/Town
- Interstate Highway
- US Highway
- State Highway
- Observation Points

Scenic Resources

- OPRD State Scenic Waterway
- BLM Wild, Scenic, or Recreational River
- Scenic Byway (ODOT)
- State Scenic Highway (ODOT)
- Oregon National Historical Trail (National Park Service (NPS) and Oregon Historic Trails Advisory Committee)

TETRA TECH

PGE

Reference Map



1:175,000 WGS 1984 UTM Zone 10N

0 2.5 5 10 15 20 Miles

NOT FOR CONSTRUCTION

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Attachment R-1. Land Use Management Plan Excerpts

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Sherman County Comprehensive Land Use Plan

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COMPREHENSIVE LAND USE PLAN

SHERMAN COUNTY OREGON

1994

UPDATED 2007

PHYSICAL CHARACTERISTICS -Section XI

Finding I. This Plan was drafted to conform with the State-wide planning goals relating to agricultural lands (goal 3); air, water and land resource quality (goal 6); areas subject to natural hazards (goal 7); and open spaces, scenic sites/areas and natural resources (goal 5).

Finding II. Sherman County's land resources are extensively used for agricultural purposes. 57% of all lands with the County are used for crop production. Approximately 42% of the County is rangeland with 37% of it producing useable forage.

Finding III. Soil capability classes II, IV, VI, VII and VIII exist within the County.

Finding IV. The County, historically and currently, enjoys a high quality physical environment. Its rivers, streams and air are relatively free from pollutants, with the exception of the waters of the John Day River which are frequently highly turbid, wind erosion reduces the quality of the land and air, whereas, water erosion can result in reduced land and water quality. The State of Oregon has enacted laws relating to land, water and air quality (ORS 450 and 468), as has the Federal government.

Finding V. To conform to the Federal requirements of The Clean Water Act, Public Law 95-217, the County Water Quality Committee has developed the Sediment Reduction Project Report. This report is an appraisal of the existing water quality problems, current efforts to reduce or control the problems and methods to achieve the

requirements of the law. The Sediment Reduction Project Report does reflect the existing sediment problems and efforts to control them. The method of program implementation provides for locally monitored compliance and, if necessary, ordinance enforcement.

Finding VI. Limited information is available relating to groundwater resources within the County.

Finding VII. Groundwater resources will continue to be the source of most of the domestic water supplies within the County.

Finding VIII. There are lands managed by the Bureau of Land Management within Sherman County, which may meet the review wilderness procedures and thus qualify for wilderness designation.

Finding IX. Natural hazards are primarily limited to those areas with cross-slopes greater than 40% and along waterways. The County is currently participating in the National Flood Insurance Program. The U.S. Department of Housing and Urban Development has identified specific flood zones within the County. However, there is danger of "flash flooding" in all streambeds and gullies.

Finding X. An adequate number of aggregate extraction sites exist within the County to satisfy future demands through the year 2027. A haul distance of greater than five miles for a major construction project is not practical.

Finding XI. Rock outcroppings, trees, the John Day River Canyon and the Deschutes River Canyon are all-important features of the County's landscape. In addition, the Oregon State Department of Transportation has designated certain segments of I-84, U.S. 97, ORE 206 and ORE 216 as Scenic Highways.

Listed below are the segments so designated.

Route #	**Hwy #**	**Milepost to Milepost**	
I-84	2	99.85 (Sherman/Wasco)	106.46
		110.10	114.23 (Sherman/Gilliam)
OR 216	290	8.30 (Sherman/Wasco)	11.00
OR 206	300	5.00	14.91 (Sherman/Gilliam)
US 97	42	0.50	5.00
		10.00	16.00
		22.00	27.00
		30.00	48.81 (Sherman/Wasco)

Finding XII. A diversity of fish and wildlife habitat types are available within the County and are utilized by an even greater number of fish and wildlife species. Grain production and cattle grazing when properly managed are consistent with wildlife and fisheries habitat preservation. The riparian vegetation adjacent to seeps, springs, streams and rivers within the County constitute a particularly valuable resource. Riparian vegetation also conserves soil resources and improves water quality and quantity. At the present time, 118 wildlife vegetative planting and 147 guzzler sites are in varying degrees of repair. The Oregon Department of Fish and Wildlife has established wildlife refuges: one-quarter mile wide along the entire eastern boundary of the County; north of the Union Pacific right-of-way along the Columbia River to the State-line along the entire northern boundary of the County; and any sandbar or island within or along the Deschutes River

from the Columbia River to a point one-half mile south of the US 30 Highway bridge.

Finding XIII. The citizens of the State passed a ballot measure, which was later, enacted into law (ORS 390.805 through 390.925), which designated the lands within one-quarter mile of the Deschutes and John Day Rivers bordering Sherman County to be within the Oregon State Scenic Waterway System. That portion of the John Day River has not been included.

Former Governor McCall officially nominated the Deschutes River for inclusion in the National system under Section 2 (a) of the Wild and Scenic Rivers Act (P.L.94-486). Numerous citizen and/or stock ranchers of the County have expressed opposition to the inclusion of the Deschutes and/or John Day Rivers to the National Wild and Scenic River System. Some of the stock ranchers believe such designation might limit their stock operations in the future.

Finding XIV. There are significant steelhead and trout species spawning areas within the Lower Deschutes. One laboratory study, A. J. Sutherland and D. G. Ogle - Effects of Jet Boats on Salmon, concluded that under certain specific circumstances the passage of jet boats over salmon eggs could result in fatality rates up to 40%. The operation of jet boats on the Deschutes does coincide with the steelhead and trout spawning, as well as, their egg incubation period. The operation of power boats on the Deschutes and John Day Rivers of those sections currently within the State Scenic Waterway System may negatively impact the natural resources which designation of the river to the system was intended to protect.

Flood Prone Area

Land identified by the Department of Housing and Urban Development as being subject to flooding. For specific locations, please refer to HUD flood hazard boundary map (a copy of these is on file at the Planning Office).

Oregon State Scenic Waterway

Lands within ¼ mile of the Deschutes and John Day Rivers designated in accordance with ORS 390.805 to 390.925 except that land that, in the Department of Transportation's judgement, does no affect the view from the waters within the scenic waterways.

Gravel

Surface mines utilized primarily for an aggregate extraction source.

Jasper

Surface mines utilized primarily for the extraction of lapidary stone.

Other

Miscellaneous types of surface mines including sand and/or any combination of other materials.

Urban Growth Boundary

The urbanizing limit for each of the incorporated cities. The boundary separates urban or urbanizable land from rural land. Urban type public facilities will be available within but will not be extended outside such boundaries.

Klickitat County Comprehensive Plan

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KLICKITAT COUNTY, WASHINGTON

COMPREHENSIVE PLAN
AUGUST 1977
AMENDED APRIL 1979

As Amended:

September 4, 1990
Roosevelt Community Subarea Plan

November 1991
Bingen/White Salmon Urban-exempt Area Plan

December 18, 1995
Husum/BZ Corner Sub-area Plan

December 26, 1995
Trout Lake Sub-Area Plan

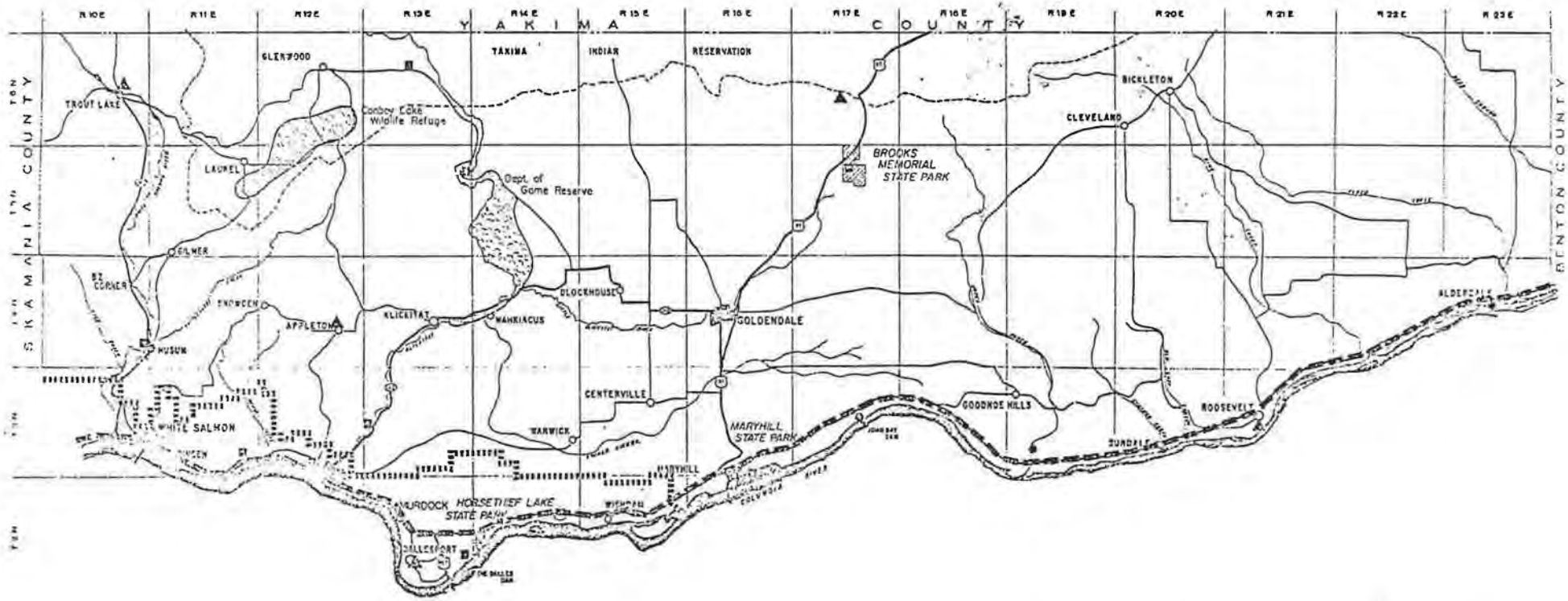
March 15, 2005
Natural Resources/Energy

November 10, 2009
Snowden Sub-Area Plan

September 3, 2013
Designation of Natural Resources Lands

October 1, 2013
Dallesport-Murdock Sub-Area Plan

THE INFORMATION PROVIDED HERE IS BELIEVED TO BE BOTH ACCURATE AND CURRENT. HOWEVER, THESE PAGES ARE ONLY COPIES OF, OR CONVERSIONS FROM, ORIGINAL DOCUMENTS. IF DISCREPANCIES, PLEASE REFER TO ORDINANCES PASSED.



LEGEND

- COUNTY
- STATE
- FEDERAL
- MAJOR PARK RESERVE
- SCENIC & RECREATION HIGHWAY [Act of 1967 and 1969]
- COLUMBIA GORGE COMMISSION

KLICKITAT COUNTY, WASHINGTON

Klickitat Regional Council, 1976

PUBLIC RECREATIONAL LANDS

KLICKITAT COUNTY COMPREHENSIVE PLAN

CONCERN:

ECONOMY/TOURISM

FINDINGS:

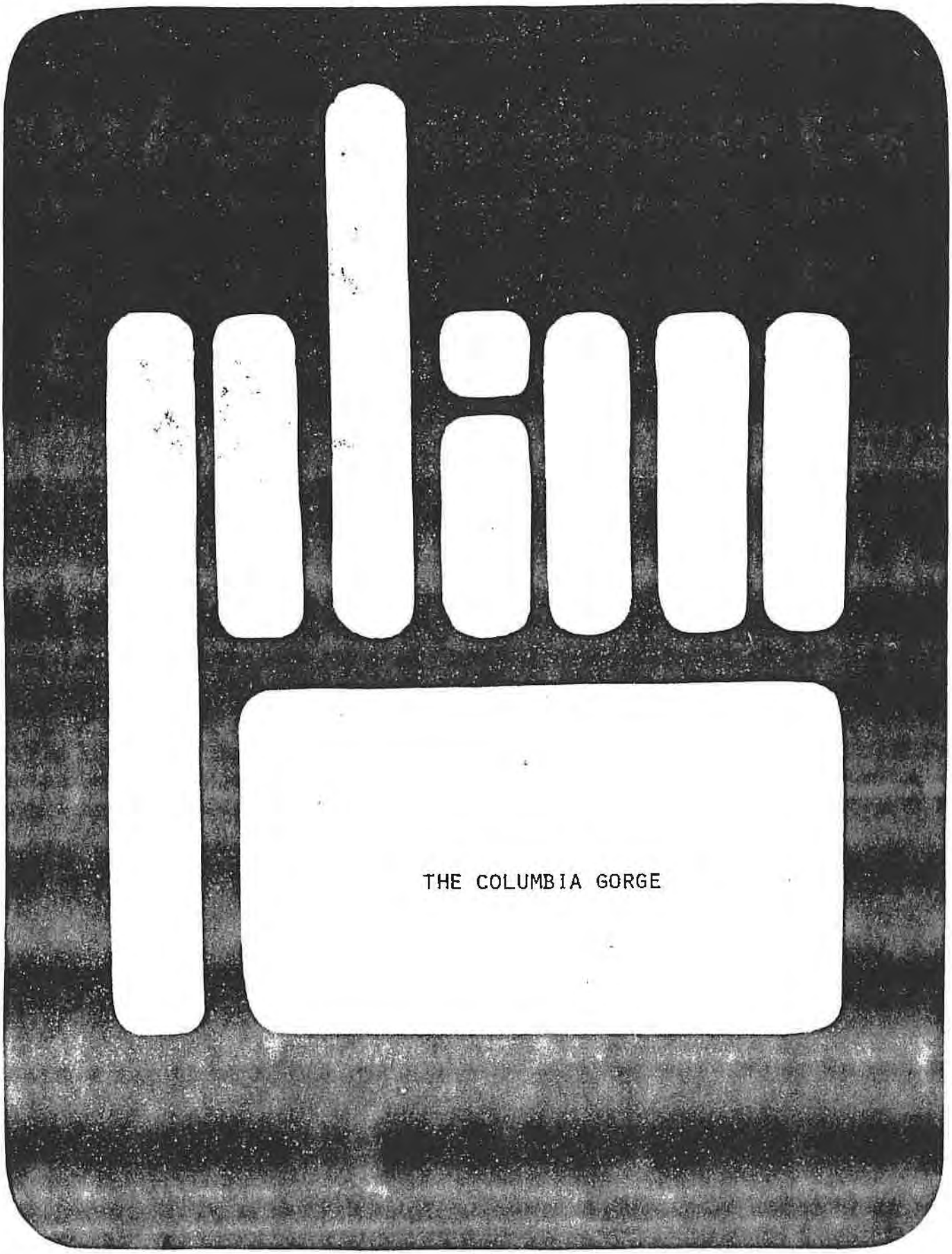
TOURISM IS A MULTIMILLION DOLLAR INDUSTRY AND KLICKITAT COUNTY HAS HISTORIC, CULTURAL, SCENIC, AND RECREATIONAL FEATURES WHICH CAN ATTRACT A SIZEABLE TOURIST TRADE. OTHER ELEMENTS OF THIS PLAN DOVETAIL WITH THE GOAL OF INCREASING TOURISM REVENUES. PRESERVATION OF FORESTLANDS AND PROTECTION OF FISH AND WILDLIFE HABITAT WILL PROTECT AND INCREASE OPPORTUNITIES FOR CAMPING, HIKING, HUNTING AND FISHING. AN EXPANDED COUNTY PARKS AND RECREATION PROGRAM IS CONSISTENT WITH IMPROVED TOURIST OPPORTUNITIES. THIS PROGRAM WOULD BE MORE ATTRACTIVE IF IT INCREASES PUBLIC ACCESS TO SHORELINES. PRESERVATION OF OPEN SPACE THROUGH CLUSTERED DEVELOPMENT AND USE OF SUCH TOOLS AS THE OPEN SPACE TAX ACT AND OTHER CONSERVATION MEASURES ALSO SUPPORT THIS GOAL. COMMERCIAL RECREATION FACILITIES PLAY AN IMPORTANT PART IN ATTRACTING AND RETAINING TOURISTS.

GOAL:

TO ENCOURAGE TOURISM IN KLICKITAT COUNTY.

POLICIES:

1. DEVELOPMENT OF PRIVATE AND PUBLIC PARKS, CAMPGROUNDS, RECREATIONAL AREAS AND OVERNIGHT FACILITIES SHOULD BE ENCOURAGED.
2. DEVELOPMENT OF TRANSIENT PUBLIC AND PRIVATE FACILITIES WHICH CAN BE USED BY MANY PEOPLE, SUCH AS RENTAL VACATION HOMES, TRAILER SPACES, OR RESORTS SHOULD BE GIVEN PREFERENCE OVER PERMANENT VACATION HOMES WHICH CAN BE USED ONLY BY THE OWNERS.
3. AN ACTION PROGRAM DESIGNED TO ENCOURAGE TOURISM SHOULD BE DEVELOPED AND MAINTAINED.
4. EFFORTS OF GROUPS SUCH AS THE MID-COLUMBIA VISITORS COUNCIL AND THE WASHINGTON STATE DEPARTMENT OF COMMERCE AND ECONOMIC DEVELOPMENT TO ENCOURAGE TOURISM GROWTH SHOULD BE RECOGNIZED


THE COLUMBIA GORGE

THE COLUMBIA GORGE

DUE TO THE IMPORTANCE OF THE COLUMBIA GORGE AREA OF KLICKITAT COUNTY TO TRANSPORTATION, INDUSTRY, COMMERCE, RECREATION AND THE QUALITY OF LIFE; AND DUE TO ITS FRAGILE ENVIRONMENT BALANCE, THAT PORTION OF THE RESOURCE MANAGEMENT PROGRAM FOR THE COLUMBIA GORGE PERTAINING TO KLICKITAT COUNTY, PREPARED BY THE WASHINGTON COLUMBIA GORGE COMMISSION, IS HEREBY ADOPTED AS PART OF THE COMPREHENSIVE PLAN OF KLICKITAT COUNTY, AND IS INCLUDED HEREIN.

FURTHER, THE COLUMBIA GORGE COMMISSION SHALL ROUTINELY REVIEW ALL MAJOR LAND USE PROPOSALS WITHIN THE GORGE AND SHALL SUBMIT ITS RECOMMENDATIONS AND COMMENTS TO THE APPROPRIATE BODY.

(THE FOLLOWING IS AN EXCERPT FROM A RESOURCE MANAGEMENT PROGRAM FOR THE COLUMBIA GORGE, BY THE WASHINGTON COLUMBIA RIVER GORGE COMMISSION.)

INTRODUCTION

THE COLUMBIA GORGE IS ONE OF THE MOST BEAUTIFUL AREAS IN THE COUNTRY. IT IS ALSO THE HOME OF THOUSANDS OF PEOPLE, A GREAT TRANSPORTATION CORRIDOR AND A MAJOR SOURCE OF ELECTRIC POWER. CAN THESE THINGS OCCUR IN ONE LOCATION WITHOUT DESTROYING THE NATURAL BEAUTY, AND AT THE SAME TIME, WITHOUT MAKING THE AREA ECONOMICALLY USELESS? WE THINK THEY CAN! BUT IT WILL TAKE GENUINE CONCERN AND CONSIDERATION TO MAKE THESE MANY ATTRIBUTES AND ACTIVITIES COMPATIBLE.

HIGHWAYS AND RAILROADS NOW PASS THROUGH THE GORGE - YET GREAT BEAUTY REMAINS. THE RIVER HAS BEEN HARNESSED FOR HYDROELECTRIC POWER - YET GREAT BEAUTY REMAINS. PEOPLE HAVE SETTLED IN SMALL COMMUNITIES ALONG THE RIVER - YET GREAT BEAUTY REMAINS. IT CAN BE SAID THAT THE GORGE SHOULD HAVE BEEN MADE A NATIONAL PARK, BUT IT WASN'T. IT CAN BE SAID THAT IT SHOULD HAVE BEEN MADE A PART OF A NATIONAL FOREST, BUT IT WASN'T. IT CAN BE SAID THAT THE COLUMBIA SHOULD HAVE BEEN LEFT FREE AND WILD, BUT IT WASN'T. ALL OF THESE THINGS HAVE CHANGED THE GORGE - HAVE DIMINISHED ITS NATURAL BEAUTY, BUT YET, GREAT BEAUTY REMAINS.

THE QUESTION IS, HOW MUCH MORE CAN HAPPEN WITHOUT RUINING THIS VERY SPECIAL PLACE. CLEARCUTTING CAN STRIP ITS FACE, AND ALREADY MUCH OF THE WOODED AREA IS SCRUB FOREST. ROCK MINING ON ITS FACE WILL LEAVE LASTING SCARS AND CHANGE ITS FEATURES. IT IS HARD TO BELIEVE THAT BEACON ROCK WAS NEARLY BLOWN TO BITS TO BE HAULED DOWN RIVER, BUT IT IS TRUE.

SOMEHOW A METHOD MUST BE FOUND SO THAT ECONOMIC GROWTH CAN OCCUR, BUT NOT AT THE COST OF THE GORGE ITSELF, FOR IF THIS HAPPENS, NOT ONLY WILL A GREAT OPPORTUNITY FOR DEVELOPMENT BE LOST IN THE TOURIST AND RECREATION INDUSTRY, THE CHARACTER OF THE AREA WHICH BROUGHT THE PEOPLE HERE TO LIVE WILL HAVE BEEN DESTROYED. SOME BALANCE BETWEEN NATURE AND GROWTH SEEMS A REASONABLE GOAL. IT IS TOWARD THIS END THAT THE COLUMBIA GORGE COMMISSIONS WERE CREATED BY THE STATE LEGISLATURES OF BOTH WASHINGTON AND OREGON. THE GORGE COMMISSIONS ARE CHARGED TO DEVELOP A RESOURCE MANAGEMENT CONCEPT WHICH RECOGNIZES BOTH NATURAL AND ECONOMIC VALUES. THIS CONCEPT IS THE SUBJECT OF THIS REPORT TO YOU.

PART 1 - PRESENT CONDITIONS, FACTORS AND INFLUENCES

IDENTIFYING THE GORGE

THERE ARE ALWAYS MANY PROBLEMS WHEN GROWTH AND DEVELOPMENT OCCUR IN AREAS OF GREAT NATURAL BEAUTY. THERE ARE ALMOST ALWAYS TWO SIDES TO EVERY ISSUE, PRESERVATION AND DEVELOPMENT. AS IS TRUE WITH MOST CONTINUING DISAGREEMENTS, THERE IS USUALLY SOME MERIT ON BOTH SIDES. FOR YEARS, THE GORGE COMMISSIONS' POLICY WAS TO TRY TO PROTECT THE GORGE FROM ALL FORMS OF DEVELOPMENT IN ORDER TO RETAIN AS MUCH OF THE PRESENT CHARACTER OF THE AREA AS POSSIBLE. FOR THE PAST FEW YEARS, THE GORGE COMMISSIONS HAVE BEEN INVOLVED IN AN INTENSIVE STUDY OF THE NATURAL ASSETS AND ECONOMIC POTENTIAL OF THE GORGE. THIS STUDY HAS MODIFIED THE COMMISSIONS' ATTITUDE TO THE POINT WHERE THEY RECOGNIZE THE FACT THAT DEVELOPMENT CAN AND WILL OCCUR WITHIN THE GORGE. HOWEVER, THE COMMISSIONS BELIEVE THAT NEW DEVELOPMENT SHOULD BE DONE IN A MANNER WHICH RESPECTS THE NATURAL ENVIRONMENT.

ONE OF THE FIRST THINGS DONE BY THE COMMISSIONS IN THEIR STUDY OF THE GORGE WAS TO IDENTIFY ITS BOUNDARIES SO THAT EVERYONE WOULD KNOW EXACTLY WHAT AREA IS INVOLVED. THERE WAS GENERAL AGREEMENT THAT THE GORGE EXTENDED FROM ABOUT CAPE HORN EAST TO AT LEAST THE WHITE SALMON-BINGEN AREA. THERE WAS ALSO CONSIDERABLE SUPPORT TO INCLUDE THE AREA EAST TO MILLER ISLAND. AFTER MUCH DISCUSSION AND PUBLIC COMMENT, IT WAS DECIDED THAT THE WASHINGTON GORGE SHOULD EXTEND FROM THE WEST END OF MILLER ISLAND WEST TO THE WEST END OF REED ISLAND. THESE BOUNDARIES CORRESPOND ROUGHLY TO WHAT HAS FOR YEARS BEEN CONSIDERED THE LIMITS OF THE OREGON GORGE.

HOW FAR BACK FROM THE RIVER DOES THE GORGE EXTEND? IT SHOULD INCLUDE WHAT CAN BE SEEN FROM STATE ROUTE 14, THE COLUMBIA RIVER OR INTERSTATE 80. MAPS AND PHOTOGRAPHS OF THE 84 MILE SECTION OF RIVER ON THE NORTH SIDE WERE STUDIED AND A SITE LINE WAS MAPPED TO SHOW WHAT COULD BE SEEN FROM THE THREE VIEWING LINES. THIS LINE VARIES FROM ONE-HALF MILE TO SEVEN MILES BACK FROM THE RIVER, DEPENDING ON THE TERRAIN. IT WAS THEN ADJUSTED TO THE NEAREST QUARTER SECTION LINE SO THAT IT COULD BE LEGALLY DESCRIBED. IN 1975, THE STATE LEGISLATURE AMENDED THE GORGE COMMISSION LAW TO INCLUDE A LEGAL DESCRIPTION OF THE GORGE IN THE STATE OF WASHINGTON.

SPECIAL QUALITIES OF THE GORGE

THE GREAT BEAUTY OF THE COLUMBIA GORGE IS WORTH SOME EFFORT FROM ALL OF US TO PROTECT IT AS GROWTH OCCURS. IF IT WERE AS REMOTE AS CRATER LAKE OR YELLOWSTONE, DEVELOPMENT WOULD BE MUCH LESS OF A THREAT. BUT IT ISN'T. THE GORGE IS LOCATED NEAR A RAPIDLY GROWING METROPOLITAN AREA AND IS ONE OF THE MOST IMPORTANT TRANSPORTATION ROUTES IN THE NORTHWEST. ITS LOCATION AND OUTSTANDING BEAUTY ARE THE RESULT OF A UNIQUE SET OF HISTORIC CIRCUMSTANCES

WHICH CREATED THIS VERY SPECIAL PLACE.

THE COLUMBIA GORGE WAS FORMED BY A COMBINATION OF NATURAL FORCES THAT CREATED A RIVER SO POWERFUL THAT IT FLOWS DIRECTLY THROUGH THE CASCADE MOUNTAIN RANGE. THESE FORCES INCLUDED VOLCANIC ACTION AND EARTH TREMORS WHICH SHIFTED AND DISTORTED THE EARTH'S SURFACE.

THE ULTIMATE CONTRIBUTING FORCE WAS THE MISSOULA FLOOD, WHICH POURED A 400 FOOT HIGH WALL OF WATER DOWN THE COURSE OF THE EARLY RIVER FOR A PERIOD OF THREE OR FOUR DAYS. THIS FLOOD WAS SO POWERFUL THAT IT SCOURED THE LANDSCAPE WITH ROOM-SIZED BOULDERS, AND CARRIED MATERIAL FROM IDAHO AND MONTANA AS FAR SOUTH AS THE PRESENT SITE OF EUGENE. OVER THE CENTURIES, EROSION AND WEATHERING HAVE PLAYED THEIR PARTS. ALL OF THESE FORCES TOGETHER WITH THE NATURAL FOREST COVER AND WILDLIFE HAVE PRODUCED THE WATER GAP WE KNOW TODAY AS THE COLUMBIA GORGE, A PHENOMENAL NATURAL MASTERPIECE.

THE BEAUTY OF THE GORGE OCCURS ON A GRAND SCALE USUALLY FOUND ONLY IN THE HIGHER REACHES OF MOUNTAIN RANGES. THE WALLS OF THE GORGE RISE AS HIGH AS 3,000 FEET ABOVE THE RIVER IN LESS THAN THREE MILES. SHEER ROCK PALLISADES EXPOSE MILLIONS OF YEARS OF GEOLOGIC HISTORY. LARGE MONOLITHS AND THE CASCADE SLIDE, THE LARGEST LANDSLIDE IN NORTH AMERICA, CONTRIBUTE TO THE GRANDEUR OF THE GORGE. DENSELY FORESTED SLOPES DRAINED BY RUSHING STREAMS PROVIDE AN UNUSUAL HABITAT FOR WILDLIFE.

SPECTACULAR SEASONAL CHANGES MAKE THE GORGE AN EVERCHANGING EXPERIENCE IN BEAUTY AND COLOR FROM THE ADVENT OF SPRING, WITH ITS ABUNDANCE OF WILDFLOWERS, THROUGH THE FALL WHEN BRILLIANT DECIDUOUS TREES ARE SET AGAINST A BACKGROUND OF DEEP GREEN FORESTS. EVEN WINTER IS AN EXPERIENCE. SNOW-CAPPED VOLCANOES STAND ABOVE RIDGES AND DARK CLIFFS ARRAYED WITH HUNDREDS OF MISTY WATERFALLS, SOME FROZEN AGAINST THE CANYON WALLS AWAITING SPRING. IN A MORE REMOTE LOCATION, GROWTH AND DEVELOPMENT WOULD BE MUCH LESS OF A PROBLEM. BUT - THE GORGE IS NOT REMOTE, AND ITS USES BY MAN ARE MANY. THIS THEN, IS THE NATURE OF OUR PROBLEM--HOW CAN THIS MAGNIFICENT AREA BE USED BY MAN WITHOUT LOSING ITS GREAT NATURAL BEAUTY?

<u>THERE IS ONLY ONE GORGE</u>

IT WAS STATED BRIEFLY EARLIER THAT THE WASHINGTON AND OREGON GORGE COMMISSIONS HAVE ESSENTIALLY THE SAME RESPONSIBILITIES. THE TWO COMMISSIONS HAVE WORKED CLOSELY TOGETHER IN THE STUDY OF THE GORGE OVER THE PAST SEVERAL YEARS. OBVIOUSLY, THE GORGE HAS TWO SIDES. THERE CAN BE NO "OREGON GORGE" AND NO "WASHINGTON GORGE". THERE CAN ONLY BE ONE COLUMBIA GORGE. HOWEVER, FOR REASONS RELATING TO DIFFERENT GOVERNMENTAL STRUCTURES IN TWO STATES, WE DO HAVE A GORGE COMMISSION FOR EACH STATE. FOR IDENTIFICATION, THE TERMS "SOUTH SIDE" AND "NORTH SIDE" MAY BE USED, BUT IT IS STILL ONE GORGE. IN THE DEVELOPMENT OF GOALS, PROGRAMS AND POLICIES, THE TWO COMMISSIONS REGARD THE GORGE AS A MUTUAL REGIONAL ASSET BEST

SERVED BY THE COMMISSIONS TO ASSURE A JOINT PROGRAM.

THE NEED FOR A MANAGEMENT PROGRAM

THERE ARE MANY PROBLEMS TO BE FACED WHEN DEALING WITH THE GORGE. HISTORICALLY, ECONOMIC VALUES OF THE GORGE HAVE BEEN RELATED TO TRANSPORTATION, ELECTRIC POWER AND LUMBERING. AT THE TIME OF LEWIS AND CLARK, THE GORGE WAS THE BEST NATURAL ROUTE TO THE PACIFIC NORTHWEST. IT STILL IS. IT HAS A NATURAL ROLE TO PLAY IN TRANSPORTATION AND ALWAYS WILL HAVE. THE GORGE HAS MAJOR HIGHWAYS AND RAILROADS ALONG EACH SIDE. THE RIVER ITSELF IS A BROAD HIGHWAY FOR BARGE TRAFFIC WHICH IS MINOR COMPARED TO ITS FUTURE AND THERE ARE MANY COMMUNITIES WITHIN THE GORGE.

IN ADDITION, THE GORGE HAS TWO MAJOR DAMS TOGETHER WITH THEIR HYDRO-ELECTRIC PLANTS AND NAVIGATION LOCKS. THESE DAMS BROUGHT ABOUT MAJOR CHANGES IN THE CHARACTER OF THE RIVER AND ITS SHORES. CURRENT WORK UNDERWAY AT BONNEVILLE DAM TO INCREASE POOL LEVELS FOR ADDED PEAKING POWER AND A SECOND HYDRO-ELECTRIC PLANT WILL AGAIN AFFECT THE SHORES AND MAJOR POWER TRANSMISSION LINES HAVE LEFT THEIR MARK ON THE FACE OF THE GORGE. THE LUMBER INDUSTRY HAS HELPED ESTABLISH SEVERAL SMALL COMMUNITIES WITHIN THE GORGE AND MADE IT POSSIBLE FOR PEOPLE TO LIVE AND WORK IN THIS BEAUTIFUL PLACE. AT THE SAME TIME, LOGGING HAS LEFT GEOMETRIC PATCHES ON THE FACE OF THE GORGE AS THE TIMBER IS HARVESTED. ALL OF THESE VARIOUS ACTIVITIES AMOUNT TO AN UNUSUAL SET OF CIRCUMSTANCES TO BE FOUND IN AN AREA OF SCENIC EXCELLENCE.

THE GROWTH OF THE PORTLAND-VANCOUVER AREA WILL BRING INCREASING PRESSURE FOR INDUSTRIAL AND HOUSING DEVELOPMENT IN THE GORGE. IT IS LIKELY THAT THE COMPLETION OF INTERSTATE 205 WILL SIMPLIFY ACCESS TO THE WEST END AND FURTHER STIMULATE DEVELOPMENT. WITHOUT EXERCISING SOME FORESIGHT, IT IS REASONABLE TO ASSUME THAT THE HISTORIC PATTERN OF SPRAWL AND BLIGHT WILL EXTEND INTO THE GORGE ITSELF. THIS IS NOT TO SAY THAT DEVELOPMENT SHOULD BE PROHIBITED. HOWEVER, NEW INDUSTRIAL OR HOUSING DEVELOPMENTS CAN BE DONE IN WAYS THAT RESPECT THE SCENIC VALUES OF THE AREA.

DWINDLING GRAVEL SOURCES IN THE METROPOLITAN AREA WILL ALSO BRING INCREASING PRESSURE ON THE GORGE AS A SOURCE OF ROCK BECAUSE OF NEARNESS TO THE CITY AND ECONOMICAL BARGE TRANSPORTATION.

WITH ALL OF THESE INTERESTS AND ACTIVITIES IN THE GORGE, THERE IS A NEED FOR SOME KIND OF MANAGEMENT PROGRAM WHICH RECOGNIZES THESE ACTIVITIES AND WHICH ALSO RECOGNIZES THE SCENIC VALUE AS AN ECONOMIC RESOURCE. THE GORGE COMMISSIONS HAVE THE RESPONSIBILITY FOR RECOMMENDING POLICIES, REGULATIONS AND LEGISLATION BUT THEY DO NOT HAVE THE POWER TO MAKE REGULATIONS OR TO ENFORCE THEM. THE COMMISSIONS DO NOT BELIEVE THAT THEY SHOULD HAVE THIS AUTHORITY BETWEEN THE PEOPLE AND THE LEGISLATURE. HOWEVER, THEY DO BELIEVE THAT THE AUTHORITY SHOULD BE IDENTIFIED AND PLACED WITHIN EXISTING GOVERNMENTAL AGENCIES. AS IT IS NOW, THE GORGE IS SOMEWHAT LIKE AN ORPHANED WAIF. EVERYONE UNDERSTANDS, EVERYONE IS

SORRY, BUT NO ONE REALLY WANTS TO GET INVOLVED.

DESPITE ITS UNIQUE AND SPECTACULAR QUALITIES, THE NORTH SIDE OF THE GORGE HAS BEEN IN THE SAME LEGAL CATEGORY AS THE MOST BARREN AND DESOLATE PART OF THE STATE. IF THIS CONTINUES, WE WILL REVERSE ECONOMIC VALUES AND CONVERT A STUNNING, NATURAL JEWEL INTO PIECES OF BROKEN GLASS. THE ULTIMATE CATASTROPHE IN THE HISTORY OF THE GORGE MAY BE WROUGHT BY MAN.

IN 1975 THE WASHINGTON STATE LEGISLATURE DECLARED THE GORGE TO BE AN AREA OF STATE-WIDE SIGNIFICANCE. ALTHOUGH THIS ACTION IS CERTAINLY A STEP IN THE RIGHT DIRECTION, IT DOES LITTLE TO SOLVE THE PROBLEMS OF THE GORGE. MOST EXISTING STATE REGULATIONS SAY THAT SCENIC VALUES SHOULD BE CONSIDERED, BUT GIVE THEM NO ECONOMIC VALUE. WHEN DECISIONS INVOLVING DIFFERENT RESOURCES MUST BE MADE, THEIR IMPACTS ON EACH OTHER AND THEIR LONG-TERM BENEFITS MUST BE CONSIDERED. HOWEVER, WHEN THE SPECIAL QUALITIES OF THE GORGE ARE NOT RECOGNIZED AS A NATURAL RESOURCE WITH ECONOMIC VALUE, THE QUALITY OF THE GORGE MUST BE THE LOSER EVERY TIME. THE SCENIC, GEOLOGIC AND HISTORIC QUALITIES OF THE GORGE WHICH ATTRACT MILLIONS OF VISITORS EACH YEAR MUST HAVE SOME ECONOMIC VALUE.

RECREATION, INCLUDING TOURISM, IS GENERALLY RANKED SECOND OR THIRD AMONG OUR NATION'S INDUSTRIES, AND IT WILL CONTINUE TO EXPAND AS THE COUNTRY GROWS. ALTHOUGH THE DEMANDS ON NATURAL RECREATIONAL RESOURCES WILL INCREASE, THE SUPPLY IS LIMITED. THE COLUMBIA GORGE IS ONE OF THE BEST REMAINING UNDERDEVELOPED RECREATIONAL AREAS IN THE NATION.

THE GORGE IS EASILY REACHED BY THE TRAVELER AND CONVENIENT TO METROPOLITAN PORTLAND. MANY OF THE VISITORS TO THE GORGE PLACE IT IN THE SAME CATEGORY AS YOSEMITE, CRATER LAKE OR MT. RAINIER. THE GORGE MERITS THIS COMPARISON BECAUSE OF ITS UNIQUE COMBINATION OF PLUNGING WATERFALLS, TOWERING CLIFFS AND MAJESTIC PANORAMAS TOGETHER WITH A WELCOME VARIETY OF RECREATIONAL OPPORTUNITIES. VISITORS CAN ENJOY AN AFTERNOON DRIVE IN THE GORGE OR SPEND A COUPLE OF WEEKS CAMPING OR "MOTELING" TO SAVOR ITS FULL QUALITY. THEY CAN VISIT A FISH HATCHERY, RETRACE THE STEPS OF LEWIS AND CLARK, TRY THEIR HAND AT LANDING A 30 LB. CHINOOK, OR CHALLENGE THE PACIFIC CREST TRAIL.

IN THEIR SEARCH TO SUPPLEMENT THE BASIC SEASONAL TIMBER ECONOMY, COMMUNITIES ALONG THE GORGE HAVE ONLY RECENTLY REALIZED THE ECONOMIC POTENTIAL OF AN INCREASING NUMBER OF VISITORS NOW ESTIMATED AT 4 TO 5 MILLION ANNUALLY. ACCORDINGLY, THEY HAVE FORMED THE MID-COLUMBIA VISITORS COUNCIL TO COORDINATE DEVELOPMENT OF FACILITIES, ACCOMMODATIONS AND INFORMATION WHICH WILL ENCOURAGE VISITORS TO VACATION IN THE GORGE, INSTEAD OF JUST DRIVE THROUGH.

PART II - A MANAGEMENT PROGRAM FOR THE FUTURE

THE MAJOR FACTORS

THERE APPEAR TO BE SOUND REASONS FOR BELIEVING THAT THE SCENIC QUALITIES OF THE GORGE ARE OF SIGNIFICANT ECONOMIC VALUE AS A NATURAL RESOURCE AND THAT BENEFITS FROM THIS RESOURCE DEPEND ON ITS QUALITY. UNTHINKING EXPLOITATION OF NATURAL RESOURCES WHICH HAS OCCURRED IN OTHER AREAS COULD DESTROY THIS LONG-TERM ECONOMIC BENEFIT TO THE PEOPLE IN THE GORGE. THIS IS THE PRINCIPAL CONCERN OF THE COLUMBIA GORGE COMMISSIONS. IT IS NOT TO STOP GROWTH, IT IS NOT TO STOP DEVELOPMENT, IT IS NOT TO STOP SURFACE MINING. BUT RATHER, IT IS TO HAVE THE NATURAL SCENIC, HISTORIC AND RECREATIONAL RESOURCES OF THE GORGE CONSIDERED AS LEGITIMATE ASSETS WITH REAL ECONOMIC VALUE. IT IS NOT A CASE OF WHETHER OR NOT DEVELOPMENT SHOULD OCCUR, IT IS A QUESTION OF WHERE OR HOW THESE THINGS SHOULD HAPPEN IN LIGHT OF THE NATURAL VALUES OF THE LOCATION INVOLVED.

WITH THIS PHILOSOPHY IN MIND, THE GORGE COMMISSIONS HAVE IDENTIFIED FIVE BASIC CONCERNS RELATING TO THE GORGE. THESE ARE FOREST MANAGEMENT, SURFACE MINING, HOUSING DEVELOPMENT, COMMERCIAL AND INDUSTRIAL DEVELOPMENT, AND ENHANCEMENT OF THE GORGE. EACH OF THESE ACTIVITIES CAN HAVE A STRONG INFLUENCE ON THIS BEAUTIFUL AND UNIQUE PLACE.

AS MENTIONED EARLIER, THE GORGE COMMISSIONS MAY RECOMMEND GUIDELINES AND ACTIONS TO OTHER AGENCIES BUT HAVE NO AUTHORITY TO IMPLEMENT THEM. THE GUIDELINES RECOMMENDED TO YOU IN THIS REPORT ARE THE RESULT OF NUMEROUS MEETINGS WITH PRIVATE AND PUBLIC INTEREST GROUPS AND INDIVIDUAL CITIZENS. THE FOLLOWING DISCUSSION OF THESE GUIDELINES IS A GENERAL STATEMENT OF THEIR PURPOSE AND CONTENT. THE COMPLETE GUIDELINES ARE INCLUDED IN PART III OF THIS REPORT.

FOREST MANAGEMENT

IN TERMS OF AREA INVOLVED, FOREST MANAGEMENT PROBABLY HAS THE STRONGEST IMPACT ON THE APPEARANCE OF THE GORGE. THE WOODED SLOPES ADD GREATLY TO ITS SCENIC BEAUTY. WITH SOME CARE AND FORETHOUGHT, THERE ARE WAYS BY WHICH TIMBER CAN BE HARVESTED WITHOUT DESTROYING THE SCENIC AND RECREATIONAL VALUES OF THE GORGE. PART OF THE PROBLEM IS THAT THERE ARE MANY METHODS OF HARVESTING AND REPLANTING TIMBER, EACH SUCCESSFUL IN DIFFERENT SITUATIONS, AND MANY OPINIONS AS TO WHAT THE BEST METHODS ARE. BASICALLY, THE PROCESSES RECOMMENDED HERE INVOLVE FOREST MANAGEMENT PRACTICES USED FOR SCENIC AREA IN GENERAL WITH SOME SPECIAL CONSIDERATIONS FOR MORE SENSITIVE AREAS OF THE GORGE.

CLEAR CUTTING IS THE MOST COMMON METHOD OF TIMBER HARVESTING IN THE PACIFIC NORTHWEST. BUT, EXTENSIVE CLEAR CUTTING CAN LEAVE LARGE BARREN PATCHES ON THE FACE OF THE GORGE. THE VISUAL IM-

PACT CAN BE GREATLY REDUCED IF CUT-OVER AREAS ARE SMALL AND IRREGULAR TO REFLECT THE NATURAL TERRAIN. THE NATURAL OVER-ALL APPEARANCE CAN BE MAINTAINED BETTER IF CLEAR-CUT AREAS ARE QUICKLY REFORESTED AND IF NO OTHER CLEAR CUTS ARE MADE NEARBY UNTIL A NEW COVER IS ESTABLISHED. OTHER METHODS OF HARVESTING SUCH AS SELECTIVE LOGGING SHOULD BE USED, ESPECIALLY IN THE FOREGROUND LANDS NEAR THE RIVER. BY REMOVING SOME OF THE TREES OVER A PERIOD OF TIME, THE FOREST COVER WILL HAVE A MORE NATURAL APPEARANCE. AREAS WHERE THIS KIND OF HARVESTING IS SUGGESTED AMOUNT TO A RELATIVELY SMALL PART OF THE FOREST LANDS IN THE GORGE.

THE IMPACT OF ROADS ON THE SCENIC VALUES OF THE GORGE SHOULD ALSO BE CONSIDERED. LOGGING ACCESS ROADS SHOULD AVOID LARGE CUTS AND FILLS WHICH WILL SCAR THE HILLSIDES AND THEY SHOULD BE DESIGNED SO THAT AS LITTLE AS POSSIBLE OF THE ROAD CAN BE SEEN FROM THE THREE VIEWING LINES. SPECIAL CARE SHOULD BE TAKEN WHEN LOGGING IS DONE ALONG HEAVILY TRAVELED ROADS. WHEREVER POSSIBLE, STRIPS OF TIMBER SHOULD BE LEFT ALONG THESE ROADS TO SCREEN THE CUT-OVER AREA. THESE COMMENTS ARE RELATED TO LOGGING ON SLOPES VISIBLE FROM THESE LINES. IN AREAS WHICH ARE NOT VISIBLE FROM THESE LINES, SUCH AS ON THE BACK SIDES OF SLOPES OR IN LOW-LYING AREAS, TIMBER HARVESTING CAN BE DONE AS USUAL. IN CASES WHERE SPECIAL HARVESTING TECHNIQUES WOULD PLACE SEVERE HARDSHIPS ON THESE OPERATIONS, EFFORTS SHOULD BE MADE TO EXCHANGE THESE LANDS FOR PUBLIC LANDS OF SIMILAR VALUE OR, IF NECESSARY, THE LANDS SHOULD BE PURCHASED TO PRESERVE THEIR OUTSTANDING SCENIC QUALITIES.

THIS GENERAL DESCRIPTION OF THE FOREST MANAGEMENT GUIDELINES INDICATES THE GORGE COMMISSIONS ARE NOT TRYING TO PREVENT TIMBER HARVESTING WITHIN THE GORGE. RATHER, THEY SUGGEST WAYS BY WHICH TIMBER CAN BE REFORESTED AND HARVESTED WHILE MAINTAINING MUCH OF THE SCENIC QUALITY. IN THIS WAY, THE LUMBER INDUSTRY IS AFFECTED AS LITTLE AS POSSIBLE WHILE THE RESOURCES FOR THE RECREATION AND TOURIST INDUSTRY ARE MAINTAINED.

SURFACE MINING

SURFACE MINING CAN ALSO HAVE A STRONG IMPACT ON THE VISUAL QUALITY OF THE GORGE. WE ARE LIVING IN AN AGE OF CONCRETE CONSTRUCTION AND PAVED ROADS, AND MOST OF THE PRODUCTS OF SURFACE MINING ARE ESSENTIAL TO BOTH. INCREASING NEEDS FOR CONSTRUCTION MATERIALS CAUSED BY LOCAL GROWTH AND GROWTH IN THE PORTLAND-VANCOUVER AREA WILL BRING GREATER PRESSURES ON THE GORGE AS A SOURCE OF THESE MATERIALS.

THE OREGON STATE DEPARTMENT OF GEOLOGY SAYS THAT ROCK SOURCES IN THE SILLAMETTE VALLEY WILL NOT MEET THE FUTURE NEEDS OF THE METROPOLITAN AREA. THE NEAREST ALTERNATE SOURCE IS THE COLUMBIA GORGE. WITH THE AVAILABILITY OF ECONOMICAL BARGE TRANSPORTATION, THIS IS A VERY REAL POSSIBILITY.

AGAIN, WE HAVE PRESSURE FOR THE USE OF A RESOURCE WHICH WILL AFFECT THE SCENIC QUALITIES OF THE GORGE. AGAIN, WITH SOME FORETHOUGHT THERE ARE WAYS BY WHICH ROCK CAN BE OBTAINED WITHOUT DESTROYING

THE SPECIAL QUALITIES OF THE GORGE.

THE GORGE COMMISSIONS ARE CONCERNED ABOUT SURFACE MINING OPERATIONS WHICH TAKE PLACE ON SLOPES VISIBLE FROM THE THREE VIEWING LINES. WITHIN THE GORGE THERE ARE MANY TALUS SLOPES WITH ROCK THAT HAS VERY GOOD CHARACTERISTICS FOR USE IN CONSTRUCTION. THESE SLOPES OFTEN OCCUR NEXT TO THE RIVER AND ARE EASY TO REMOVE. WITH THE HIGHWAY AT THE BOTTOM OF THE SLOPE, THEY ARE VERY ATTRACTIVE ROCK SOURCES NOW AND WILL BECOME MORE ATTRACTIVE IN THE FUTURE. UNFORTUNATELY, AS THE ROCK IS DISTURBED AND SLIDES OCCUR, LIGHTER COLORED, LESS WEATHERED ROCK IS EXPOSED AND LARGE SCARS APPEAR ON THE FACE OF THE GORGE. IT WILL TAKE MANY YEARS OF WEATHERING TO RESTORE THE NATURAL COLOR. IN ADDITION, REMOVAL OF THESE TALUS SLOPES WILL CHANGE THE FEATURES OF THE GORGE. WIND MOUNTAIN IS THE MOST OBVIOUS EXAMPLE OF THIS, AND IT DOESN'T TAKE TOO MUCH IMAGINATION TO EXPECT ITS SHAPE TO CHANGE IF SURFACE MINING INCREASES THERE OVER THE YEARS.

THERE ARE MANY ROCK SOURCES IN THE GORGE BESIDES THOSE ON THE SLOPES NEXT TO THE RIVER. NEW SURFACE MINING OPERATIONS SHOULD USE SOURCES ON THE BACK SIDES OF SLOPES, OR IN LOW-LYING AREAS THAT ARE SCREENED BY NATURAL FOREST COVER FROM THE THREE VIEWING PLACES. IN SOME CASES, SURFACE MINING OPERATIONS COULD BE SCREENED FROM VIEW BY EARTH BERMS AND LANDSCAPING. THEY CAN ALSO BE LOCATED IN INDUSTRIAL AREAS OR OTHER PLACES DESIGNATED FOR SUCH USE BY THE COUNTY'S COMPREHENSIVE PLAN.

THESE LOCATION CONSIDERATIONS ARE RECOMMENDED FOR NEW SURFACE MINING OPERATIONS ONLY AND EXISTING OPERATIONS SHOULD BE ALLOWED TO CONTINUE. BECAUSE ROCK REMOVAL HAS SUCH A DRAMATIC AND LONG-LASTING IMPACT ON THE GORGE, IT IS ALSO RECOMMENDED THAT PERMITS BE REQUIRED FOR ALL SURFACE MINING OPERATIONS, EXCEPT THOSE WHERE A PROPERTY OWNER IS USING THE MATERIAL ON THE SAME SITE. REGULATION OF SURFACE MINING SHOULD REMAIN WITH EXISTING AGENCIES AND AN INVENTORY OF POTENTIAL SURFACE MINING RESOURCES SHOULD BE PREPARED SO THAT ALTERNATE LOCATIONS WILL BE KNOWN. IF THESE KINDS OF ACTIONS ARE TAKEN, THESE RESOURCES OF THE GORGE CAN BE USED WITHOUT DESTROYING THE FACE OF THE GORGE ITSELF.

<u>COMMUNITY GROWTH AND COMMERCIAL DEVELOPMENTS</u>

HOUSING, COMMERCIAL AND INDUSTRIAL DEVELOPMENTS IN THE GORGE ARE RELATED TO THE GROWTH OF COMMUNITIES IN THE AREA. THERE ARE EIGHT POPULATION CENTERS AND FIVE SMALLER, MORE RURAL SETTLEMENTS ON THE NORTH SIDE OF THE GORGE. THESE VARIOUS POPULATED AREAS ARE SPACED ABOUT 3 TO 6 MILES APART ALONG THE HIGHWAY AND INCLUDE NEARLY ALL OF THIS KIND OF DEVELOPMENT IN THE GORGE. THIS SAME PATTERN HOLDS TRUE ON THE SOUTH SIDE BETWEEN HOOD RIVER AND THE DALLES. LARGE AREAS OF NATIONAL FOREST LANDS AND VERY STEEP SLOPES NEAR THE RIVER'S EDGE HAVE DISCOURAGED SETTLEMENTS WEST OF HOOD RIVER, WITH THE EXCEPTION OF CASCADE LOCKS.

THE PATTERN OF PEOPLE SETTLING IN SMALL CLUSTERS AND THE LOCATION OF MOST COMMERCIAL AND INDUSTRIAL DEVELOPMENTS IN THESE SAME PLACES HAS HELPED PRESERVE THE NATURAL BEAUTY OF THE GORGE. ALL IN ALL, ONLY A SMALL PART OF THE GORGE APPEARS TO BE DEVELOPED. THIS PATTERN SHOULD BE CONTINUED IN THE FUTURE. NEW COMMERCIAL USES SHOULD LOCATE IN OR NEAR POPULATION CENTERS UNLESS SOME UNUSUAL CIRCUMSTANCES JUSTIFIES A SPECIAL RECREATION FACILITY AT A PARTICULAR LOCATION.

INDUSTRIAL DEVELOPMENTS

NEW INDUSTRIAL DEVELOPMENT AND NEW KINDS OF INDUSTRIES SHOULD BE ENCOURAGED TO BROADEN THE ECONOMIC BASE OF THE AREA. THESE INDUSTRIES SHOULD ALSO LOCATE IN OR NEAR EXISTING CENTERS AS INDICATED BY LOCAL COMPREHENSIVE PLANS AND PORT EXPANSION PROGRAMS. NEW INDUSTRIAL USES SHOULD PROVIDE LANDSCAPING AND SCREENING ON THOSE PARTS OF THEIR SITES THAT CAN BE SEEN FROM THE HIGHWAYS OR THE RIVER. EXISTING INDUSTRIAL USES SHOULD BE ENCOURAGED TO IMPROVE THEIR APPEARANCE FROM BOTH THE HIGHWAY AND THE RIVER. IN SOME CASES, EFFORTS HAVE BEEN MADE TO DRESS UP THE APPEARANCE FROM THE HIGHWAY BUT NOTHING HAS BEEN DONE ABOUT THE SIDE FACING THE RIVER. THE GORGE HAS TWO SIDES AND BOTH SIDES SHOULD BE CONSIDERED.

ONE OTHER MORE OR LESS INDUSTRIAL USE IN THE GORGE IS THE TRANSMISSION OF ELECTRIC POWER. THESE LINES AND TOWERS MARCH ACROSS THE LANDSCAPE IN BARREN GEOMETRIC PATTERNS AND THE SECOND POWERHOUSE AT BONNEVILLE WILL ADD TO THEIR NUMBER. SPECIAL EFFORTS SHOULD BE MADE TO REDUCE THE IMPACT OF THESE FACILITIES ON THE VISUAL QUALITY OF THE GORGE. NEW LINES SHOULD BE BURIED WHENEVER POSSIBLE. PIGGYBACKING, PLACING TWO LINES IN ONE EASEMENT AND ESTABLISHING A LOW GROWING TREE COVER IN THE EASEMENTS WOULD ALL HELP TO REDUCE THEIR VISIBILITY.

HOUSING DEVELOPMENTS

OF ALL OF THE TYPES OF DEVELOPMENT, HOUSING HAS THE WIDEST VARIETY OF SITE POSSIBILITIES AND CAN BE BUILT NEARLY ANY PLACE IN THE GORGE. HOUSING WILL USE MANY TIMES AS MUCH LAND AND ADD MANY TIMES THE NUMBER OF STRUCTURES TO THE LANDSCAPE THAN WILL COMMERCIAL AND INDUSTRIAL USES COMBINED. IN ADDITION, GRADING, CLEARING, ROADS AND UTILITIES INCREASE THE VISUAL EFFECT OF HOUSING DEVELOPMENTS. FOR THESE REASONS, HOUSING WILL HAVE A GREATER LONG-RANGE IMPACT ON THE NATURAL SCENIC QUALITIES OF THE GORGE THAN ANY OTHER KIND OF DEVELOPMENT.

THE GORGE COMMISSIONS ARE NOT INTERESTED IN PREVENTING NEW HOUSING DEVELOPMENTS. BUT THEY ARE INTERESTED IN HAVING HOUSING AREAS DEVELOP IN WAYS WHICH WILL CAUSE THE LEAST CHANGE IN THE NATURAL QUALITIES OF THE GORGE. SINCE THE LANDSCAPE OF THE GORGE VARIES FROM PLACE TO PLACE, SO DO CONSIDERATIONS FOR HOUSING. THE LOCATION AND DISTRIBUTION OF HOUSING AREAS WILL BE DETERMINED BY LOCAL COMPREHENSIVE PLANS. THE GORGE COMMISSIONS ACCEPT THESE

PLANS BUT DO RECOMMEND SPECIAL GUIDELINES FOR DIFFERENT SECTIONS OF THE GORGE DEPENDING UPON CHANGES IN THE NATURAL CHARACTER.

AS MENTIONED EARLIER, THE PATTERN OF PEOPLE SETTLING IN SMALL CLUSTERS HAS HELPED PRESERVE THE NATURAL BEAUTY OF THE GORGE. CONTINUATION OF THIS PATTERN IN THE FUTURE, PARTICULARLY FOR SMALLER LOT RESIDENTIAL AREAS, WILL RETAIN THIS DESIRABLE DEVELOPMENT PATTERN. THE LACK OF STRIPS OF HOUSES ALONG BOTH SIDES OF THE HIGHWAY HAS DONE MUCH TO RETAIN THE NATURAL FEELING OF THE AREA. AS GROWTH OCCURS, STRANDS OF EXISTING TREES SHOULD BE PRESERVED ALONG BOTH THE HIGHWAY AND THE RIVER AS A SCREEN FOR HOUSING DEVELOPMENTS. IN WOODED AREAS, AS MANY TREES AS POSSIBLE SHOULD BE LEFT ON BUILDING SITES TO AVOID CLEARED PATCHES ON THE HILLSIDES. IN PLACES WHERE HOUSING IS DEVELOPED ALONG CLIFFS BY THE RIVER, HOUSES SHOULD BE KEPT A SHORT DISTANCE BACK FROM THE EDGE TO AVOID BUILDINGS LINING THE SKYLINE. IN ADDITION, THEY SHOULD BE LANDSCAPED AND SCREENED TO REDUCE THEIR IMPACT ON THE NATURAL SETTING. THESE THINGS CAN BE DONE WITHOUT HURTING THE VIEWS FROM THESE SITES.

IN AREAS WHERE LAND HAS BEEN CLEARED FOR AGRICULTURE OR CLEAR CUTTING, NEW HOUSING DEVELOPMENTS SHOULD INCLUDE TREES AND LANDSCAPING AT THE TIME OF DEVELOPMENT IN ORDER TO RESTORE A MORE NATURAL APPEARANCE. NEW STREETS AND ROADS SHOULD AVOID LARGE CUTS AND FILLS AND THEIR ALIGNMENTS SHOULD BE DESIGNED TO REDUCE THEIR VISIBILITY AS MUCH AS POSSIBLE. IF THESE KINDS OF THINGS ARE DONE, THE NATURAL QUALITIES AND LIVABILITY OF THE GORGE CAN BE MAINTAINED.

ENHANCEMENT OF THE GORGE

THE ENHANCEMENT OF THE GORGE CAN HAVE A STRONG INFLUENCE ON FUTURE RECREATION AND TOURIST ACTIVITIES. IT WILL TAKE A SUSTAINED EFFORT FROM BOTH PRIVATE AND PUBLIC INTEREST TO DEVELOP THE RECREATION POTENTIAL OF THE GORGE. THE MID-COLUMBIA VISITORS COUNCIL IS BEGINNING WORK NOW TO ENCOURAGE SOME OF THE FOUR TO FIVE MILLION YEARLY VISITORS TO VACATION HERE. THE GORGE COMMISSIONS WANT TO ENCOURAGE THIS KIND OF EFFORT AND TO ADD THEIR EFFORTS AS WELL. TOWARD THIS END, THE COMMISSIONS HAVE PREPARED A FAIRLY DETAILED SET OF ENHANCEMENT GUIDELINES WHICH INCLUDE PARTICIPATION BY LOCAL, STATE AND FEDERAL AGENCIES AND LOCAL ORGANIZATIONS. GENERALLY THESE GUIDELINES DEAL WITH THE LOCATION OF ADDITIONAL PARKS AND VIEWPOINTS; PLACES WHERE ROADSIDE TREES COULD BE THINNED TO IMPROVE VIEWS; IDENTIFICATION OF HISTORIC SITES AND POINTS OF INTEREST; AND THE IDENTIFICATION OF SPECIAL SCENIC AREAS. WITH THE EXCEPTION OF THE SPECIAL SCENIC AREAS, ELEMENTS OF THE ENHANCEMENT PROGRAM ARE SELF EXPLANATORY AND ARE SET FORTH IN THE GUIDELINES FOR DIFFERENT SEGMENTS OF THE GORGE.

THE SPECIAL SCENIC AREAS ARE FEATURES OF SUCH OUTSTANDING BEAUTY THAT THEIR PROTECTION IS NECESSARY FOR THE PRESERVATION OF THE CHARACTER OF THE GORGE. THESE FEATURES ARE MOUNTAINS, ROCK FACES OR VERY STEEP SLOPES WHERE SURFACE MINING, LOGGING OR DEVELOPMENT

WOULD STRONGLY AFFECT THE SCENIC QUALITY OF THE GORGE. SOME OF THESE AREAS SHOULD BE PROTECTED BY OUTRIGHT PURCHASE OF THE LAND OR BY PURCHASE OF DEVELOPMENT RIGHTS OR SCENIC EASEMENTS. SOME OF THIS LAND MAY BE OBTAINED BY TRADING FOR PUBLIC LAND NEARBY OR ELSEWHERE ON A LIKE-VALUE BASIS. SOME OF THE LAND IN SPECIAL SCENIC AREAS CAN BE PROTECTED BY SPECIAL USE CONSIDERATIONS THAT WOULD PERMIT AGRICULTURE BUT WOULD NOT PERMIT MINING OR COMMMERCIAL OR INDUSTRIAL USES.

THE PRECEDING DESCRIPTIONS OF GUIDEDLINES INDICATE IN A GENERAL WAY THE GORGE COMMISSION'S RECOMMENDATIONS FOR THE PROTECTION OF THE GORGE. THE LOCATION OF VARIOUS LAND USES WILL BE DETERMINED BY LOCAL COMPREHENSIVE PLANS OR MANAGEMENT PROGRAMS AND THIS IS AS IT SHOULD BE. THE GORGE COMMISSION'S GUIDELINES SIMPLY RECOMMEND SPECIAL TREATMENT OF VARIOUS USES TO MAKE THEM MORE COMPATIBLE WITH THE GREAT NATURAL BEAUTY OF THE AREA.

PLAN MAPS AND GORGE COMMISSION RECOMMENDATIONS

TO ILLUSTRATE THESE GUIDELINES A MAP HAS BEEN PREPARED WHICH SHOWS THE COMPREHENSIVE PLAN FOR KLICKITAT COUNTY GORGE AREA. THE LAND USE DESIGNATION PRECEDES THE COMMENTS REGARDING GORGE COMMISSION GUIDELINES. THE GORGE COMMISSION'S GUIDELINES ARE SHOWN AS NOTES WHICH REFER TO AREAS OUTLINED ON THE COMPOSITE PLAN. MANY OF THE GUIDELINES REPEAT AS SIMILAR CONDITIONS OCCUR ALONG THE GORGE. THE GUIDELINES THEN ARE NOT BASIC LAND-USE RECOMMENDATIONS. RATHER, THEY REPRESENT SPECIAL CONSIDERATIONS FOR VARIOUS LAND-USE AREAS PROPOSED BY LOCAL PLANS OR MANAGEMENT PROGRAMS.

PART III - COLUMBIA GORGE COMMISSION GUIDELINES

FOREST MANAGEMENT GUIDELINES

NATURAL BEAUTY AND A TIMBER HARVEST ARE BOTH IMPORTANT FACTORS IN THE FUTURE OF THE GORGE, AND A PROGRAM WHICH RECOGNIZES BOTH VALUES IS NECESSARY TO REALIZE LONG-RANGE BENEFITS FROM THIS RESOURCE. FOREST MANAGEMENT IS THE KEY TO SUCH A PROGRAM BECAUSE IT INCLUDES BOTH REFORESTATION TO MAINTAIN THE GREEN TREE COVER AND TECHNIQUES TO MINIMIZE THE ADVERSE EFFECTS OF HARVESTING TIMBER.

STEEP SLOPES, WINDS AND ICE STORMS MAKE SOME PLACES IN THE GORGE TOO SEVERE FOR IDEAL FOREST GROWTH. YET THE FORESTS HAVE CONTRIBUTED SIGNIFICANTLY TO GORGE ECONOMY.

UNFORTUNATELY, THE TIME FOR A TREE TO MATURE WAS OFTEN CONSIDERED TOO LONG FOR MUCH CONCERN ABOUT REFORESTING TO PRODUCE ANOTHER CROP. INSTEAD, THE TENDENCY WAS TO MOVE TO OTHER STANDS, WHICH SEEMED WITHOUT LIMIT. AS A RESULT, MORE OR LESS SCRUB GROWTH TOOK THE PLACE OF EVERGREENS, WHICH COULD HAVE BEEN REFORESTED STANDS READY, OR NEARLY READY, FOR HARVEST TODAY. THUS, LACK OF FOREST MANAGEMENT DEPRECIATED BOTH THE TIMBER AND SCENIC RESOURECES.

HOWEVER, THERE IS INCREASING CONVICTION BASED ON SEVERAL REALISTIC FACTORS THAT THE TIME MAY BE AT HAND TO TURN TO REFORESTATION. SOME OF THESE FACTORS ARE:

1. FORESTS ARE ESSENTIAL AND THEY ARE NOT UNLIMITED. TIMBER HARVEST EXCEEDS TIMBER GROWTH IN SOME AREAS, AND TREES MUST BE PLANTED TO HARVEST IN THE FUTURE TO PROVIDE FOR OUR FUTURE NEEDS.

2. WE MUST LEARN TO USE ALL FORMS OF ENERGY MORE COMPLETELY. FORESTS ARE STORED ENERGY.

3. MODERN SILVICULTURE HAS SHOWN THAT THE TIME FOR A TREE TO REACH USEFUL MATURITY CAN BE REDUCED AND THAT SUCCESSFUL REGENERATION CAN BE MADE MORE CERTAIN.

4. GREATER USE OF FOREST RESIDUE AND NEW ECONOMIC USES OF HARDWOOD CHIPS CAN HELP FINANCE LAND PREPARATION AND REFORESTATION.

5. STATE AND FEDERAL FUNDS TO ASSIST IN REFORESTATION ARE AVAILABLE THROUGH LOCAL USDA AND ASCS COMMITTEES.

THE "BIBLE" FOR FOREST MANAGEMENT IN THE STATE IS THE FOREST PRACTICES ACT, THE RESULT OF MUCH EFFORT, EXPERIENCE AND EXPERTISE. THIS ACT APPLIES TO THE WHOLE INDUSTRY AND THE WHOLE STATE BUT THE PROBLEMS OF THE GORGE AMOUNT TO ONLY A VERY SMALL PART OF EACH.

MOREOVER, THE LEGISLATIVE ACTION DESIGNATING A PORTION OF THE GORGE, TO BE AN AREA OF "STATE-WIDE SIGNIFICANCE" AND TO BE AMONG THE STATE'S MOST VALUABLE NATURAL RESOURCES OCCURRED AFTER RECENT REVISIONS TO THE FOREST PRACTICES ACT AND, THEREFORE, COULD NOT HAVE BEEN INCLUDED IN THESE REVISIONS.

BECAUSE OF THE PRECEDING FACTORS AND CONSIDERATIONS, THE GORGE COMMISSION IS RECOMMENDING SPECIAL FOREST MANAGEMENT GUIDELINES FOR APPLICATION IN THE COLUMBIA RIVER GORGE. THESE GUIDELINES WOULD APPLY TO ONLY THOSE AREAS INCLUDED IN THE DESCRIPTION SET FORTH IN SENATE BILL 2242 (1975) WHICH ARE VISIBLE FROM STATE ROUTE 14, THE COLUMBIA RIVER OR INTERSTATE 80 N. THEY ARE NOT INTENDED TO SUPPLANT OR SUBVERT THE FOREST PRACTICES ACT. THE FOREST MANAGEMENT GUIDELINES WHICH FOLLOW ARE INTENDED TO ENCOURAGE FOREST PRACTICES WHICH RECOGNIZE AND RESPECT THE VALUE OF BOTH THE FORESTRY RESOURCE AND THE GREAT NATURAL BEAUTY OF THE COLUMBIA GORGE.

1. REFORESTATION

   A. THAT REFORESTATION, AS A MUTUAL BENEFIT TO SCENIC AND TIMBER RESOURCES, BE A BASIC FACTOR IN THEIR COMPATIBLE MANAGEMENT AND IN MAINTENANCE OF A CONIFEROUS COVER FOR THE GORGE.

   B. THAT REFORESTATION IN THE GORGE BE DONE IN THE FIRST PLANTING SEASON AFTER HARVEST, IF POSSIBLE, AND BE ACCOMPLISHED IN STRICT COMPLIANCE WITH THE STATE FOREST PRACTICES ACT.

   C. THAT USE OF FOREST RESIDUES, OF LOW VALUE SPECIES, AND OF CHIPPING PROGRAMS RELATIVE TO POSSIBLE ECONOMIC AID IN REFORESTATION BE INVESTIGATED. THAT SUCH STANDS AS WELL ESTABLISHED ALDER OF GOOD QUALITY BE EVALUATED IN TERMS OF ALLOWING THE CROP TO MATURE FOR HARVEST, AND THEN CONVERTING TO CONIFERS.

   D. THAT ON CLEAR-CUT LANDS WHICH HAVE NOT RESPONDED TO PREVIOUS REFORESTATION EFFORT, SUCCESSIVE REFORESTATION BE DONE AFTER THREE YEARS FOR A REPLANTING EFFORT AND AFTER FIVE YEARS FOR NATURAL REGENERATION.

   E. THAT REFORESTATION BY REPLANTING BE DONE ONLY WITH NATIVE, WIND-HARDY PLANTS OF APPROPRIATE ZONE ORIGIN, THAT NURSERY PRODUCTION OF SUCH PLANTS FOR THE GORGE BE INCREASED, AND THAT THE SUCCESS OF A MEASURE OF SEEDING ALONG WITH REPLANTING BE EVALUATED.

2. TAX RELIEF.

   THAT AN ORGANIZED APPEAL BE DIRECTED TO THE STATE TIMBER TAX BOARD FOR A SPECIAL TAX ZONE WITHIN THE GORGE BECAUSE OF FIRE HAZARD, WINDS, AND ICE STORMS OCCURRING ABOUT EVERY THREE YEARS, AND BECAUSE OF GREATER COSTS OF

THE HEAVIER THAN NORMAL PLANTING AND THE MORE FREQUENT REPLANTINGS REQUIRED ON THE NORTH SLOPES OF THE GORGE.

3. HARVESTING.

A. THAT "SELECTIVE LOGGING" BE CONSIDERED AND USED AS A METHOD OF REFORESTATION, INCLUDING SUCH TECHNIQUES AS PRE-COMMERCIAL TRIMMING, SHELTER WOODS, SEED TREE RETENTION, ETC.

B. THAT PLANNED AND CONTROLLED CLEAR-CUTTING BE RECOGNIZED AS A USEFUL TECHNIQUE TO ASSIST FOREST REGENERATION AND SHOULD BE CONTINUED AS A FOREST MANAGEMENT TOOL, PROVIDED THAT:

(1) CLEAR CUTTING BE RESERVED FOR USEFULLY MATURE TIMBER, TO AREAS AFFECTED BY NATURAL DISASTERS SUCH AS WINDS, INFESTATIONS, STORMS AND FIRE, OR WHERE TERRAIN PRECLUDES OTHER OPERATIONS.

(2) VOLUNTARY GOALS TO BE SET FOR A CLEAR-CUT IN THE GORGE NORMALLY BE IN THE NEIGHBORHOOD OF 20 TO 25 ACRES OR LESS, BUT NOT TO EXCEED 40 ACRES (AREAS WITH STORM, FIRE OR INFESTATION DAMAGE TO BE EXCEPTED).

(3) IRREGULAR CUTTING LINES RELATED TO THE TERRAIN BE FOLLOWED WHEREVER POSSIBLE, AND APPROPRIATE LEAVE STRIPS BE EMPLOYED ALONG ROADS, STREAMS AND SKYLINES, UNLESS IDENTIFIABLE BLOW-DOWN DANGER PRECLUDES THIS PRACTICE.

C. THAT ROAD CONSTRUCTION, PARTICULARLY ACROSS HARVESTED AREAS BE MINIMIZED.

4. SILVICULTURE

THAT FOR ACCELERATED GROWTH AND GREATER YIELD, INFORMATIONAL PROGRAMS BE DEVELOPED AND MAINTAINED ON TECHNIQUES FOR THINNING, RODENT CONTROL, INFESTATION, PLANTING, CAPSULATED SEEDLINGS, NEW AND MORE PRODUCTIVE SPECIES, ETC.

5. FOREST FARM MANAGEMENT.

A. THAT THE DEPARTMENT OF NATURAL RESOURCES, WITH FUNDED AID, IF NECESSARY, IMPLEMENT THE FOREST FARM MANAGEMENT PROGRAM INTO AN AVAILABLE, CONSISTENT AND RELIABLE PLANNING VEHICLE FOR SERVICE TO WOODLANDS OWNERS RELATIVE TO GENERAL AND PARTICULAR PROBLEMS OF FOREST FARM MANAGEMENT.

B. THAT CONTACTS RELATIVE TO FUNDING BE ENCOURAGED

AND EXPEDITED BETWEEN THE WOODLANDS OWNER, THE AGRICULTURAL STABILIZATION AND CONSERVATION SERVICE AND THE U.S. DEPARTMENT OF AGRICULTURE, ESPECIALLY VIA THEIR LOCAL AGENCIES.

C. THAT SERIOUS CONSIDERATION BE GIVEN TO THE RELATIVE PRODUCTION AND ECONOMIC FEASIBILITIES OF INDIVIDUAL TREE MANAGEMENT AND AREA MANAGEMENT, PARTICULARLY ON SOME STANDS OWNED BY SMALL WOODLANDS OPERATORS.

6. DIFFERENT LAND USE.

A. THAT WHEN A DIFFERENT LAND USE IS PLANNED, THE PROPOSED PLAN BE EVALUATED FOR COMPLIANCE WITH COUNTY LAND USE AND COMPREHENSIVE PLANS AND WITH STATE GOALS, BEFORE THE TIMBER HARVESTING OPERATION COMMENCES.

B. THAT WORK ON AN APPROVED NEW-USE PLAN IN THE GORGE BE UNDERWAY WITHIN TWO YEARS OF HARVEST, WITH SUFFICIENT BOND POSTED TO REFOREST IF THE PROPOSED USE FAILS TO MATERIALIZE WITHIN THAT TIME.

7. SLASH BURNING.

THAT, IF SLASH MUST BE BURNED, REGULATIONS BE AMENDED TO PERMIT SUCH BURNING TO BE ACCOMPLISHED DURING THE SPRING AND FALL MONTHS. (THE PRESENT REGULATION INVOLVES EXTRA FIRE HAZARD FOR THE INDUSTRY AND CONTRIBUTES SIGNIFICANTLY TO A CONTINUOUS SMOKE POLLUTION OF THE GORGE DURING THE MONTHS OF ITS GREATEST PUBLIC USE.)

8. FEDERAL, STATE AND PRIVATE LANDS.

A. THAT MANAGEMENT OF FEDERAL LANDS WITHIN THE GORGE BE DIRECTED TO CREATION OF A SCENIC AREA UNDER CFR 294.1.

B. THAT STATE PLANS ADHERE TO THE DEPARTMENT OF NATURAL RESOURCES SCENIC MANAGEMENT PROGRAM.

C. THAT ALL PRIVATE LANDOWNERS BE ENCOURAGED AND ASSISTED BY FEDERAL AND STATE AGENCIES AND THE GORGE COMMISSION TO RETAIN BOTH THE SCENIC AND FOREST VALUES IN THE GORGE, PARTICULARLY IN AREAS VISIBLE FROM STATE ROUTE 14 AND HIGHWAY 80N.

9. SENATE BILL 2242. (PASSED BY LEGISLATURE AT 1975 SESSION.)

THAT IN REACHING FOREST MANAGEMENT DECISIONS, THE LEGISLATIVE INTENT OF SENATE BILL 2242 IN FINDING THE GORGE

TO BE "AMONG THE MOST VALUABLE OF THE STATE'S NATURAL RESOURCES" FOR ITS ESTHETIC QUALITIES BE AN IMPORTANT AND PARTICIPATING FACTOR.

SURFACE MINING GUIDELINES.

SURFACE MINING IN THE GORGE REFERS ALMOST EXCLUSIVELY TO THE REMOVAL OF ROCK, SAND, GRAVEL AND SOIL. WHEN CONSIDERING SURFACE MINING GUIDELINES FOR THE GORGE, WE MUST RECOGNIZE THAT WE ARE IN AN AGE OF CONCRETE CONSTRUCTION AND PAVED ROADS. SURFACE MINING IS BASIC TO EACH.

IT IS NECESSARY TO RECOGNIZE, TOO, THAT THE UNIQUE SCENIC QUALITY OF THE GORGE IS ALSO A NATURAL RESOURCE OF ECONOMIC IMPORTANCE. THIS IS TRUE BECAUSE OF ITS RELATION TO RECREATION, WHICH IS AN EXPANDING AND ALREADY LEADING INDUSTRY IN THIS COUNTRY...AND POSSIBLY OF MORE IMMEDIATE IMPORTANCE, BECAUSE OF ITS RELATION TO THE "QUALITY OF LIVING" WHICH IT BRINGS TO THE GORGE AND TO THE PROPERTY VALUES IT CREATES AND SUSTAINS.

SOME CONFLICT BETWEEN THESE TWO IMPORTANT RESOURCES IS VERY PROBABLE IN THE GORGE. THE PURPOSE OF THESE GUIDELINES IS TO ASSIST IN RESOLVING SUCH CONFLICT WITH CONSIDERATION FOR BOTH INTERESTS AND FOR THE GREATEST BENEFIT FOR THE PEOPLE.

THE FOLLOWING ARE RECOMMENDED GUIDELINES FOR SURFACE MINING WITHIN THE COLUMBIA RIVER GORGE:

1. THAT ALL SURFACE MINING PERMITS PRESENTLY IN EFFECT WITHIN THE GORGE BE CONTINUED IN EFFECT PURSUANT TO THEIR ORIGINAL TERMS AND CONDITIONS.

2. THAT FUTURE SURFACE MINING PERMITS FOR OPERATIONS WITHIN THE GORGE BE GRANTED:

   A. IF THE OPERATIONS ARE ON REVERSE SLOPES OR IN SCREENED SITES NOT VISIBLE FROM HIGHWAY 14 OR 80N, OR

   B. IF THE OPERATIONS ARE IN AREAS NOW DESIGNATED FOR INDUSTRIAL PURPOSES, OR

   C. IF THE OPERATIONS ARE CONDUCTED UNDER A RECLAMATION PLAN APPROVED BY THE COUNTY PLANNING COMMISSION AND THE COUNTY PLANNING DEPARTMENT AS BEING FULLY COMPATIBLE WITH THE COUNTY COMPREHENSIVE PLAN, BOTH AS TO ITS GOALS AND ITS TIME FRAME.

3. THAT ALL AUTHORITY PRESENTLY VESTED IN COUNTY AND CITY GOVERNMENTAL AND PLANNING AGENCIES RELATIVE TO SURFACE MINING BE RETAINED AND THAT THE RIGHT OF LOCAL CITIZENS TO HAVE THEIR VIEWS CONSIDERED BE A PART OF THE PERMIT PROCESS.

4. THAT THE SURFACE MINING ACT BE AMENDED TO PLACE ALL SURFACE MINING OPERATIONS WITHIN THE GORGE UNDER THE PERMIT SYSTEM, EXCEPT THAT, THE RIGHTS OF PRIVATE OWNERS TO MAKE ON-SITE USE OF ROCK, SAND, GRAVEL AND SOIL MINED ON THE PREMISES BE RETAINED AS PRESENTLY PROVIDED IN THE SURFACE MINING ACT OF 1970.

5. THAT AN INVENTORY OF ALTERNATE ROCK SITES BE COMPILED.

6. THAT THE REMOVAL OF ROCK BY STATE AND COUNTY HIGHWAY DEPARTMENTS FROM THE FACES OF THE GORGE BE RECOGNIZED AS NECESSARY AT TIMES FOR SUCH PURPOSES OF ALIGNMENT OF ROADS AND THE PUBLIC SAFETY, BUT NOT FOR SUCH PURPOSES AS A BORROW PIT.

7. THAT PROVISIONS BE MADE FOR THE STOCKPILING OF ROCK FOR EMERGENCY USE BY THE STATE AND COUNTY HIGHWAY DEPARTMENTS AND SUCH AGENCIES AS THE BURLINGTON-NORTHERN RAILROAD.

8. THAT THE SCENIC QUALITY OF THE GORGE WHICH HAS BEEN IDENTIFIED BY THE LEGISLATURE "TO BE AMONG THE MOST VALUABLE OF THE STATE'S NATURAL RESOURCES" BE CONSIDERED AS SUCH A RESOURCE BY STATE, COUNTY, LOCAL AND PRIVATE AGENCIES IN THEIR EVALUATIONS FOR APPROVAL OF PERMITS AND/OR VARIANCES.

HOUSING GUIDELINES

THE HOUSING GUIDELINES OF THIS PLAN DEAL WITH URBAN GROWTH IN THE COLUMBIA GORGE. THE LAND USE PATTERNS SHOWN ON THE MAP ARE ESSENTIALLY THOSE PROPOSED BY THE PLANS OF VARIOUS COUNTIES WITHIN THE GORGE. IT IS NOT THE INTENT OF THE GORGE COMMISSION TO SIGNIFICANTLY MODIFY EXISTING OR PROPOSED LAND-USE PATTERNS. RATHER, GORGE COMMISSION GUIDELINES RECOMMEND SPECIAL DEVELOPMENT STANDARDS TO ENCOURAGE METHODS OF DEVELOPMENT WHICH WILL MAKE FUTURE GROWTH MORE COMPATIBLE WITH THE NATURAL BEAUTY AND SCENIC VALUES OF THE GORGE.

1. FUTURE HOUSING CONCENTRATIONS SHOULD BE ENCOURAGED TO LOCATE IN EXISTING POPULATION CENTERS RATHER THAN AS STRIPS ALONG THE HIGHWAY.

2. THE LOCATION, DISTRIBUTION AND TYPE OF HOUSING WILL BE DETERMINED BY THE COMPREHENSIVE PLANS OF THE CITIES AND COUNTIES WITHIN THE GORGE.

3. THE FOLLOWING SPECIAL DEVELOPMENT CONSIDERATIONS ARE INTENDED TO MAKE FUTURE HOUSING DEVELOPMENTS MORE COMPATIBLE WITH THE NATURAL BEAUTY AND SCENIC VALUES OF THE GORGE. THEY DO NOT APPLY TO WHITE SALMON, BINGEN, LYLE, MURDOCK, DALLESPORT, WISHRAM, WHERE STANDARDS WILL BE DEVELOPED LOCALLY.

A. FROM THE WHITE SALMON RIVER TO THE CITY OF WHITE SALMON - KEEP DEVELOPMENT BACK SLIGHTLY FROM CLIFF AND PRESERVE TREES ON BUILDING SITES OR PLANT SCREENING.

B. IN ALL FOREST OR CONSERVANCY AREAS - PRESERVE TREES ON BUILDING SITES AS DEVELOPMENT OCCURS.

4. INSOFAR AS POSSIBLE, LOCATE AND ALIGN ROADS IN NEW HOUSING DEVELOPMENTS SO THAT THEY ARE SCREENED FROM SR-14, THE RIVER OR I-80.

5. WITHIN POPULATION CENTERS, THE APPEARANCE OF DEVELOPMENT ALONG SR-14 AND THE RIVER SHOULD BE AN IMPORTANT CONSIDERATION IN THE COMPREHENSIVE PLAN.

COMMERCIAL AND INDUSTRIAL GUIDELINES

THE COMMERCIAL AND INDUSTRIAL PATTERNS SHOWN ON THE MAP ARE ESSENTIALLY THOSE PROPOSED BY THE PLAN OF VARIOUS COUNTIES OR PORT DISTRICTS WITHIN THE GORGE. THE COLUMBIA GORGE IS ONE OF THE MOST BEAUTIFUL AREAS IN THE COUNTRY AND HAS A TREMENDOUS FUTURE POTENTIAL AS A TOURIST AND RECREATION AREA. IN FACT, RECREATION AND TOURISM MAY BECOME A LEADING INDUSTRY IN THE GORGE. IF THIS FUTURE POTENTIAL FOR ECONOMIC GROWTH IS TO BE REALIZED, EFFORTS MUST BE MADE TO INSURE THAT FUTURE FROWTH ENHANCES THE AREA. AT THE VERY LEAST, IT SHOULD NOT DETRACT FROM THE GORGE AS A DESIRABLE PLACE TO VISIT. THE VARIOUS RECOMMENDATIONS MADE FOR COMMERCIAL AND INDUSTRIAL AREAS ARE DIRECTED TOWARD THIS END.

1. FUTURE GENERAL COMMERCIAL DEVELOPMENTS SHOULD BE LOCATED IN POPULATION CENTERS.

2. COMMERCIAL DEVELOPMENTS SHOULD NOT BE PERMITTED TO FORM "STRIPS" ALONG HIGHWAYS OUTSIDE OF POPULATION CENTERS.

3. EXISTING ISOLATED COMMERCIAL USES OUTSIDE OF POPULATION CENTERS SHOULD NOT BE EXPANDED OTHER THAN FOR THE ENLARGEMENT OF THE PRESENT USE.

4. WITHIN POPULATION CENTERS, THE APPEARANCE OF DEVELOPMENT ALONG SR-14 AND THE RIVER SHOULD BE AN IMPORTANT CONSIDERATION WITHIN THE COMPREHENSIVE PLAN.

INDUSTRIAL GUIDELINES -

1. NEW INDUSTRIAL DEVELOPMENTS SHOULD BE LOCATED IN OR NEAR POPULATION CENTERS.

2. LOCATION AND TYPES OF INDUSTRIAL DEVELOPMENT WILL BE DETERMINED BY THE COMPREHENSIVE PLANS OF CITIES AND COUNTIES AND PLANS OF PORT DISTRICTS WITHIN THE GORGE.

3. THE FOLLOWING SPECIAL DEVELOPMENT CONSIDERATIONS ARE INTENDED TO MAKE INDUSTRIAL USES MORE COMPATIBLE WITH THE NATURAL BEAUTY AND SCENIC VALUES OF THE GORGE.

   A. ALL NEW INDUSTRIAL DEVELOPMENTS ADJACENT TO THE RIVER OR SR-14 SHOULD BE LANDSCAPED AND SCREENED FROM THESE ROUTES.

   B. EFFORTS SHOULD BE MADE TO ADD LANDSCAPING AND SCREENING TO ALL EXISTING INDUSTRIAL USES FRONTING ON SR-14 OR THE RIVER.

   C. EFFORTS SHOULD BE MADE TO UPGRADE THE APPEARANCE OF INDUSTRIAL BUILDINGS AND FACILITIES THROUGHOUT THE GORGE.

4. WITHIN POPULATION CENTERS, THE APPEARANCE OF DEVELOPMENT ALONG SR-14 AND THE RIVER SHOULD HAVE AN IMPORTANT CONSIDERATION IN THE COMPREHENSIVE PLAN.

5. INDUSTRIAL DEVELOPMENTS IN THE GORGE AREA SHOULD BE LOCATED IN OR NEAR THE FOLLOWING PLACES:

BINGEN-WHITE SALMON	WISHRAM
DALLESPORT	ROOSEVELT
LYLE (LIGHT INDUSTRY)	THE CLIFFS AREA

ENHANCEMENT GUIDELINES

THE OBJECTIVE OF "ENHANCEMENT OF THE GORGE" IS TO MAKE THE GORGE EXPERIENCE MORE INFORMATIVE AND ENJOYABLE WHETHER IT IS FOR A FEW HOURS OR FOR A LIFETIME. ITEMS SUCH AS THE FOLLOWING NEED IDENTIFICATION:

VISTA POINTS
PICNIC AND REST AREAS
HISTORICAL, SCENIC AND GEOLOGICAL MARKERS
PARKS
HISTORICAL SITES
GEOLOGIC FEATURES
ACCESS TO RIVER
SPECIAL SCENIC AREAS

TO ACHIEVE THIS OBJECTIVE, THE INTENT OF THIS PLAN IS TO ENCOURAGE THE IDENTIFICATION, DEVELOPMENT AND INCREASED USE OF THE SCENIC, HISTORIC AND GEOLOGIC ASSETS OF THE GORGE FOR RECREATIONAL PURPOSES.

THE ENHANCEMENT GUIDELINES WERE PREPARED IN COOPERATION WITH COUNTY PARK BOARDS AND HISTORICAL SOCIETIES AND INCLUDE A COMPREHENSIVE LIST OF APPROPRIATE SITES AND FEATURES IN KLICKITAT COUNTY. EACH ITEM ON THE LIST IS FOLLOWED BY A BRIEF RECOMMENDATION FOR ACTION FOR THE LONG-RANGE ENHANCEMENT OF THE GORGE.

THE IMPLEMENTATION OF THIS PROGRAM WILL COME FROM FUTURE FUNDING OF

VARIOUS KINDS AND FROM PUBLIC SUPPORT. THE ENHANCEMENT OF THE GORGE IS NOT AN ISOLATED CONCEPT BECAUSE:

1. IT AGREES WITH THE RECREATIONAL, CULTURAL AND EDUCATION CONCEPT UNDER DEVELOPMENT ALONG THE COLUMBIA RIVER FROM THE CANADIAN BORDER TO THE SEA BY THE U.S. ARMY CORPS OF ENGINEERS, THE PACIFIC NORTHWEST RIVER BASINS COMMISSION AND CERTAIN PUBLIC UTILITY DISTRICTS.

2. IT IS CONSISTENT WITH CORPS PLANS FOR THE BONNEVILLE POOL.

3. IT SUPPORTS PLANS OF THE MID-COLUMBIA VISITORS COUNCIL TO DEVELOP A RECREATIONAL ECONOMY IN THE MID-COLUMBIA WITH ASSISTANCE FROM THE DEPARTMENT OF COMMERCE AND ECONOMIC DEVELOPMENT DISTRICT.

4. IT HAS BEEN DISCUSSED WITH VARIOUS STATE AGENCIES WHICH MAY BE INVOLVED.

THE LIST OF SITES IS LENGTHY AND THE ASSISTANCE OF VARIOUS COUNTIES WILL BE NECESSARY TO DEVELOP PRIORITIES TO EXPEDITE IMPLEMENTATION. WITH THE EXCEPTION OF THE SPECIAL SCENIC AREAS, ELEMENTS OF THE ENHANCEMENT PROGRAM ARE SELF-EXPLANATORY AND ARE LISTED FOR DIFFERENT SEGMENTS OF THE GORGE.

THE SPECIAL SCENIC AREAS ARE FEATURES OF SUCH OUTSTANDING BEAUTY THAT THEIR PROTECTION IS NECESSARY FOR THE PROTECTION OF THE CHARACTER OF THE GORGE. THESE FEATURES ARE MOUNTAINS, ROCK FACES OR VERY STEEP SLOPES WHERE SURFACE MINING, LOGGING OR DEVELOPMENT WOULD STRONGLY AFFECT THE SCENIC QUALITY OF THE GORGE. SOME OF THESE AREAS SHOULD BE PROTECTED BY OUTRIGHT PURCHASE OF THE LAND OR BY PURCHASE OF DEVELOPMENT RIGHTS OR SCENIC EASEMENTS. SOME OF THIS LAND MAY BE OBTAINED BY TRADING FOR PUBLIC LAND NEARBY OR ELSEWHERE ON A LIKE-VALUE BASIS. SOME OF THE LAND IN SPECIAL SCENIC AREAS IS ALREADY PUBLICLY OWNED. OTHER SPECIAL SCENIC AREAS CAN BE PROTECTED BY SPECIAL USE CONSIDERATIONS THAT WOULD PERMIT AGRICULTURE BUT WOULD NOT PERMIT MINING OR COMMERCIAL OR INDUSTRIAL USES, EXCEPT UNDER SPECIAL CIRCUMSTANCES.

<u>BINGEN-WHITE SALMON</u>. HISTORICAL MARKER: RELATION TO BINGEN-ON-THE-RHINE AND TO THE BAVARIAN THEME; EARLY PORT; JOSLYN HOME SITE, THE FIRST FARM IN KLICKITAT COUNTY. OUTDOOR AREA MAP: GATEWAY TO MT. ADAMS RECREATIONAL AREA, LOCATION OF MARINA AND LOCAL PARKS.

<u>ROWLAND LAKE (DUBOIS LAKE)</u>. MUCH USED FISHING AND PICNIC SITE. UPGRADE RESTROOM AND PICNIC FACILITIES. PROVIDE AREA INFORMATIONAL MARKER: BALCH CEMETERY, PRE-HISTORIC STONE FENCES, GEOLOGICAL AREA WITH BINGEN ANTICLINE AND MOSIER SYNCLINE.

<u>CHAMBERLAIN LAKE REST AREA</u>. PROVIDE INFORMATIONAL MARKER RELATING TO MEMALOOSE ISLAND, ANCIENT INDIAN BURIAL GROUNDS.

LYLE. ACT ON THE "PARK FOR LYLE" CONCEPT. HISTORICAL MARKER RELATING TO LYLE. INFORMATIONAL MARKER RELATING TO KLICKITAT RIVER AND CANYON.

MURDOCK-SMITHVILLE-DALLESPORT. HISTORICAL MARKER FOR FIRST COUNTY SEAT (ROCKLAND) AND FIRST SCHOOL. INFORMATIONAL MARKER FOR THE DALLES DAM, SPEARFISH LAKE, U.S. CORPS SPEARFISH PARK, KLICKITAT COUNTY PORT DISTRICT INDUSTRIAL PARK.

HORSETHIEF STATE PARK. INFORMATIONAL MARKER RELATIVE TO PETROGLYPHS, PETROGRAPHS AND ARCHEOLOGICAL IMPORTANCE OF AREA.

AVERY AND BROWN'S ISLAND. EXPANSION OF FACILITIES AND RECREATIONAL USE AT AVERY. TIME FOR LOCAL INPUT INTO RECREATIONAL USE OF BROWN'S ISLAND BY CORPS.

WISHRAM. HISTORICAL MARKER ABOUT THIS EARLY AND STILL BUSY RAILROAD TOWN WHICH HAS RETAINED MANY OF ITS EARLY QUALITIES.

IT IS ALSO RECOMMENDED THAT:

1. ALL MARKERS BE OF THE SAME DESIGN AND OF SIMILAR SIZE. (ONE SUGGESTION: TWO SUPPORT POSTS ABOUT 10" IN DIAMETER, FACE 2" THICK WITH LETTERS ROUTED OUT AND PAINTED.)

2. ONE OR MORE GAZEBO TYPE STRUCTURES BE CONSTRUCTED TO JOIN THE VARIOUS ELEMENTS INTO A MORE COMPLETE PICTURE OF THE GORGE OR OF SEGMENTS OF IT.

IMPLEMENTATION

STATE LEGISLATION PROPOSES IMPLEMENTATION OF A GORGE COMMISSION MANAGEMENT PROGRAM BY LOCAL GOVERNMENTS AND EXISTING STATE AGENCIES. BECAUSE OF THIS, IMPLEMENTATION IS NOT THE RESPONSIBILITY OF THE GORGE COMMISSION AND NOT A PART OF THIS PROGRAM. HOWEVER, LOCAL AND STATE AGENCIES WERE INVOLVED IN DEVELOPING THE GORGE PROGRAM AND IMPLEMENTATION WAS DISCUSSED CONCURRENTLY WITH THE GUIDELINES.

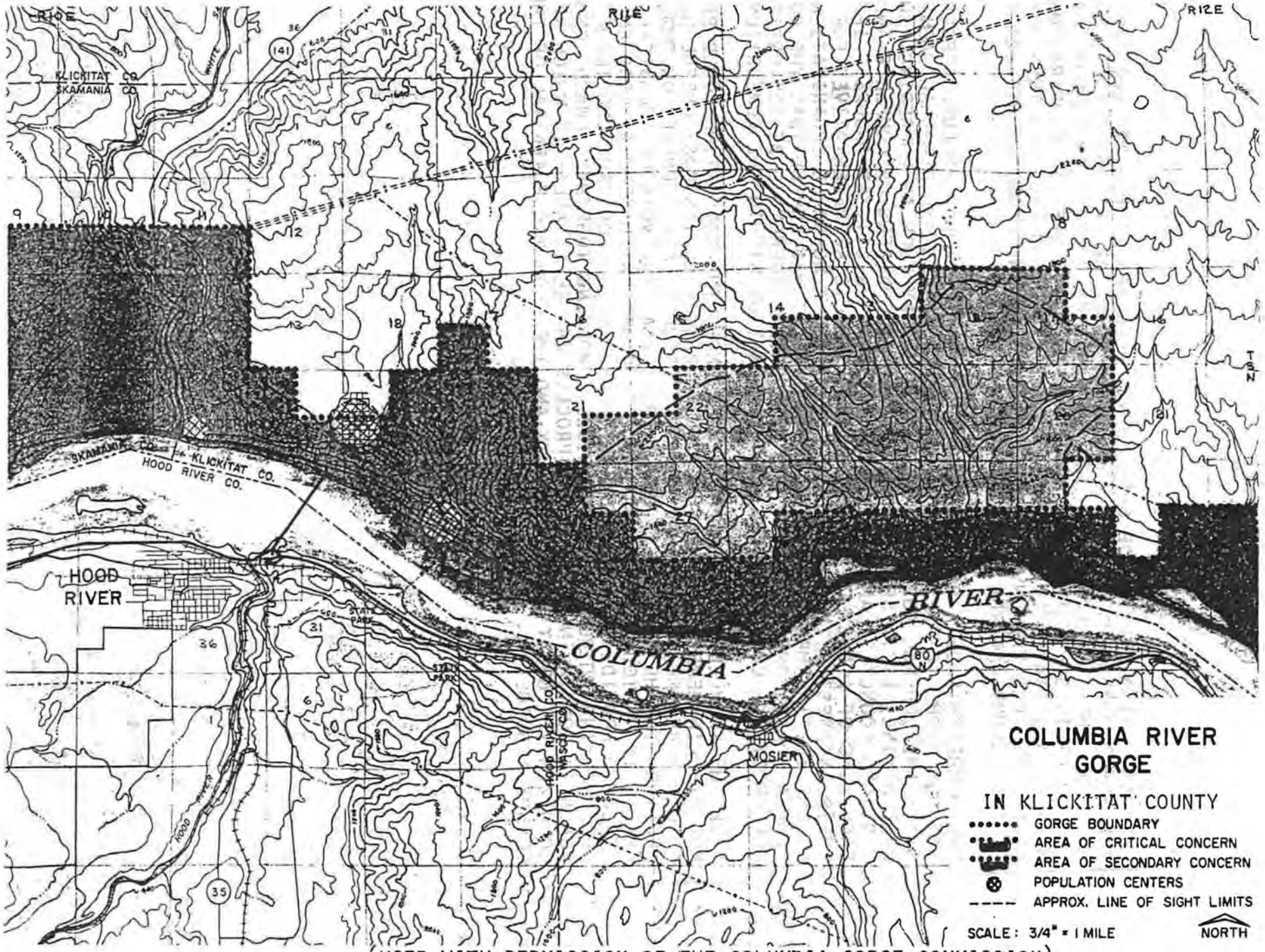
IN ADDITION, CLOSE COOPERATION WITH COUNTY PLANNERS IN INTEGRATING HOUSING, COMMERCIAL AND INDUSTRIAL RECOMMENDATIONS WITH LAND USE AND COMPREHENSIVE PLANS OF THE COUNTIES WILL ASSIST IN IMPLEMENTING THE PROGRAM. COUNTY PARK BOARDS AND HISTORICAL SOCIETIES ALSO PARTICIPATED IN FORMULATING THE MANAGEMENT PROGRAM AND HAVE A STRONG INTEREST IN ITS IMPLEMENTATION. THE RESPONSE OF LOCAL AND STATE AGENCIES HAS BEEN BOTH PROMISING AND GRATIFYING.

THE EXTENSIVE INVOLVEMENT OF LOCAL, STATE AND FEDERAL AGENCIES IN THE DEVELOPMENT OF THIS PROGRAM WILL PROVIDE A WORKABLE BASIS FOR FUTURE ACTION AND COOPERATION FOR THE CLUMBIA GORGE CONSORTIUM. THE CONSORTIUM WAS PROPOSED BY THE U.S. FOREST SERVICE IN 1974 AS A MEANS OF FURTHERING COMMON GOALS FOR LAND USE AND DEVELOPMENT IN THE GORGE THROUGH THE EXCHANGE OF INFORMATION AND COORDINATION OF

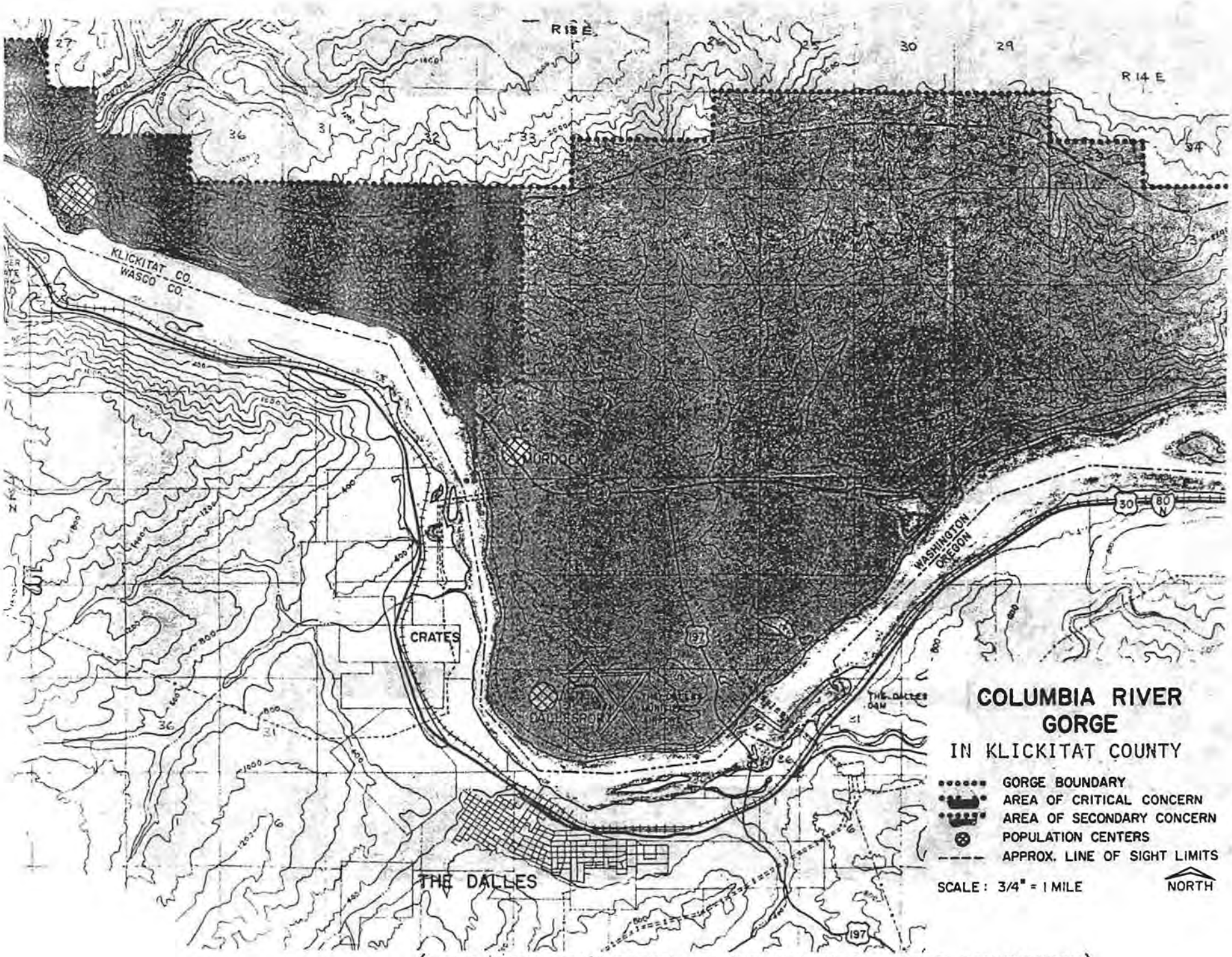
ACTIONS. AT A MEETING OF SOME TWENTY AGENCIES, THERE WAS GENERAL AGREEMENT THAT FORMATION OF A CONSORTIUM WOULD BE DESIRABLE AND USEFUL. AT THAT TIME, THERE WERE NO DEFINED AREAS OF CONCERN OR COMMON GOALS AND GUIDELINES. THIS MANAGEMENT PROGRAM, DEVELOPED IN COOPERATION WITH LOCAL, STATE, FEDERAL AND PRIVATE INTERESTS PROVIDES THESE COMMON GUIDELINES FOR THE ENVIRONMENTAL PROTECTION AND ECONOMIC UTILIZATION OF THE COLUMBIA GORGE.

THE MEMBERSHIP OF A COLUMBIA GORGE CONSORTIUM WOULD INCLUDE REPRESENTATIVES FROM: CITIES, COUNTIES, PORT DISTRICTS AND REGIONAL AGENCIES; STATE AND FEDERAL AGENCIES; PRIVATE INDUSTRY SUCH AS LUMBERING, SURFACE MINING, ETC.; SPECIAL GROUPS SUCH AS CHAMBERS OF COMMERCE AND VISITORS COUNCILS; AND INTERESTED CITIZENS OR CITIZEN GROUPS. IF EACH KIND OF AGENCY OR INTEREST GROUP SELECTS REPRESENTATIVES FOR THEIR INTERESTS, THE CONSORTIUM CAN BECOME A WORKABLE ORGANIZATION. AT THE INITIAL MEETING OF THE CONSORTIUM IT WAS AGREED THAT THE COLUMBIA GORGE COMMISSION WAS THE APPROPRIATE AGENCY TO BE RESPONSIBLE FOR PROVIDING COMMUNICATION AND COORDINATION WITHIN THE CONSORTIUM.

WITH THE KNOWLEDGE GAINED FROM EXPERIENCE, THE CONSORTIUM COULD BE MODIFIED IN MEMBERSHIP OR FUNCTION TO BEST FILL ITS MOST USEFUL ROLE. IT COULD BECOME AN INFORMAL ADVISORY GROUP TO ALL AGENCIES ON PROBLEMS RELATING TO THE GORGE. IT COULD PROVIDE A RESERVOIR OF TECHNICAL SKILLS IN VARIOUS FIELDS AVAILABLE TO OTHERS WITH SPECIAL PROBLEMS. IT COULD PROVIDE AN INFORMED, BUT EFFECTIVE WAY OF CROSSING THE RIVER AND UNIFYING INTERESTS ON BOTH SIDES. WORKING TOGETHER TOWARD COMMON GOALS, A CONTINUING MANAGEMENT PROCESS CAN BE ESTABLISHED WHICH RECOGNIZES THE GREAT NATURAL BEAUTY AND THE ECONOMIC POTENTIAL OF THE COLUMBIA GORGE.



(USED WITH PERMISSION OF THE COLUMBIA GORGE COMMISSION)



(USED WITH PERMISSION OF THE COLUMBIA GORGE COMMISSION)

TRANSPORTATION

HIGHWAY

SR 142 INTERSECTS SR 14 AT THE COMMUNITY OF LYLE. ALTHOUGH 142 IS A STATE ROADWAY IT FURTHER FUNCTIONS AS A LOCAL COLLECTOR TO US 97 AND SR 14. THE ROADWAY PASSES THROUGH THE COMMUNITY OF KLICKITAT AND THE CITY OF GOLDENDALE. MANY FAMILIES MAKE USE OF THE ROADWAY FOR BOTH TRAVEL TO AND FROM TOWN AND FOR MOVEMENT OF GOODS TO MARKET.

THE ROADWAY PARALLELS THE KLICKITAT RIVER FOR A DISTANCE OF ABOUT FOUR MILES NORTH OF THE COMMUNITY OF KLICKITAT. THE ROADWAY THEN TURNS IN AN EASTERLY DIRECTION AND BEGINS CLIMBING OUT OF THE KLICKITAT RIVER GORGE WHILE PASSING THROUGH A PORTION OF THE LITTLE KLICKITAT RIVER CANYON.

ALONG THE KLICKITAT RIVER ARE TO BE FOUND A NUMBER OF RECREATIONAL SITES. PUBLIC FISHING AREAS HAVE BEEN DEVELOPED BY THE DEPARTMENT OF FISHERIES ALONG THE RIVER WITH EASY PUBLIC ACCESS TO THE RIVER FOR SPORTSMEN. THE CONFLUENCE OF THE KLICKITAT RIVER WITH THE COLUMBIA RIVER AT LYLE IS ONE OF THE FEW PLACES IN THE UNITED STATES WHERE SALMON AND STEELHEAD ARE NETTED BY INDIANS FROM PLATFORMS ATTACHED TO THE STEEP ROCK WALLS OF THE CANYON.

STATE ROUTE 14 IS THE MAJOR THROUGH EAST-WEST ROUTE IN THE COUNTY. THE ROADWAY PARALLELS THE COLUMBIA RIVER ALONG ALL OF THE COUNTY'S SOUTHERN BOUNDARY AND SERVES TO LINK POINTS IN KLICKITAT COUNTY WITH THE CITY OF VANCOUVER TO THE WEST AND THE TRI-CITIES OF PASCO, KENNEWICK AND RICHLAND TO THE EAST.

THE PROXIMITY OF THE ROADWAY TO THE RIVER INCREASES THE RECREATIONAL AND SCENIC POTENTIAL OF SOME POINTS ALONG THIS ROUTE--THE COMMUNITY OF LYLE IS AT SUCH A POINT. SCENIC VANTAGE POINTS, PICNIC AREAS AND HISTORICAL SITES CAN EASILY BE DEVELOPED. THE SCENERY IS AS IMPRESSIVE AS THE COLUMBIA RIVER ITSELF. ACTIVE RECREATION SUCH AS FISHING, BOATING, SWIMMING, CAMPING AND WATER-SKIING IS BECOMING MORE PREVELANT AND THE LYLE AREA IS CONSIDERED EASILY ADAPTABLE TO SUIT THE DEMANDS GENERATED IN THESE ACTIVITIES.

DOW CHEMICAL CORPORATION BEGAN CONSTRUCTION OF A CHEMICAL PLANT AT DALLESPORT IN 1971. CONSTRUCTION HAS TEMPORARILY HALTED FOR MANY REASONS BUT CHIEFLY DUE TO THE LACK OF A FIRM POWER COMMITMENT.

AS INDUSTRIAL DEVELOPMENT OCCURS TRAFFIC VOLUMES ARE EXPECTED TO INCREASE. THIS INCREASE IN AUTOMOBILE AND TRUCK TRAFFIC WILL BE THE RESULT OF PERSONS EMPLOYED BY INDUSTRY AND PERSONS ASSOCIATED WITH SERVICE SECTORS.

TOURIST AND RECREATIONAL TRAFFIC OVER THE ROADWAY WILL INCREASE

AS RECREATIONAL AND CAMPING SITES ARE DEVELOPED ALONG THE RIVER, THE HIGHWAY WILL SERVE AS A MAJOR ARTERY FOR ACCESS TO THESE FACILITIES. RECREATIONAL LAND SUBDIVISIONS AND RESIDENTIAL LAND SUBDIVISIONS WILL BE DEPENDENT UPON THE HIGHWAY FOR ACCESS TO AND FROM COMMERCIAL AND INDUSTRIAL CENTERS.

IT IS RECOMMENDED THAT STATE HIGHWAY 14 BE INCREASED IN DESIGN TO A FOUR-LANE PARKWAY WITH LIMITED ACCESS POINTS TO RECREATION AREAS. A PARKWAY WOULD ALLOW FOR SAFER UNIMPEDED MOVEMENT OF TRAFFIC THROUGH THE COUNTY AS WELL AS REDUCE TRAVEL TIME BETWEEN VARIOUS POINTS. IT WOULD ALSO PROVIDE A PLEASANT SCENIC DRIVE, IN SHARP CONTRAST WITH THE FREEWAY ON THE OREGON SIDE OF THE COLUMBIA RIVER.

CAPITAL IMPROVEMENT PROGRAM

THE BROAD PURPOSE OF A LONG-RANGE CAPITAL IMPROVEMENT PROGRAM IS TO FURTHER FACILITATE THE SYSTEMATIC, ECONOMICAL AND OTHERWISE SOUND PROVISION OF NEEDED PUBLIC IMPROVEMENTS, MOST OF WHICH ARE EMBODIED IN THE COMPREHENSIVE PLAN. THE PLAN CANNOT, OF ITSELF, PRODUCE THE BETTER, MORE ATTRACTIVE AND EFFICIENT COMMUNITY WHICH IT PORTRAYS. THE ACHIEVEMENTS WHICH MAY BE REALIZED AND CAN BE EXPECTED UNDER THE PLAN ARE DEPENDENT ON FISCAL PROGRAMMING BASED ON COST AND REVENUE CONSIDERATIONS. LONG-RANGE, COORDINATED SCHEDULING OF CAPITAL IMPROVEMENTS, COMBINES PHYSICAL AND FINANCIAL PLANNING IN A WAY THAT IT ANTICIPATES COMMUNITY NEEDS IN TERMS OF IMPROVEMENTS AND THE ABILITY TO FINANCE SUCH IMPROVEMENTS. THESE PUBLIC IMPROVEMENTS, OFTEN CALLED "PUBLIC WORKS" OR "CAPITAL IMPROVEMENTS", INCLUDE STREETS, SEWERS, PARKS, PLAYGROUNDS, SCHOOLS, FIRE STATIONS, ETC., AND THE FUNDS NEEDED FOR THESE FACILITIES ARE REFERRED TO AS CAPITAL EXPENDITURES. LISTING THE PRIORITIES FOR NEEDED CAPITAL IMPROVEMENTS AND KNOWING THE COSTS AND REVENUES ANTICIPATED, IS A PRACTICAL MEANS OF ASSURING THAT MUNICIPAL SERVICES AND CAPITAL PROJECTS WILL BE PROVIDED ON A BASIS OF RELATIVE NECESSITY AND ABILITY TO PAY. SUCH ADVANCE FISCAL PLANNING DOES NOT DETRACT FROM THE ULTIMATE AUTHORITY AND RESPONSIBILITY OF THE COUNTY COMMISSIONERS TO DETERMINE CAPITAL SPENDING; IT DOES, HOWEVER, PROVIDE THE COUNTY LEGISLATIVE BODY WITH RELEVANT INFORMATION REGARDING THE COSTS OF IMPROVEMENTS. SERVICE AND SOARING OPERATIONAL EXPENSES IN ADDITION TO CAPITAL OUTLAYS, ARE QUICKLY REFLECTED IN TAX INCREASES AND, THEREFORE, A LONG-RANGE CAPITAL IMPROVEMENT PROGRAM WITH A CAPITAL IMPROVEMENT BUDGET CAN SERVE AS A CHECK ON THE FISCAL CAPACITY OF A COMMUNITY AND FORMULATION OF POLICIES WHICH TEND TO STABILIZE THE REAL PROPERTY TAX RATES.

City of Wasco Comprehensive Land Use Plan

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CITY OF WASCO

COMPREHENSIVE LAND USE PLAN

June 2003 revision to incorporate
Transportation System Plan

THIS PROJECT IS PARTIALLY FUNDED BY A GRANT FROM THE TRANSPORTATION AND GROWTH MANAGEMENT (TGM) PROGRAM, A JOINT PROGRAM OF THE OREGON DEPARTMENT OF TRANSPORTATION AND THE OREGON DEPARTMENT OF LAND CONSERVATION AND DEVELOPMENT. THIS TGM GRANT IS FINANCED, IN PART, BY FEDERAL TRANSPORTATION EQUITY ACT FOR THE 21ST CENTURY (TEA-21), LOCAL GOVERNMENT, AND THE STATE OF OREGON FUNDS.

THE CONTENTS OF THE DOCUMENT DO NOT NECESSARILY REFLECT VIEWS OR POLICIES OF THE STATE OF OREGON.

WASCO

REVISED
COMPREHENSIVE LAND USE PLAN
MAY, 1978

COMPREHENSIVE LAND USE PLAN
WASCO, OREGON

Prepared by
Mid-Columbia Economic Development District
JOHN S. FORLAND
Executive Director

In cooperation with the
Sherman County Planning Commission

For the
Wasco City Council

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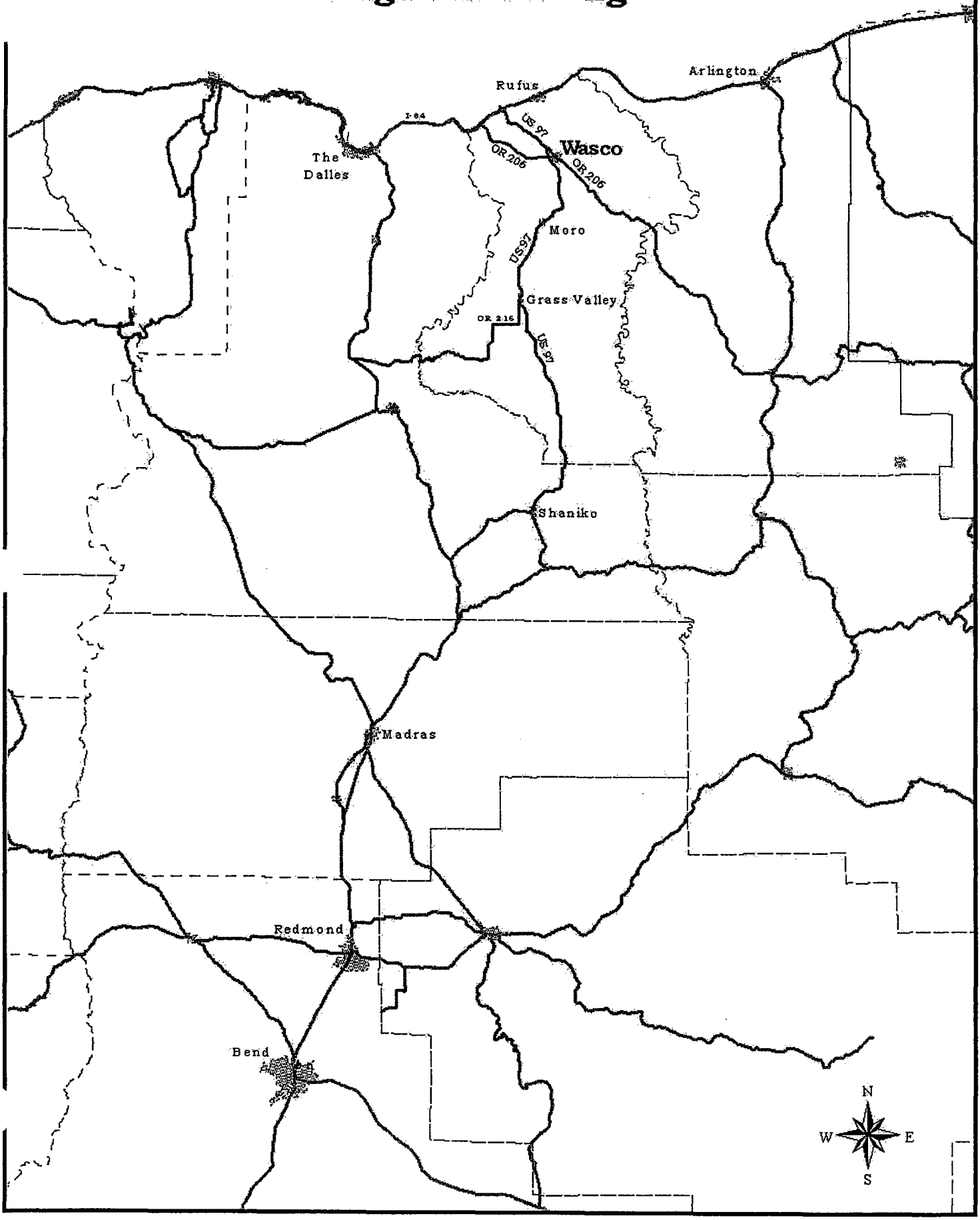
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Debbie Sasaki -Graphics/Typist
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Howard Wagner Reproduction

The preparation of this plan was financed in part through a comprehensive planning grant from the Department of Housing and Urban Development, under the provisions of Section 701 of the Housing Act of 1954, as amended.

Additional financial assistance was obtained through the State of Oregon Department of Land Conservation and Development.

May, 1978

Regional Setting



PHYSICAL CHARACTERISTICS

GENERAL PHYSICAL SETTING

The City of Wasco is located in northern Sherman County, ten miles south of the Columbia River and I-80N and nine miles north of Moro, the county seat. At an elevation of 1,276 feet, Wasco sits on a high plateau, which adjoins the Columbia Basin.

Wasco is a low-density agricultural service center surrounded in almost every direction by expansive wheat farms. Furthermore, it is positioned between two rivers classified under Oregon's Scenic Rivers System, the Deschutes and the John Day. Because of the natural setting of the city and proximity to fine trout fishing as well as the rural atmosphere, people from more urban areas are now attracted to the city for retirement and recreational homesites.

Wasco is a member of the Mid-Columbia Economic Development District. The District is comprised of five counties: Hood River, Wasco, and Sherman Counties in Oregon and Klickitat and Skamania Counties in Washington (see location map). The District has three distinct geographical provinces of which the differences are abrupt and distinctive. The provinces are the Cascades, the High Plateaus and the Columbia River Gorge. The High Plateaus are sparsely populated and contain mostly wheat land; it is in this regional province that Wasco is located.

TOPOGRAPHY AND DRAINAGE

Topographically, Wasco is located in what is known as Spanish Hollow. Within the city limits there is an elevation change of over 240 feet. Urban development has occurred mostly at the bottom of the hollow along the major transportation corridors, i.e., highways and railroads. City streets extend upward in the cardinal directions from the hollow bottom and the hollow passes through the city in a northwest/southeast direction. Vehicular traffic is only rarely disrupted when snow or ice forms on sloping streets. The topography has had only a moderate influence on existing land use patterns and will not be a significant factor in the future.

Some flooding may occur in localized areas along the hollow bottom during periods of rapid runoff (see hazards map).

The city limits delineate an area of approximately 640 acres, much of which is productive farmland.

(Table 20 continued)

Facilities	Name	Number
Picnic Tables	LePage Park	15
	John Day Dam Visitor Facility	49
Ball Fields	Moro City Park	1
Designated Swimming Beach	LePage Park	300 ft
Hiking Trails	Deschutes River State Rec. Area	3 mi
Paved Lanes	Biggs Recreation Area	1
	LePage Park	2
Unpaved Lanes	Deschutes River State Rec. Area	1
	John Day Dam Visitor Facility	1
Multiple Use Trails	John Day Dam Visitor Facility	2.3 m
All Purpose Courts	Moro Community Presbyterian Church	1
Tennis Courts	Sherman High School	1

Designated Scenic Highways

	Hwy. #	Milepost	to	Milepost
I-80N	2	99.85		106.46
		110.10		114.55
OR216	290	8.30		11.00
OR206	300	5.00		14.95
US 97	42	0.50		5.00
		10.00		16.00
		22.00		27.00
		30.00		48.81

There are numerous proposals by a diversity of agencies and groups for recreation developments within Sherman County. The Oregon Department of Transportation, Parks and Recreation Branch has plans to further develop the Deschutes State Park. Current plans for development of the park identifies 21 additional camping sites, swimming beaches and fish cleaning area as well as the acquisition of 2 miles of river frontage for a foot trail and fishing access.

City of Moro Revised Comprehensive Land Use Plan

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MORO

REVISED
COMPREHENSIVE LAND USE PLAN

THE COMPREHENSIVE LAND USE PLAN

MORO, OREGON

Prepared by

Mid-Columbia Economic Development-District

JOHN S. FORLAND
Executive Director

in cooperation with the
Sherman County Planning Commission

For the
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County Planner

TECHNICAL ASSISTANCE

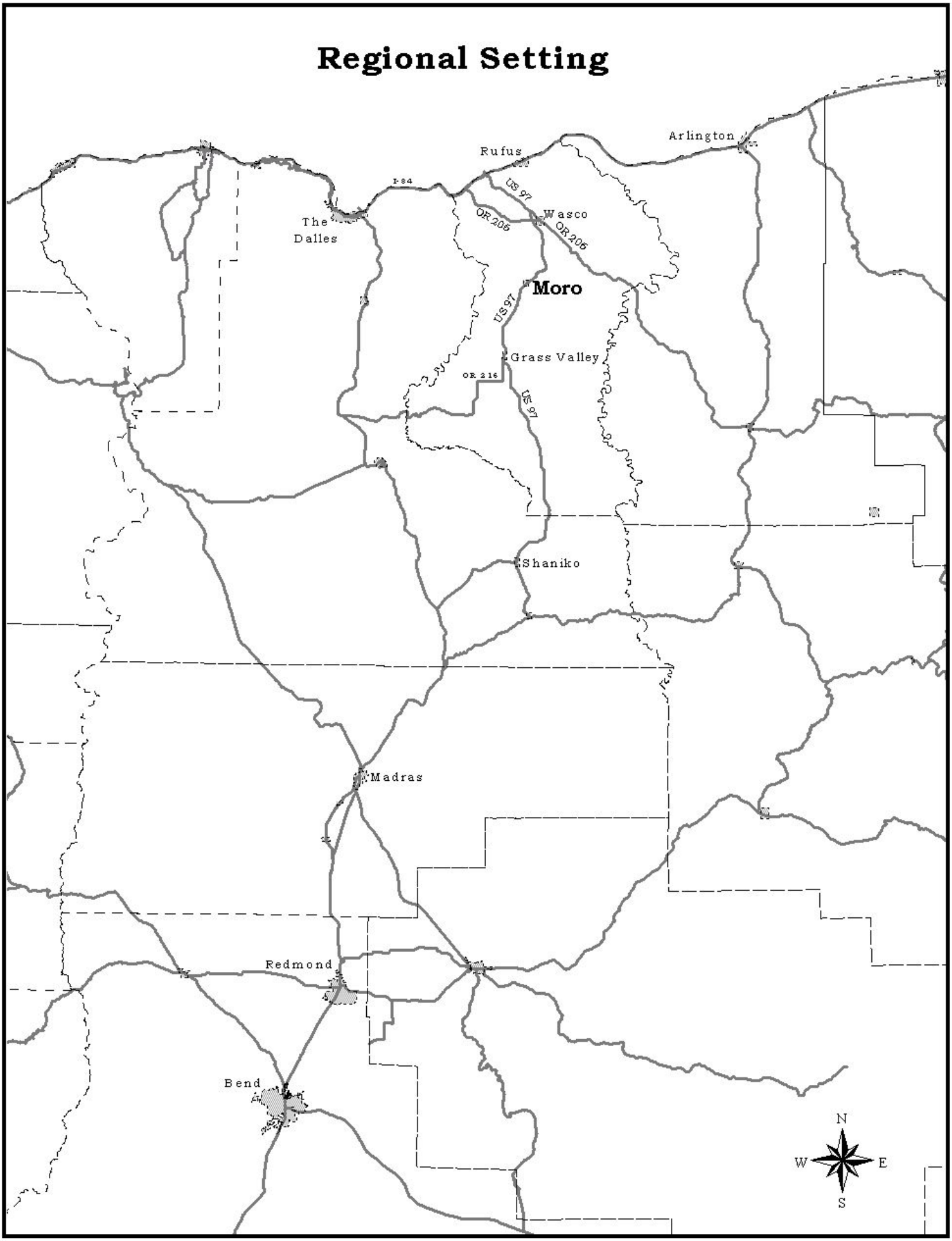
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Debbie Sasaki	-	Graphics/Typist
Rita Tanner	-	Typist
Howard Wagner	-	Reproduction

The preparation of this plan was financed in part through a comprehensive planning grant from the Department of Housing and Urban Development, under the provisions of Section 701 of the Housing Act of 1954, as amended.

Additional financial assistance was obtained through the State of Oregon Department of land Conservation and Development.

July, 1978

Regional Setting



INTRODUCTION

PLANNING FOR MORO

This comprehensive plan was developed for the City of Moro to serve as the guiding document for all future land use decisions. It is designed to do several things: to insure the future livability, so that Moro is at least as nice to live in the future, if not better than it is today; to manage future growth and development so that it is orderly and is in harmony with the public desires of the area; and to conserve natural resources to provide for their wise utilization or preservation. It also will provide the basis for business, the public and individuals to make sound investment decisions. By knowing where and how development may occur, financial savings will be realized and development can proceed more rapidly while attaining the desired livability goals determined by the area.

Those living in Sherman County near the Deschutes and Columbia Rivers are fortunate to have an environment with natural resources that often provide an economic livelihood along with abundant scenic and natural amenities. However, poorly considered land use decisions leading to a disorderly and often uneconomic land use pattern can threaten this enviable way of life. We can no longer afford to make these arbitrary decisions regarding land uses, we must instead, consider land for I what it really is, not a commodity to be bought and sold, but rather a resource, a non-renewable resource for which competition for its use is becoming increasingly intense.

Once land has been committed to a particular use it is often physically impossible, or economically impractical to reclaim it. Consequently, this and the high private costs of site development and the higher public costs of providing utilities and services make it essential that all options be carefully considered prior to land use decisions. Such is the purpose of this planning process.

PLANNING PROCESS

The basic questions that must be addressed is land use planning are as follows:

A. What do we have today?

B. What type of land use patterns do we want in the years to come?

C. How do we achieve these aspirations?

In over-simplified terms, the answers to these questions are sought through the planning process.

Generally defined, the planning processes, includes researching of inventories, analysis, planning, implementation and review. The formulation of this plan combines the first three of these phases. The review phase indicates that the process is dynamic and ongoing rather than a static one-time event. Review of the comprehensive plan should be scheduled semi-annually with a total update

(Table 15 continued)

Facilities	Name	Number
Picnic Tables	LePage Park	15
	John Day Dam Visitor Facility	49
Ball Fields	Moro City Park	1
Designated Swimming Beach	LePage Park	300 ft
Hiking Trails	Deschutes River State Rec. Area	3 mi
I		
Paved Lanes	Biggs Recreation Area	1
	LePage Park	2
Unpaved Lanes	Deschutes River State Rec. Area	1
	John Day Dam Visitor Facility	1
Multiple Use Trails	John Day Dam Visitor Facility	2.3 m
All Purpose Courts	Moro Community Presbyterian Church	1
Tennis Courts	Sherman High School	1

Designated Scenic Highways

	Hwy. #	Milepost	to	Milepost
I-80N	2	99.85		106.46
		110.10		114.55
OR216	290	8.30		11.00
OR206	300	5.00		14.95
US 97	42	0.50		5.00
		10.00		16.00
		22.00		27.00
		30.00		48.81

There are numerous proposals by a diversity of agencies and groups for recreation developments within Sherman County. The Oregon Department of Transportation, Parks and Recreation Branch has plans to further develop the Deschutes State Park. Current plans for development of the park identifies 21 additional camping sites, swimming beaches and fish cleaning area as well as the acquisition of 2 miles of river frontage for a foot trail and fishing access.

City of Rufus Comprehensive Land Use Plan

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DOCUMENTS
LOCAL
Rufus
(1978)

c.1 Rufus
Review

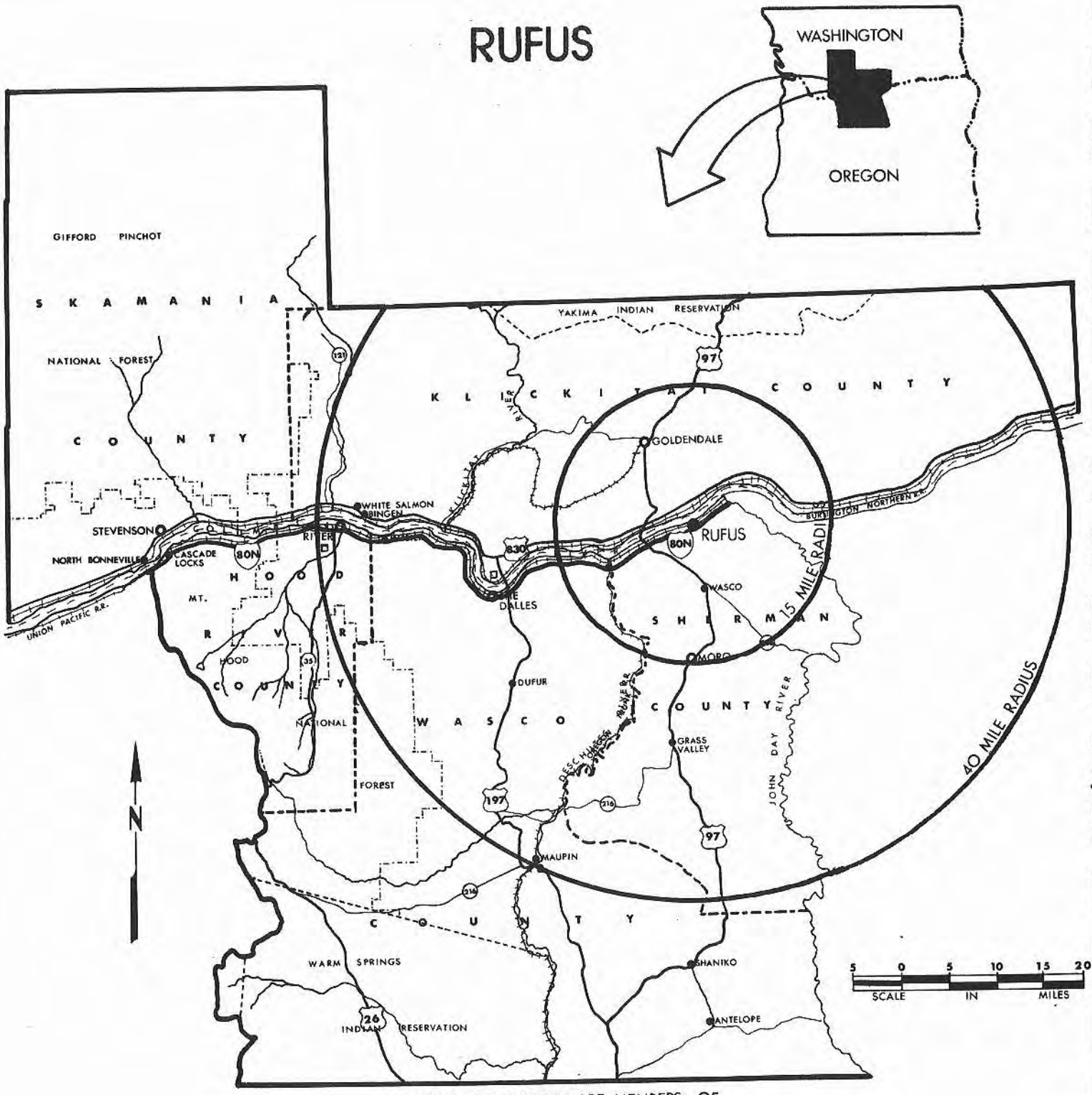
RUFUS

Comprehensive Land Use Plan

1978

LOCATION MAP

RUFUS



THE COUNTIES SHOWN ARE MEMBERS OF
THE MID-COLUMBIA ECONOMIC DEVELOPMENT DISTRICT

RUFUS

REVISED

COMPREHENSIVE LAND USE PLAN

MAY, 1978

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THE COMPREHENSIVE LAND USE PLAN
RUFUS, OREGON

Prepared by

Mid-Columbia Economic Development District

JOHN S. FORLAND
Executive Director

Prepared for:

RUFUS CITY COUNCIL

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May, 1978

PHYSICAL CHARACTERISTICS

GENERAL PHYSICAL SETTING

The City of Rufus is located in northern Sherman County, adjacent to the Columbia River and I-80N. It is twenty miles north of Moro, the county seat, twenty-five miles east of The Dalles, and two miles downstream from the John Day Dam. At an elevation of 200 feet, Rufus sits in the Columbia Basin at the base of what becomes a high plateau.

Rufus is a low density tourist and agricultural service center on the perimeter of an area of expansive wheat farms. It is positioned between two rivers classified under Oregon's Scenic Rivers System, the Deschutes and the John Day. Because of the natural setting of the city and proximity to fine trout fishing as well as the rural atmosphere, people from more urban areas are now attracted to the city for retirement and recreational homesites. Its location on a well-traveled highway connecting with the Sam Hill Bridge gives Rufus potential as a residential location for workers in Klickitat County in Washington.

Rufus is a member of the Mid-Columbia Economic Development District. The District is comprised of five counties: Hood River, Wasco, and Sherman Counties in Oregon and Klickitat and Skamania Counties in Washington (see location map). The District has three distinct geographical provinces of which the differences are abrupt and distinctive. The provinces are the Cascades, the High Plateaus and the Columbia River Gorge. The High Plateaus are sparsely populated and contain mostly wheat land; Rufus is located in the Gorge province bordering the High Plateaus. The Columbia River contains the transportation corridors and the bulk of the regional population.

TOPOGRAPHY AND DRAINAGE

The topography of Rufus is characteristic of this are of the Columbia River Gorge. Beginning at the river bank there is a gradual increase in elevation from 180 feet to about the 300 to 400 foot level. From there elevation change is rapid, especially where thick talus has acoumulated below the rim-rock cliffs. Two canyons, Scott and Gerking, make up the remainder of the major topographic features.

The elevation of the developed portion of the city is between 200 and 260 feet, and within the city limits there is an elevation change of more than 500 feet. The city limits delineate an area of approximately 745.9 acres.

(Sherman County Parks and Facilities cont.)

Facilities:		Number
Campsites:	Deschutes River Recreation Area	34
	Beavertail	21
	Dike #2	3
	Gert	5
	Homestead Site	4
	Jones Canyon	7
	Macks Canyon	19
	Oakbrook	3
	Rattlesnake Canyon	5
	Twin Springs	5
Picnic Tables:	Grass Valley City Park	4
	Moro City Park	4
	Wasco City Park	4
	Biggs Recreation Area	10
	DeMoss Memorial	15
	Deschutes River State Rec. Area	25
	LePage Park	15
	John Day Dam Visitor Facility	49
Ballfields:	Moro City Park	1
Designated Swim Beach:	LePage Park	300 ft.
Hiking Trails:	Deschutes River State Rec. Area	3 miles
Paved Landings:	Biggs Recreation Area	1
	LePage Park	2
Unpaved Landings:	Deschutes River State Rec. Area	1
	John Day Dam Visitor Facility	1
Multiple Use Trails:	John Day Dam Visitor Facility	2.3 miles
All Purpose Courts:	Moro Community Presbyterian Church	1
Tennis Courts:	Sherman High School	1

Designated Scenic Highways:

	Hwy.#	Milepoint	to	Milepoint
I-80N	2	99.85		106.46
		110.10		114.55
OR 216	290	8.30		11.00
OR 206	300	5.00		14.95
US 97	42	.50		5.00
		10.00		16.00
		22.00		27.00
		30.00		48.81

ODOT Journey Through Time Management Plan

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Journey Through Time

Management Plan



This project was undertaken by Michael Wetter & Associates of Salem, Oregon, on behalf of the Travel Information Council, the Oregon Department of Transportation, and the North Central Region.

The Journey Through Time Tour Route has been incorporated into the Tourism Strategic Plan for the North Central Oregon Regional Strategy Board (Gilliam, Grant, Morrow, Sherman, Wasco and Wheeler Counties) and is considered a major component of that Plan, also produced by Michael Wetter & Associates.

Michael Wetter, principal, Michael Wetter & Associates, served as project manager on development of the Journey Through Time Tour Route. Michael Teskey, of CommunityFirst! partners in Boulder, Colorado, assisted with resource evaluation and community meetings.

Lyn Jensen of OutPost Publications in Canyon City, Oregon, researched and wrote substantial sections of this document.

March 1996

Table of Contents

SUMMARY AND BACKGROUND 1

Introduction 1
A Few Highlights 2
History of the Route 3

PROJECT HISTORY AND ORGANIZATION 5

Project History 5
Organization 6

VISION, GOALS, OBJECTIVES 7

Vision 7
Goals 7
Objectives 8

ENHANCEMENT AND MANAGEMENT STRATEGIES 9

Overall Enhancement Efforts 9
Points of Interest and Specific Enhancement and Protection Projects 10

TRANSPORTATION 35

Visitor Traffic Volume 35
Seasonality 35
Road Conditions and Hazards 36
Signing 37

ECONOMIC IMPACT 38

MARKETING 39

APPENDIX: POINTS OF INTEREST AND MAP 1

APPENDIX: ROAD CONDITIONS AND HAZARD INFORMATION 7

APPENDIX: DRAFT MARKETING MATERIALS 8

APPENDIX: TRAFFIC VOLUME DATA 9

Introduction 9
Methodology 9

APPENDIX: LETTERS OF SUPPORT 11

Journey Through Time

Cultural and Natural History Corridor

Management Plan

Summary and Background

Introduction

The Journey Through Time Tour Route is a partnership effort among residents, community leaders and governmental agencies to highlight and share special features of a 286 mile route through North Central Oregon. Partners include the Oregon counties of Baker, Grant, Sherman, Wasco, and Wheeler; Klickitat County in the State of Washington, and their municipalities, historical and civic organizations, museums and businesses.

The North Central Oregon Regional Strategies Board, Clyde Holliday State Park, John Day Fossil Beds National Monument, Wallowa-Whitman and Malheur US National Forests, Historic Baker City Inc., Maryhill Museum of Art, area Chambers of Commerce and many other organizations involved in the tourism industry are participating in this project.

It is the hope of these organizations that the Journey Through Time Tour Route will serve to enhance and protect the valuable heritage resources along this unique corridor, and that it will create a source of economic vitality for the region.

The Journey Through Time Tour Route is a key component of the Tourism Strategic Plan developed for the North Central Regional Strategies Board in 1995. This route is envisioned as an efficient means of drawing visitors further into the region of North Central Oregon and will serve as a primary destination for many visitors.

The Journey Through Time stretches from Baker City along Highway 7 to US 26, then along Highway 19 to Fossil, along Highway 216 to Shaniko, and along US 97 through Biggs to a terminus just across the Oregon/Washington border at the Maryhill Museum of Art. The Journey Through Time links to Washington-designated scenic route at its north end.

An alternate route is being developed from Service Creek, down Highway 207 to Mitchell, to the Painted Hills Unit of the John Day Fossil Beds National Monument, then East on Highway 26 to rejoin the main route at Picture Gorge. Spurs to Sumpter, Granite and Canyon City will also be included.

The Journey Through Time Tour Route celebrates an area uniquely rich in history. The route provides the traveler with an experience of that history: a history of the land, a history of the people, and a history of the industry and commerce.

The Journey Through Time is a story of massive gold discoveries, of fortunes made and lost, of Chinese laborers and their culture, of towns that boomed and busted, of places once more populated than any in Oregon; of timber, agriculture and pioneer settlers. The story told by this route includes the story of the earth's history, of sea beds where there is now desert, and of creatures that once roamed abundantly but are now extinct.

A Few Highlights

A sampling of the route's highlights:

1. The Maryhill Museum in Klickitat County, Washington, offers an impressive view of the Columbia River Gorge. Maryhill is a national caliber museum with a fascinating past and a unique facility.
2. The award-winning Sherman County Museum in Moro tells the history of the area.
3. Picture Gorge, where the John Day River rushes through a dramatic gorge of 200-foot basalt cliffs formed by volcanic lava flows is visually striking. It is made even more significant by the ancient pictographs which mark its canyon walls.
4. Parts of the John Day Fossil Beds National Monument are the only place on earth where there is a visible, fossilized record of 50 million years of geological activity.
5. Blue Basin, a dry badlands canyon striped horizontally in shades of blue, has a two-mile self-guided hiking trail with interpretive signs.
6. Cathedral Rock, a cathedral-sized, pastel-hued rock palisade, slid down from a high bluff to the west. Coming to rest, it forced the John Day River around it.
7. Kimberly is a picturesque junction where the rushing North Fork, Middle Fork and South Forks of the John Day River meet.
8. Fossilized mammoth bones were discovered in the town of Fossil a century ago. The public fossil-digging beds are a treasure.
9. There are more fossils, trails and interpretive exhibits at the John Day Fossil Beds National Monument / Clarno Unit, and the University of Oregon's Hancock Field Station, known for its field studies in paleontology and geology, is nearby.
10. From various locations along the route, there are spectacular mountain views of the Strawberry Range, and, from the high plains, of Mt. Jefferson, Mt. Hood and Mt. Adams.
11. Unusual rock formations line the route, like sculpted river canyon walls, turrets and columns whipped by the wind.
12. The route crosses the Columbia River Gorge.
13. Deep wagon ruts of the Oregon and Barlow Trails are clearly visible.
14. An old military road from Canyon City to The Dalles, built in the 1870s, is visible from the route.

15. The route crosses the sites of Native American salmon harvests, rendezvous, ancient pictographs dyed on rock walls and tribal trade routes.
16. Railways, stagecoach routes, a ferry crossing, historic towns, hotels and museums bear testament to a colorful era of blacksmith shops, dance halls, saloons, liveries and red light districts.
17. The former Rajneeshpuram, where a religious sect controlled a town in the 1980's, is near the route.
18. Chinese laborers once toiled to mine gold. Evidence of their culture still exists.
19. Time-honored Old West traditions continue. These include branding by fire, shearing by hand and riding the range on horseback.
20. Mill sites and mill towns exemplify the historical and current timber industry.
21. Shaniko was once considered the largest wool shipping center in the world.
22. The Kam Wah Chung Museum is internationally significant as one of the best representations of the lives of 19th century Chinese immigrants. The Kam Wah Chung is a former Chinese store, medical center, religious shrine, and meeting place.
23. The epic adventure of the Oregon Trail is depicted with full scale models and living history presentations at the Oregon Trail Interpretive Center at Flagstaff Hill.

History of the Route

For untold centuries Native Americans utilized portions of this route as hunting and fishing grounds and as a trade rendezvous site with other tribes. EuroAmericans came into the area in the early 1800s for fur trapping.

Settlement exploded in the l860s with the discovery of gold. Towns were quickly established and fortunes were made and lost. Literally thousands of miners and Chinese laborers mined streams, caverns and tunnels throughout the eastern portion of the route. Some of these early towns are still thriving, with considerably smaller populations, and others are marked by weather-worn rock foundations scattered on prairies and high mountain valleys.

An 1890s entry in the Grant County historical records claims that the area was considered suitable for seasonal livestock but "too rugged" for year-round human habitat. The development of good roads and housing has, of course, changed that view.

Roads were quickly established from Canyon City, once Oregon's largest municipality, to other bustling towns, including those on the Columbia River. Highways 26, 19, and 218 mark this route. Soon freight wagons and stagecoaches ran these routes. Stagecoaches still operated as late as 1929 from Austin Junction to points south, along portions of the Journey Through Time on Highways 7 and 26.

Emigrants on the Oregon Trail crossed the proposed Journey Through Time Tour Route on its east end, and again on the west, where they established an overland trail to the Willamette Valley.

In the 1890s and through the 1930s the Sumpter Valley Railway wound through the timber belt of the Blue Mountains carrying logs, livestock, passengers and gold on a route 80 miles long between Baker City and Prairie City. Highways 7 and 26 parallel this railway route, springing from old wagon and stagecoach roads which followed the rails.

For the past several years a concerted effort by a group of residents, US National Forest staff and historians has resulted in the resurrection of a portion of the Sumpter Valley Railway, which now steams along parallel to portions of Highway 7 through a state designated Wildlife Refuge. Other interpretive sites have been created as well.

Mill towns sprang up along the tracks of this narrow-gauge, steam-operated railway, generating prosperity based on agriculture, gold and timber. Massive stream-eating dredges churned through the mountains, throwing up thousands of tons of soil to be sifted for its gold. Millions of dollars in gold were carried out of this region by train, wagon and pack animal.

At the west edge of the route was the southern terminus for the Columbia Southern Railroad which hauled sheep at the turn of this century from what was billed as the wool center of the world. Related industries sprang up from the railroad. Besides sheep and wool, the railroad moved wheat, which today is still the primary crop grown along this portion of the route. Freight wagons hauled by several teams of horses or mules at once also headed north along Highway 97 to reach freight barges on the mighty Columbia River.

Between 1930 and 1960 paved roads slowly replaced winding, unimproved roads. Early automobiles chugged along the new roads. Additional roads were also constructed, further improving access to the area for the growing population. State highways 26, 7, 19 and 97 in particular continue to serve as major trucking routes.

With the establishment of the John Day Fossil Beds National Monument Visitors Center, tourism traffic increased along Highways 26, 19, 218 and 97. With the opening of the Oregon Trail Interpretive Center in 1993 traffic along all portions of this route has increased substantially. Visitors, particularly those from points west, often travel along Interstate 84 to the Interpretive Center and then look for alternate routes for their return.

Vision, Goals, Objectives

Vision

The Journey Through Time Tour Route has developed a reputation as a rich, meaningful, and exciting heritage experience. Interpretive markers and displays located at key sites along the route's entire length tell in vivid detail the stories of those who pioneered this land, of how they made their living, and of the fortunes that were made or lost. This history provides a rich background for an understanding of the region's main industries--timber and agriculture-- which are also interpreted for the visitor. Visitors spend days in the area learning about the earth's past with naturalists, and hunting for their own fossils near the town of Fossil.

The Journey Through Time Tour Route draws repeat customers out of Portland, Boise, and other population centers in the Pacific Northwest. In addition, the Journey Through Time route serves as an alternate route to I-84 from Baker City to Biggs. Many prefer it as a scenic and engaging alternative to the interstate freeway.

Each of the towns along the Journey Through Time Tour Route actively showcase their heritage and rural lifestyle. Antique stores, gift shops, restaurants, bed and breakfasts, and motels are thriving. Local business people offer unique experiences like the chance to tour a historic town by horse-drawn carriage, take a ride on an historic train, pan for gold, or spend a few days living on a ranch. Visitors leave with a better understanding of rural issues and local people feel that the route is helping them preserve and improve their quality of life.

Goals

1. **Create Jobs.** To create economic opportunities for the towns along the Journey Through Time Tour Route.
2. **Maintain Rural Lifestyles.** The rural lifestyle is the reason why many residents live in the area. The area would like to support its traditional industries of agriculture and timber, maintain the small, friendly feeling of its towns, and continue to have available open, uncrowded, space to live.
3. **Protect Important Values.** To preserve the heritage of the area, which will be lost or degraded if it is not protected. The region's heritage is an integral part the area's identity and character and is important to both the area's present and future.

4. **Build Identity for the North Central Region.** To help create an impression, with non-residents, of the qualities and features that make the North Central Region unique.

Objectives

Create Jobs

1. **Attractions.** Develop attractions within communities so that visitors spend time and money within the communities.
2. **Interpretive Information.** Provide interpretive information in each community that tells the story of what makes the community special. This will encourage visitors to spend time in each community along the route.
3. **Business Opportunities.** Provide area businesses with an opportunity to advertise to tour route users.
4. **Downtown Revitalization.** Conduct downtown revitalization efforts in area communities to help merchants better capitalize on visitation and to help downtowns become attractive for visitor activity.

Maintain Rural Lifestyle

1. **Interpret Industry.** Provide interpretation of agriculture and forest products to create a greater understanding of these industries among out-of-area visitors.
2. **Support Authenticity.** Showcase the rural lifestyle in its authentic form, to give people an experience of why it is valuable and should be preserved.
3. **Attract Quality Visitors.** Promote to quality visitors who will spend time and money in the area. Quality, not quantity.

Protect Important Values

1. **Protect Historical Attractions.** Conduct historic preservation efforts to protect the region's valuable heritage attractions.
2. **Educate Visitors.** Educate visitors about sensitive resources, such as fossil beds and petroglyphs, so that they do not violate these important elements of the route.

Build Identity for the North Central Region

1. **Market heritage.** Conduct marketing efforts that emphasize the heritage theme.
2. **Develop heritage.** Develop attractions that reinforce the heritage theme.

3. **Emphasize the authentic.** Key promotion and development efforts to authentic aspects of the area's history, rather than fabricating new attractions.

Enhancement and Management Strategies

Economic development interests in the region have undertaken a number of key strategies to gain economic benefit from the tour route designation and to preserve unique offerings along this route.

Overall Enhancement Efforts

1. Almost every community along the Journey Through Time Tour Route has initiated efforts to preserve or showcase local historical points of interest. Downtown restoration, preservation and beautification projects are underway or recently completed in Baker City, Sumpter, Austin Junction, Prairie City, Canyon City, Mt. Vernon, Dayville, Spray, Fossil, Shaniko, Grass Valley, Moro and Maryhill. New festivals are planned, storefronts are being improved and efforts such as murals and walking tour brochures are underway. As part of a planning process initiated by the North Central Region, many communities have received, and will continue to receive, assistance from the Oregon Downtown Development Association.
2. Each of the counties in North Central Oregon has embraced tourism as a key industry through the Regional Strategies Board. Gilliam, Grant, Morrow, Wheeler, Sherman and Wasco Counties have approved a Tourism Strategic Plan for the six county North Central Oregon Region which cites the Journey Through Time Tour Route as a key component of the Strategy. In addition, some of the counties of the North Central region are active members of the Eastern Oregon Visitors Association and Oregon Trail Marketing Coalition.
3. Hospitality workshops for local businesses have been conducted in Morrow and Grant Counties and are under consideration in other places along the route.
4. Visitor kiosks were completed in 1995 at Prairie City and Fossil. These kiosks describe the Journey Through Time Tour Route through historical photos, maps, and points of interest. Free brochures are under development and will soon be available to the public to further detail this tour route and provide information on dining, lodging, museums, etc. Similar kiosk information -- detailing the Journey Through Time Tour Route -- are under development for the communities of Moro and Baker City.
5. Several Bed and Breakfasts have sprung up on or near the route.
6. Farm/Ranch recreation opportunities were developed in 1995 through a partnership between the Grant County Tourism Committee and the Oregon Department of Agriculture. Workshops have been completed and follow-up activities are currently underway throughout the region to promote farm and ranch stays, working dude ranches, retail farm stands, fee hunting, and other agri-tourism opportunities.

7. Loop tours are being developed to provide side trips from the Journey Through Time Tour Route. These loops include the Middle Fork of the John Day River, Sumpter to Greenhorn Gold Loop, Logan Valley and the Aldrich Range.
8. A new merchant's association has been formed in Prairie City. In Canyon City merchants and volunteers contributed matching funds and labor for placement of a sign depicting the town's history.
9. Public awareness of the natural resources industries has been initiated and will be integrated into the route development.
10. Cultural resources are being developed with attention to their carrying capacity. Further, the undeveloped potential of other facilities is under consideration. For example, the City of John Day is currently soliciting requests for proposals to study the feasibility of expanding the Kam Wah Chung Museum.
11. Land use patterns will be maintained by the counties.
12. The Journey Through Time Tour Route connects directly to a Washington State designated Scenic Tour Route. This connection serves to attract visitors who wish to travel further. The Maryhill Museum of Art will distribute Journey Through Time brochures at its facility.

Points of Interest and Specific Enhancement and Protection Projects

Maryhill Museum of Art

⇒ Resource: Maryhill Museum of Art.
⇒ Location: Near Highway 97 in Washington State.
⇒ Management: Non-Profit Organization
⇒ Condition: Excellent
⇒ Enhancement: None needed.
⇒ Protection: Curatorial capabilities are in place.

This historic mansion showcases sculptures by Rodin, a Native American gallery, rare chess sets, Queen Marie of Romania Royal Regalia, Russian Icons, European & American paintings, a gift shop, cafe and picnic grounds. A ghost town and replica of Stonehenge are nearby.

Biggs

⇒ Resource: Community.
⇒ Location: Highway 30.
⇒ Management: Municipality
⇒ Condition:
⇒ Enhancement: Wastewater treatment.
⇒ Protection: None needed.

Biggs' tourist accommodations straddle Hwy. 30, which runs between I-84 and the original route of the Oregon Trail. About one mile west of town is an historical marker and viewpoint. It was at this point that most of the emigrants had their first view of the

Columbia River. Mt. Hood's 11,235 ft. peak is also clearly visible. Original Oregon Trail ruts are an easy hike, located about one mile from a historical marker.

The property owners in Biggs have come together to form a service district for the purpose of constructing a wastewater collection, treatment and discharge facility. This will allow for existing businesses to expand as well as for anticipated rapid growth of new business interests in Biggs. Proposed new businesses include a motel and an RV park.

Wasco (Pop. 385)

⇒ Resource: Community.
⇒ Location: Highway 97.
⇒ Management: Municipality.
⇒ Condition:
⇒ Enhancement:
⇒ Protection: None needed.

The town is named after the county, and the county is named for a tribe of Indians, roughly shortened from Was-co-pam. The Wasco Indians were a Chinook tribe, formerly living on the south side of the Columbia River, near the present-day city of The Dalles. Was-co meant maker of basins, believed to refer to the intricately-sculpted rock canyon walls near the Columbia River. Sherman County and the town of Wasco were carved from Wasco Co. in 1889.

A small wheat-growing community, Wasco is the site of Sherman County's only airport. Although now used for commercial crop-spraying aircraft, it has the capability of being used by commercial aircraft. The Oregon Trail passes north of Wasco. The historic McDonald Crossing of the Trail is on the John Day River approximately 13 miles east of Wasco. A kiosk is located at the crossing. Wasco offers a full service restaurant as well as a community grocery store.

Oregon Trail and Barlow Road

⇒ Resource: Oregon Trail and Barlow Road Cut-off
⇒ Locations: Baker City (Oregon Trail) and Moro, Oregon (Cut-off to the Barlow Road)
⇒ Management: BLM, Baker City and Baker County partnership; Town of Moro and Sherman County.
⇒ Condition: Outstanding views of ruts of emigrant's wagons are in good condition.
⇒ Enhancement: Include in marketing efforts.
⇒ Protection: None needed.

The Oregon Trail has proven to be an extremely important visitor industry resource. Baker City has very effectively capitalized on this resource through the Oregon Trail Interpretive Center. As a result, during the 1993 sesquicentennial, the Journey Through Time Tour Route area saw a 30% increase in visitor traffic.

Because of the power of this resource as a heritage attraction, and because Baker City is at an important strategic location as the eastern portal for the route, the Journey Through Time Tour Route complements the Oregon Trail theme.

The two locations where this theme can be most effectively used are Baker City and at the town of Moro. Baker is already providing an Oregon Trail experience through the Oregon Trail Interpretive Center and marketing efforts are in place to support this effort through the Baker County Visitors and Convention Bureau and the Eastern Oregon Visitors Association.

The Sherman County Historical Museum, located at Moro, was the 1994 recipient of the prestigious Albert B. Corey award for recognition of a volunteer-based historical organization. This museum contains countless early settler artifacts, including an exhibit, "Oregon Trails, Rails and Roads in Sherman County."

With these resources in place, no further development of the resource is currently necessary, and the resource does not require protection efforts. The Journey Through Time Tour Route project will focus on weaving the Oregon Trail theme into its interpretive and marketing materials.

Moro (Pop. 295)

⇒ Resource: Community.
⇒ Location: Highway 97.
⇒ Management: Municipality.
⇒ Condition:
⇒ Enhancement: Kiosk under development, downtown revitalization efforts.
⇒ Protection: None needed.

Moro, the smallest county seat in the state, has an 1899 county courthouse. Historical records indicate that Henry Barnum was the first resident in this immediate area. He settled near the present town site in 1868, where he later established a trading post. There are several versions as to how the town was named. One states that it was named for Moro, Illinois, by Judge O.M. Stone who formerly lived in that eastern town. Moro has a full service grocery store, a 12 unit motel and a restaurant as well as being the location of the Sherman County Fairgrounds and RV Park.

A kiosk highlighting the Journey Through Time Tour Route is under development for Moro's downtown, to be located near the Sherman County Historical Museum. The kiosk will include maps, historical photos and points of interest.

Award-Winning Sherman County Museum

⇒ Resource: Sherman County Museum.
⇒ Location: Highway 97 in Moro.
⇒ Management: Non-Profit Organization
⇒ Condition: Excellent
⇒ Enhancement: None needed.
⇒ Protection: Curatorial capabilities are in place.

Moro is home to the Sherman County Museum, which was recently named the 1994 winner of the prestigious Albert B. Corey Museum Award. This award is for recognition of a small, primarily volunteer-operated historical organization that displays the best qualities of vigor, scholarship and imagination in its work. A maximum of one Corey Award per year is made to a deserving museum in North America so this award to the Sherman County Museum is a great recognition of achievement for this facility and its volunteer staff.

Grass Valley (Pop. 160)

⇒ Resource: Community.
⇒ Location: Highway 97.
⇒ Management: Municipality.
⇒ Condition:
⇒ Enhancement: Rest area, farm equipment museum, downtown revitalization.
⇒ Protection: None needed.

The community of Grass Valley was named for the abundant rye grass grown here. According to Oregon Historical Society records, a century ago the grass grew so tall that it reached a man's head as he rode horseback through this picturesque valley. The Grass Valley Canyon begins at Grass Valley, meandering north and eventually joining the canyon of the John Day River. The town was incorporated as the result of a popular vote in 1900.

Grass Valley offers the only publicly accessible gasoline and diesel station between Madras and Biggs as well as a full service grocery store and restaurant facilities. The Oregon Department of Transportation has recently expressed an interest in placing a rest stop at or near the City of Grass Valley. This would greatly increase the number of vehicles stopping in the community and would therefore enhance opportunities for tourism activity. Although this project is only in the preliminary discussion stage, the City and County are anticipating working with ODOT to make this proposal a reality within the next few years.

A local resident who has a significant inventory of antique farm machinery has expressed interest in opening an outdoor farm equipment museum in Grass Valley along Highway 97.

Mountain Views

⇒ Resource: Mountain Views. Unsurpassed and unobstructed vistas of Mt. Jefferson, Mt. Hood and Mt. Adams.

⇒ Location: Highway 97.

⇒ Condition: Good.

⇒ Management: Private agricultural land adjacent to highway.

⇒ Enhancement: A pull-out with interpretive sign is needed.

⇒ Protection: Awareness among land owners.

This is part of the Buck Hollow Watershed Project area, which is a collaboration of area landowners, the Bureau of Land Management, and the Soil & Water Conservation Districts of Sherman and Wasco Counties. The North Central Regional Strategy tourism effort will work with this organization to identify ways to keep the key views open.

Shaniko (Pop.30)

⇒ Resource: Community.
⇒ Location: Highway 97.
⇒ Management: Municipality.
⇒ Condition:
⇒ Enhancement: Sewer system needed.
⇒ Protection: None needed.

Shaniko dates from 1900, when a spur of the Columbia Southern Railroad was extended south from the Columbia River Gorge to haul sheep and wool to market. The vast grasslands were home to thousands of cattle and sheep in the late 19th century. The boom gave Shaniko the title of "Wool Shipping Center of the World" for a brief decade. The usual assortment of frontier establishments were here: hotels, saloons, brothels and dry goods stores. Some of the last big battles between the cattlemen and the sheep ranchers were fought on the open range outside Shaniko.

The town takes its name from August Scherneckau, the operator of the store and stage stop. The town had nearly faded from existence until 1985, when Jean and Dorothy Farrell from Eugene purchased the hotel and restored it. The hotel, built in 1900, was known as "Southern Queen of the Highland Hostelries." The dining room is a miniature museum of North Central Oregon with a beautiful backbar of an early saloon. In recent years Shaniko has been developing a "ghost town" theme and several Old West styled buildings have been relocated here or reconstructed.

⇒ Fossil (Pop. 470)

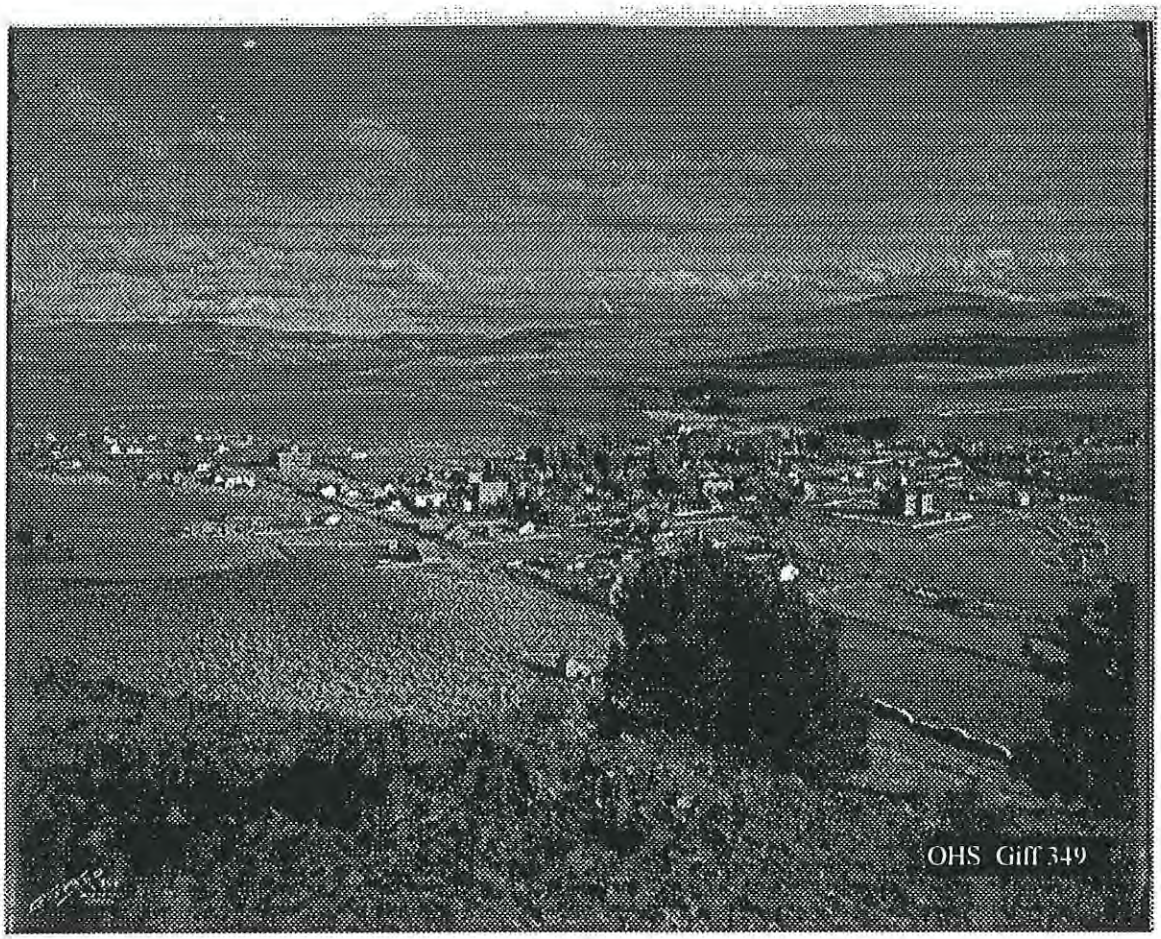
⇒ Resource: Community.
⇒ Location: Highway 19 and 218.
⇒ Management: Municipality.
⇒ Condition:
⇒ Enhancement:
⇒ Protection: None needed.

The eight-square-block downtown area is a mix of old brick and wooden false front stores. Fossil Museum, occupying the red brick IOOF hall on First Street, offers pioneer goods, farm equipment and other artifacts. Fossil was named for the numerous fossils discovered when the town was laid out in 1867. Scenic float trips along the John Day River have river access near here.

Public Fossil Beds

- ⇒ Resource: Public Fossil Beds.
- ⇒ Locations: Near Fossil, Oregon.
- ⇒ Management: None
- ⇒ Condition: Primitive
- ⇒ Enhancement: Identify entrepreneurs and develop and market public fossil digging.
- ⇒ Protection: Work with archaeologists to make sure that the resource is not depleted.

This project will work with local business people to develop a "fossil industry" in the Town of Fossil area. This would include sites where visitors can dig their own fossils, along with staff that can help identify them. Visitors would be able to mount their finds for home display, or do other crafts or science related projects. Visitors will get a hands on experience and leave with a valuable remembrance of their visit to the Journey Through Time Tour Route area.



There is an existing fossil dig site behind the Fossil High School. However, this site is not staffed or developed. If it were promoted or developed, it could be disruptive to school activities. Therefore, other sites will be sought.

This strategy would create greater awareness of fossils as an important resource and would encourage people to enjoy but not destroy the resource. Work with paleontologists will need to be completed to ensure that the fossil digging enterprise will be sustainable and not deplete the resource.

As part of the North Central Oregon Regional Strategy planning efforts, Michael Wetter & Associates will work with local economic development advocates to locate entrepreneurs that are interested in initiating a fossil digging enterprise. The plan will be tied in to the overall marketing and development strategy for the Journey Through Time Tour Route.

Julia Henderson Pioneer Park

⇒ Resource: Park.
⇒ Location: Highway 19.
⇒ Management: County.
⇒ Condition: Good
⇒ Enhancement: None needed.
⇒ Protection: None needed.

Scenic site of the Annual Eastern Oregon Pioneer Picnic held on the 3rd weekend of July. An interpretive marker tells the story of the park.

Service Creek

⇒ Resource: Community.
⇒ Location: Highway 19.
⇒ Management: Municipality.
⇒ Condition:
⇒ Enhancement:
⇒ Protection: None needed.

Originally named "Sarvis" after a pioneer settler, postal authorities changed the town's name 50 years ago without consulting local citizens. Many still call the town Sarvis. There is excellent access to the John Day River here for whitewater rafting trips.

John Day River Interpretive Site

⇒ Resource: Interpretive site.
⇒ Location: Highway 19.
⇒ Management: ODOT.
⇒ Condition: Good.
⇒ Enhancement: None needed.
⇒ Protection: None needed.

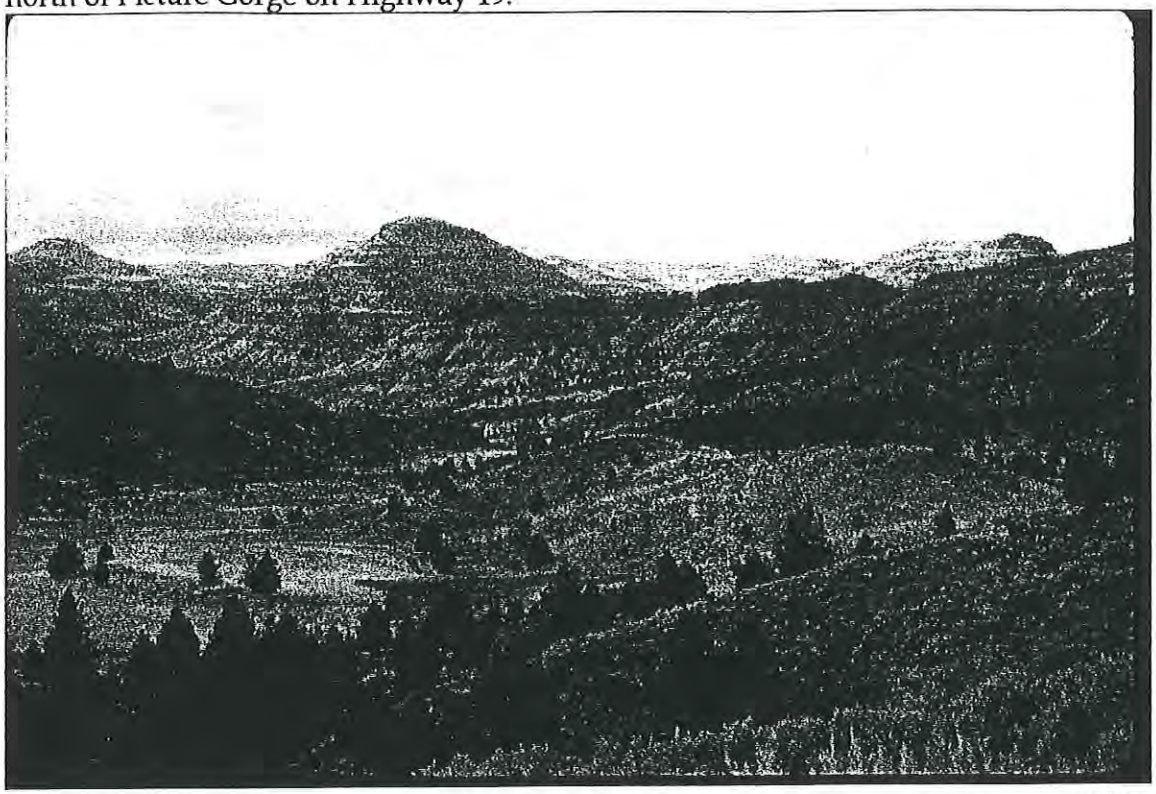
An interpretive marker provides information about the John Day River.

John Day Fossil Beds National Monument

⇒ Resource: John Day Fossil Beds National Monument.
⇒ Locations: Near Dayville and Fossil.
⇒ Management: National Park Service.
⇒ Condition: Excellent.
⇒ Enhancement: Promotion.
⇒ Protection: National Park Service has programs in place.

The John Day Fossil Beds National Monument is one of only four National Park Service-managed properties in Oregon. The National Monument is dispersed through several locations, or "Units" in the area. The Blue Basin and Clarno Units are directly on the route. The Painted Hills Unit is just off the route, nine miles west of Dayville.

The current visitor center is at the historic Cant Ranch, which is on the tour route just north of Picture Gorge on Highway 19.



As part of the North Central Oregon planning project, work will be undertaken with the National Park Service to build on programs for children and families. This is an existing strength of the John Day Fossil Beds National Monument. Children love fossils and prehistoric lore. School groups are frequent visitors. A nearby Oregon Museum of Science and Industry camp, Camp Hancock, brings many young people to the area.

A "Fossil Kit" for the region's schools has just been developed by Fossil Beds National Monument staff and is available for loan throughout the region.

Merging of the Waters

⇒ Resource: Merging of the Waters

⇒ Location: Kimberly

⇒ Management: Private Landowners, Government

⇒ Condition: Natural condition.

⇒ Enhancement: Interpretive Sign is needed.

⇒ Protection: Education as part of promotion; Riparian restoration.

The North Fork, Middle Fork and South Fork of the John Day River meet at this location. This would be an excellent site for an interpretive sign indicating that the John Day has the greatest number of miles of scenic waterway designation in the continental

United States. Information could be provided about the three forks of the river and their origination and lengths.

Also at this site begins a narrow valley of mild climate, where fruit crops cover hundreds of acres. Efforts are underway to work with farmers and ranchers in the area to develop Farm/Ranch recreation opportunities. Local supporters of the project will work with orchardists in this area to provide farm stays, open bed and breakfasts, or to market fruit directly to visitors.

As part of the North Central Regional Strategy Tourism planning process, efforts are being made to identify riparian areas that need restoration and to provide visitors with opportunities for working vacations. Visitors would pay to help restore the riparian areas and learn about the eco-systems of the area from area naturalists. A few miles north of this site, the privately-owned Longview Ranch partnered with the state to conduct miles of riparian restoration and serves as a model for this type of endeavor.

Spray (Pop.155)

⇒ Resource: Community.
⇒ Location: Highway 19.
⇒ Management: Municipality.
⇒ Condition:
⇒ Enhancement: Interpretive signing needed.
⇒ Protection: None needed.

The community of Spray lies in the curve of the John Day River. The river is tree-lined against the sage and juniper backdrop of nearby hills. Spray is known for its upland bird and game hunting, along with fishing on the river. The town is a former stagecoach stop and ferry crossing site. It currently operates a Pioneer Museum. South of Spray is the junction of Kimberly, well known for its fruit orchards and fields of clover and mint -- a fragrant journey in the springtime. There are BLM campsites at Lone Pine and Big Bend Parks east of Kimberly.

Interpretive Signing is needed to tell the story of how the ferry was needed to help freight wagons, which were traveling from gold mines in eastern Oregon up to the Columbia River, cross the John Day River.

Military Road

⇒ Resource: 1870s Military Road
⇒ Location: Road visible 5 to 6 miles west of Dayville. The location just east of Picture Gorge is an asset.
⇒ Management: Private lands, BLM
⇒ Condition: Ruts in good condition.
⇒ Enhancement: Interpretation is needed.
⇒ Protection: Work with landowners.

This site has clear markings of an old military route, worn from wagons. During the Bannock Indian Wars of the late 19th Century, settlers in this part of eastern Oregon demanded government protection. Posts were established along this route, with a main

command located south of what is now Prairie City. The Military Road was used strictly by the militia, according to historic records, and civilians negotiated with the government for construction of a parallel road which somewhat follows modern-day Highways 26 and 19.

Work is needed with landowners to ensure that they are aware of the value of the resource.

Thomas Condon Visitors Center

⇒ Resource: Thomas Condon Visitors Center.
⇒ Locations: Near Dayville.
⇒ Management: National Park Service.
⇒ Condition: Doesn't exist yet.
⇒ Enhancement: Support development.
⇒ Protection: None needed.

This project supports development of the John Day Fossil Beds National Monument proposal for a Thomas Condon Visitor Center. The proposed $20 million center would provide a facility for visitor orientation, information and interpretation as well as paleontological resource management, research and education.

About $1.3 million has been spent for design work and exhibits. The facility is ranked fourth in line on the list of park service priorities for the Oregon and Washington region. Improvements at Crater Lake are at the top of the list. A "Friends of the Thomas Condon Visitor Center" committee has been formed to support development of the center.

Picture Gorge

⇒ Resource: Ancient pictographs created by Native Americans are easily visible. Narrow canyon with John Day River rushing through. Tall canyon walls formed by lava flows.
⇒ Location: West of Dayville at the entrance to the Painted Hills area
⇒ Management: John Day Fossil Beds National Monument
⇒ Condition: Some theft and vandalism, but minimal.
⇒ Enhancement: Interpretive signing
⇒ Protection: Efforts by archaeological team are underway.

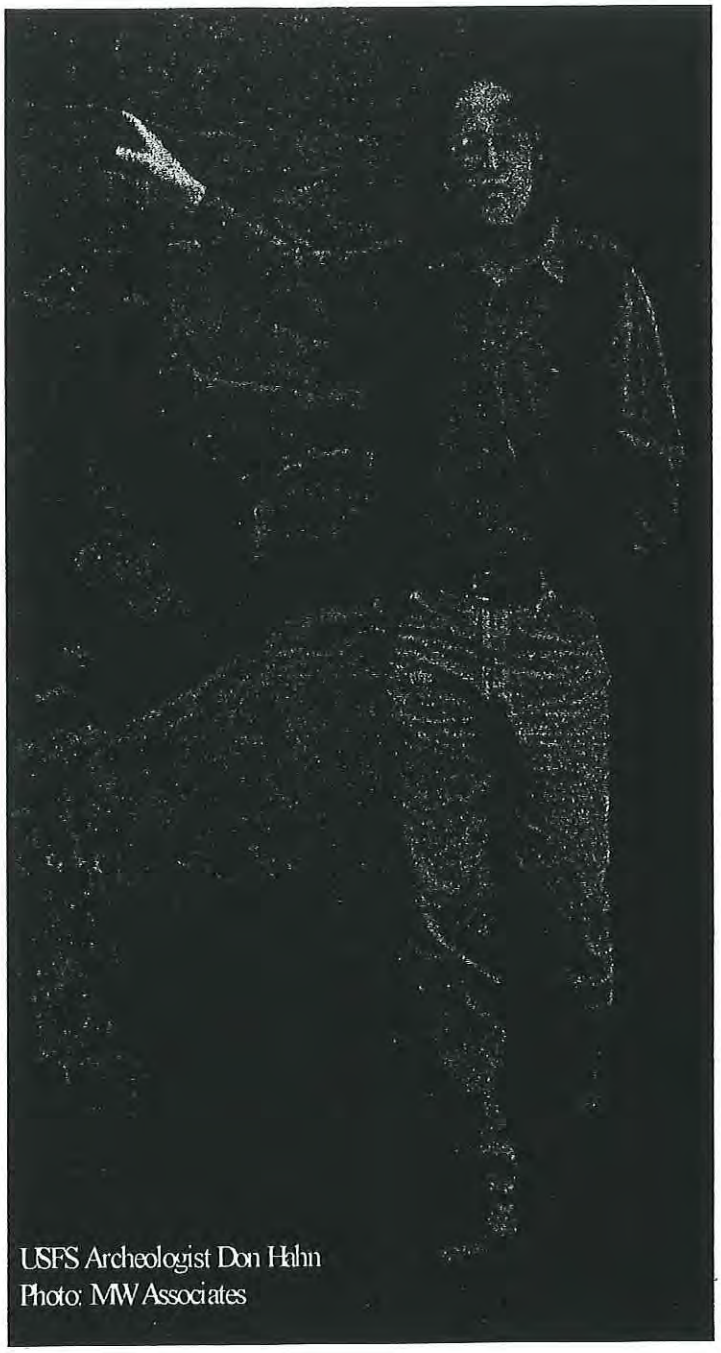
A sign already on-site clearly identifies Picture Gorge, but additional information about its history as a Native American trade crossing is needed. The same applies to the pictographs. Some are visible from the roadway, or by climbing down the bank to the river and peering down the gorge.

A pullout area already exists, although the roadway is narrow and curvy at this point and somewhat dangerous, especially in the winter when ice can form in this area.

A side tour loop through Bear Valley will be developed, where research shows more than 3,000 rendezvous sites for different tribes through the centuries. A stone camas oven, dating back approximately 700 years, was discovered in 1995 at Bear Valley by

Malheur National Forest archaeologists. It is the first found south of the Columbia Gorge and is the first found on the northern edge of the Great Basin.

A partnership between National Monument and Malheur National Forest archeologists has been initiated to interpret and preserve the pictographs. The archeologist team is working to stem vandalism and to increase public awareness to the sensitivity of this resource. Additional interpretive information in this area would be of value.



USFS Archeologist Don Hahn
Photo: MW Associates

Dayville (Pop. 145)

⇒ Resource: Community.
⇒ Location: Highway 26.
⇒ Management: Municipality.
⇒ Condition:
⇒ Enhancement: Downtown revitalization.
⇒ Protection: None needed.

A few miles outside Dayville is the Mascall Overlook, where four distinct geological ages are visible: Columbia, Rattlesnake, John Day, and Clarno. Many consider this overlook to be the best view of Oregon's fossil beds. The town of Dayville is described as "a pretty little cow town." Here, at the turn of this century, popular horse racing events attracted visitors from distant points. The Dayville Hotel, no longer in business, still makes a good photo subject. Horse races, team roping and a parade occur each July 4, with team roping in the downtown roping arena taking place on all major summer holidays.

Mt. Vernon (Pop. 625)

⇒ Resource: Community.
⇒ Location: Highway 26.
⇒ Management: Municipality.
⇒ Condition:
⇒ Enhancement: Considering park on the river, downtown revitalization.
⇒ Protection: None needed.

Mount Vernon was named after a famous race horse who was boarded just east of here in a small stone barn built especially for him. Southwest of Mt. Vernon is the Cedar Grove Botanical Area, which contains a small grove of Alaska Cedars that are unique to the area and the last remnants of a prehistoric forest. West of here is the Clyde Holliday State Park, a hiker/biker and river fishing camp facility.

Canyon City (Pop. 660)

⇒ Resource: Community.
⇒ Location: Highway 395.
⇒ Management: Municipality.
⇒ Condition:
⇒ Enhancement: Downtown revitalization
⇒ Protection: None needed.

Two miles south of John Day is the former gold rush town of Canyon City. Once a town of 5,000 people, in the 1860s approximately $26 million worth of gold was mined near this once-bustling community. Canyon City is the county seat of Grant County. The Grant County Historical Museum is located in the heart of town, with exhibits on gold mining and early settlers. The 1876 Episcopal Church is on the National Historic

Registry. The 1870s Sels Brewery, old bank and stagestop buildings still stand in the historic downtown.

Sels Brewery Renovation

⇒ Resource: Sels Brewery
⇒ Location: Canyon City
⇒ Management: Whisky Gulch Gang
⇒ Condition: Good condition, needs some renovation.
⇒ Enhancement: Develop into an operating microbrewery
⇒ Protection: None needed.

The Whisky Gulch Gang is seeking grants for renovations of this historic brewery. Once renovated, the brewery will offer tours for the period from Memorial Day through Labor Day. Long term plans possibly include converting the facility into a working microbrewery.

John Day (Pop. 1,900)

⇒ Resource: Community.
⇒ Location: Highway 395 and 26.
⇒ Management: Municipality.
⇒ Condition:
⇒ Enhancement: Downtown revitalization, traffic congestion in the summer.
⇒ Protection: None needed.

The largest community in Grant County, John Day was founded as a trading point on the old Dalles Military Road in the 1860s and once served as a Chinatown during the Gold Rush heyday at adjacent Canyon City. John Day was a pioneer whose trip West in 1810 was filled with misfortune. John Day was a member of the Jacob Astor party in Idaho. When the party split up to hunt for food, John Day and a companion became lost and nearly perished. The next spring they resumed their trip and reached the Columbia River. They were robbed of their belongings and their clothes. They were found by some trappers, nearly starved and naked. They were rescued and delivered to Astoria. The river and this area were named in honor of this unfortunate traveler who never set foot in the immediate area, and whose main achievement was surviving the hardship of his trip West.

The downtown area includes a 19th Century church on the same grounds as the Grant County Chamber of Commerce. The Kam Wah Chung Museum also downtown. In the 1880s there were twice as many Chinese in John Day as Caucasians, and the museum building was once a mercantile, herbalist's office and Chinese social center.

Gold Mining Heritage

⇒ Resource: Gold Mining Heritage
⇒ Location: Canyon City/John Day
⇒ Management: Various.
⇒ Condition: Undeveloped.
⇒ Enhancement: Develop gold panning opportunities.
⇒ Protection: None needed.

A gold rush occurred in the John Day Valley in 1862-1880 and during that period more than $26 million was taken from Canyon Creek and its environs. At its heyday Canyon City boasted more than 5,000 residents and was once more populated than the settlement of Portland. While Chinese laborers served in the mines, most actually resided at a Chinatown, at what is present day John Day. Nonetheless, during the Gold Rush era an influx of Chinese, prospectors, merchants, and emigrants filled the town and a local jargon quickly became popular, known as "Chinook." This local dialect contained a heady mix of English and Chinese words and was so prevalent that late 19th Century newspaper accounts sometimes slipped into the early terminology.

Open gold mines are still clearly visible on the mountainsides surrounding town, and some residents still pan and sluice for gold as their only livelihood. Placer mining took place for a short time earlier this century, but didn't last long. Placer ditches are also evident above the canyon, clearly visible from Hwy. 395.

A resident who owns open gold mines just south of town is offering visitors the opportunity to pan gold in Canyon Creek. For a small daily fee, findings belong to whoever discovers them! Another resident, an active member of the Gold Prospectors of America Association, is seeking funding for the purchase of hand-operated gold seekers, comparable to metal detectors, and would like to offer these devices for rent on a per day basis to visitors. Gold pans are still readily available at local hardware stores.

Many of the early prospectors are buried in the old cemetery above town. Excluded from the cemetery's walls are two prostitutes and two horse thieves, according to historic records. A sign near their graves outside the main cemetery tells these stories.

Canyon City's downtown, although devastated by three fires and a flood, still reflects the Gold Rush era. Several stone buildings remain, including the 1870s Sels Brewery, which is open to the public annually by a local civic group, the Whisky Gulch Gang, during the town's `62 Days Gold Rush Celebration.

The Canyon City Council is involved with a local tourism committee in seeking historic district designation for its downtown, and the Whisky Gulch Gang has expressed interest in a feasibility study on restoring the Sels Brewery to its original use by establishment of an on-premise microbrewery.

The 1876 St. Thomas Episcopal Church, in downtown Canyon City, is on the National Historic Registry and is an anchor for Canyon City's effort to seek designation as a historic district. Grassroots efforts for living history events are underway by a few citizens as a means of informing the public about the town's history.

Chinese History

⇒ Resource: Kam Wah Chung Museum
⇒ Location: John Day
⇒ Management: City of John Day, Oregon State Parks, Grant County Parks & Recreation Dept.
⇒ Condition: Threatened.
⇒ Enhancement: Expand with ancillary attractions.
⇒ Protection: Get curatorial assistance.

Over a century ago, two Chinese immigrants came as greenhorn miners to the newly discovered gold fields at Canyon City. Breaking social and racial barriers of the West, they stayed on in Chinatown (now John Day) long after the 1862 Gold Rush ended. Ing Hay and his business partner, Lung On, established a successful herbalist practice and drygoods general store which became the very center of the Chinese community.

> *The Kam Wah Chung & Co. building and its contents am the greatest single surviving group of original materials dating from the 19th Century influx of Chinese immigrants into the American West.*
> --Jeffrey Barlow & Christine Richardson
> China Doctor of John Day

The Kam Wah Chung Co., built in 1866-7, served as store, opium den, healing center and shrine for Chinese who labored in the gold mines. The Chinese were protected in this building, which was built like a fortress to ward off cowboys who periodically galloped through Chinatown with guns blazing.

The Kam Wah Chung holds tremendous historic significance. Upon Ing Hay's death in 1952, the building was locked and remained untouched for almost 20 years. Its stone structure allowed contents to be preserved perfectly. Contents include personal and household goods, mercantile items, priceless antiques, Chinese artifacts and more than 500 Chinese herbal medicines.

The Kam Wah Chung is the last direct link between Old China and the frontier of the gold camps and boom towns, to which these men had been drawn as youths.

A group of concerned citizens, community leaders, and State Parks staff have begun an effort to expand the Kam Wah Chung Museum by studying renovation of an existing county-owned Parks and Recreation Department building next to the museum. The adjacent building currently serves as a bathhouse for the city's municipal pool. To date, $20,000 in grants for this effort have been obtained from the Oregon Dept. of Parks and Recreation and from the US Forest Service. A feasibility study for these plans will get underway during the spring of 1996.



Kam Wah Chung Museum
Photo: MW Associates

An annual Chinese New Year's parade in John Day, has been poorly attended due to lack of publicity. A few residents dress in Chinese outfits and the parade consists of about six entries. There are no other events in conjunction with this parade. Obviously, the potential is tremendous to turn this into a broader festival.

Plans to expand the Kam Wah Chung via an interpretive center next to the existing building offer great opportunity to further tell the story of the Chinese influence on Eastern Oregon.

There are currently no other exhibits in Eastern Oregon depicting the Chinese influence, which include miles-long trenches hand-dug by the Chinese throughout the region (the Eldorado Ditch, stretching dozens of miles, is clearly visible near Unity), nor are there any displays about the infamous 1887 Chinese massacre in Wallowa County. Along the Middle Fork of the John Day River rocks piled larger than cabins were turned over by Chinese laborers by hand, where they re-sifted mine tailings left by white prospectors.

The success of the gold mines, which led to the creation of early towns, depended upon Chinese labor. The story of the Chinese impact on Eastern Oregon has been left unsaid.

Old West Traditions

⇒ Resource: Old West traditions
⇒ Location: Throughout the Length of the Route.
⇒ Management: Various
⇒ Condition: Intact.
⇒ Enhancement: Farm/Ranch recreation program.
⇒ Protection: None needed.



A unique glimpse into the Old West. Shoot-outs, stagecoaches, saloons and the Wild West are still visible in the region, where visitors can walk the sidewalks or boardwalks and relive the past. Hotels reflect an earlier era, a time when ranchers and miners would come to town frequently.

Area museums showcase this era and traditional methods of ranching are still visible to those traveling this route. Cowboys still ride the range, where cattle graze on decades-old pastures.

Even though many original smaller ranches have been consolidated into larger ones, visually nothing has changed. In the John Day Valley, most ranches consist of thousands of acres, held by descendants of those who held the first deeds. Family heritage and pride in land ownership runs strong here, and is unlikely to change at any time soon. Land use laws prohibit subdivision of these large ranches.

Livestock

⇒ Resource: Livestock
⇒ Location: John Day Valley, John Day River bottoms, Shaniko
⇒ Management: Private, Malheur National Forest
⇒ Condition: Intact
⇒ Enhancement: Farm/Ranch recreation development.
⇒ Protection: Public information.

In the John Day Valley, cattle have been the predominant livestock since ranches were established in the 1870s-1880s. Grazing allotments in the Malheur National Forest have been held for decades by the same ranching families. Most ranches follow traditional ranching methods of branding their livestock by fire, utilizing rockchucks rather than modern equipment for fence building, and cattle maintenance and cattle drives are still

accomplished by horseback. Twice yearly cattle drives of more than 1200 head of livestock are paraded through downtown John Day, as seasonal drives move these animals a distance of more than 30 miles from Bear Valley to the fertile John Day Valley. Many ranchers are descendants of original homesteaders and many of the larger properties now classify as centennial ranches.

Traditional ranches of many thousands of acres trail the John Day River bottoms west of Kimberly to east of Fossil. These picturesque valleys, with rock walls brightened by the fertile green river bottoms, mostly hold cattle. A tribute to the scenic beauty of this area is the Longview Ranch, long a model of good ranch management.

Shaniko was once billed as the "Wool Shipping Center of the World," and served as the southern terminus for the Columbia Southern Railway. From here, live sheep and wool were shipped to the Columbia for further shipping to distant points. Sheep predominated as the choice of livestock in this area.

Today, at Shaniko visitors can see remains of buildings and historic wood structures from the days when the town was a thriving commercial center.

Interpretive signing and other information is needed about the history of cattle here, the types of grasses (i.e. bunchgrass) which led to grazing as a mainstay, the types of cattle (Herefords and longhorns) best suited to this region, and about how the sheep populations declined as a result of the range wars at the turn of the century.

Efforts are underway to provide farm and ranch recreational opportunities. In January 1996 the Oregon Outdoors Association agreed to serve as the umbrella organization for farm-ranch recreation efforts statewide. This effort originated from a meeting held in the North Central region by Michael Wetter & Associates.

Timber Industry

⇒ Resource: Timber Industry
⇒ Location: Mostly Baker to John Day.
⇒ Management: Wallowa-Whitman and Malheur National Forests
⇒ Condition: Struggling, due to harvest restrictions.
⇒ Enhancement: Interpretation.
⇒ Protection: None.

No clearcutting is visible from the highways. Old growth forests are visible in sections of these National Forests. There are few private land holdings through the timber belt, an unspecified area encompassing thousands of acres, where former milltowns existed.

The Sumpter Valley Railway was built in 1890 by David Eccles, who owned a huge mill at Baker City. He realized the potential to haul logs from the Blue Mountains to Baker City for shipping from there to other points. The Railway operated from the 1890s to the 1930s, running a distance of 80.1 miles from Baker City to Prairie City. Literally hundreds of additional miles of track zigzagged on side tracks throughout the Blues.

Milltowns quickly sprang up along the route: Whitney, Austin, Bates. Whitney, is a classic high mountain ghost town now with wind-whipped wood buildings leaning in an open meadow. A three-story mill across the meadow and original narrow-gauge tracks of the railway can be viewed by visitors. Most of the structures of the town of

Austin have been moved, and the town now consists of less than a dozen quiet residences.

The entire town of Bates, quickly built as a mill company town earlier this century, was dismantled and buildings were relocated or torn apart for structures at other locations, predominantly Prairie City. Former Bates residents hold an annual reunion where they reminisce about the town and its former mill-owned store.

Enhancement: Continue excellent restoration efforts of Sumpter Railway. Signage is needed at Bates and Austin. Many visitors pass the empty field where the town of Bates used to be, not knowing that earlier this century a thriving community was located there. Cement walls mark where the former Bates mill sawed huge trees into logs and boards for shipping on the railway.

Depot Park at Prairie City tells the story of the timber and railway days, but this is mixed in with other early settler artifacts. Historic photos belonging to the National Forests, not displayed anywhere, should be made visible to the public. These depict grand old trees cut from the forests, with cuts wider than a person is tall.

At Prairie City visitors can arrange for a tour of the operating Prairie Wood Products mill. At Mt. Vernon, and at other points not on the tour route but close enough for easy designation as a side trip, former operating mills stand in quiet sentinel just outside town limits. At Long Creek, for example, one of the last operating steam-powered sawmills is standing in a field.

There is currently no museum or exhibit area solely for the timber industry, which is the backbone of many Eastern Oregon communities. North Central Regional Strategy tourism efforts will include contact with mill owners about helping to fund a timber or natural resource-based museum or interpretive site.

Trade Goods

⇒ Resource: Trade goods
⇒ Location: Throughout Area, paralleling modern highways
⇒ Conditions: Some traces of historical trade is still visible.
⇒ Enhancement: Interpretation.
⇒ Protection: None.

The Sumpter Valley Railway hauled logs, livestock, gold and passengers from the John Day Valley to Baker City. Columbia Southern Railway hauled sheep, wool and wheat from North Central Oregon to the Columbia River.

Heavy freight wagons, pulled by teams of horses or mules, moved goods from the boom towns via a network of undeveloped trails and roads which eventually became the highways of today. Gold and disgruntled miners and settlers often were freighted out of the high mountains, while much-needed supplies were hauled in.

The creation of permanent residences gave rise to the stagecoach routes which followed the tracks of the freight wagons. As late as 1929 stages hauled passengers, trade goods, emigrants and gold dust through Grant County. Stagecoach routes ran from Baker City to Canyon City and from Canyon City to the Columbia. Besides town liveries, rural

settlers prospered by providing supplies to travelers. Many original homesteads, which later gave rise to the establishment of towns, served as stage stops.

The Cant Ranch, now the Visitors Center for the John Day Fossil Beds, is a prime example of a popular stage stop. This Victorian home offered respite to weary travelers. Travel in this region was arduous at best and the railways, freight wagons and passenger-movers played a critical role in development.

Much of the region of the Journey Through Time Tour Route was used by Native Americans as crossing grounds to reach designated points for trading, such as further west along the Columbia River. The part of Oregon along the tour route, according to historic records, served mostly as a migratory area for early Native Americans.

While tepee rings are visible in the John Day Valley in the springtime, USFS records show that tribes came to this area to hunt and gather food rather than to maintain permanent residence. Twenty miles to the south, Bear Valley served as a major rendezvous site and so far more than 3,000 campsites of varied tribes have been discovered. Evidence shows flint remains from rock not native to this area.

The Columbia is well known for its Native American gathering points for the harvest of salmon and trading of goods. The word Wasco is derived from a Native American word meaning "bowl," referring to the rolling hills terrain near the Columbia.

Prairie City (Pop. 1,160)

⇒ Resource: Community.
⇒ Location: Highway 26.
⇒ Management: Municipality.
⇒ Condition:
⇒ Enhancement: Downtown revitalization
⇒ Protection: None needed.

Prairie City was the west end of the turn-of-the-century railroad from Sumpter. The town is considered the gateway to the Strawberry Mountains. The Dewitt Museum is located in the relocated Sumpter Valley Railroad Depot at Depot Park, a few blocks from the picturesque downtown. The 1910 depot has 11 rooms filled with displays of pioneer artifacts, and overnight camping facilities are available in Depot Park. Interesting architecture downtown includes brick, masonry and cut stone. The Malheur National Forest ranger station is located in Prairie City.

Strawberry Mountain Overlook.

⇒ Resource: Scenic vista.
⇒ Location: Highway 26.
⇒ Management: ODOT/Travel Information Council.
⇒ Condition: Good.
⇒ Enhancement: None needed.
⇒ Protection: None needed.

A spectacular view of the Strawberry Mountain Range. An interpretive marker and a covered wagon visitor information kiosk provide visitor information.

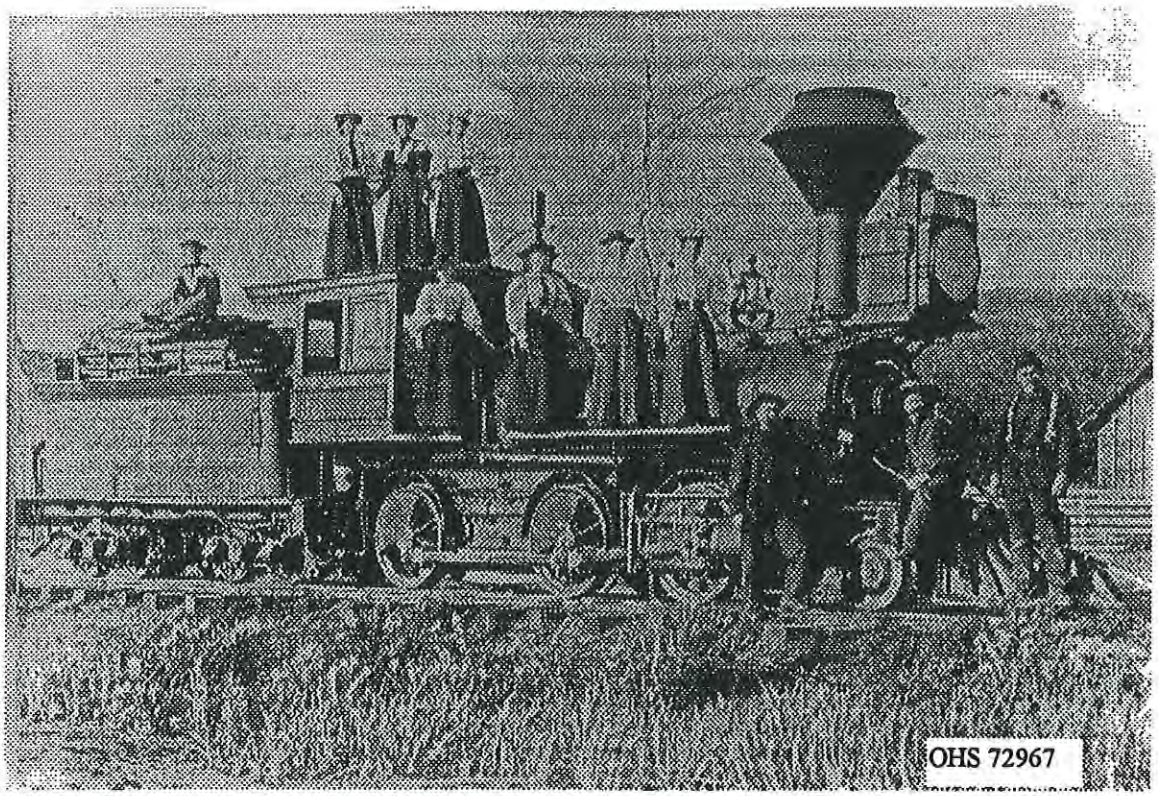
Sumpter (Pop. 165)

⇒ Resource: Community.
⇒ Location: Highway 7.
⇒ Management: Municipality.
⇒ Condition:
⇒ Enhancement:
⇒ Protection: None needed.

Gold was discovered here during the Civil War era, and the town was named (with incorrect spelling) after Fort Sumter, North Carolina, by early settlers. Despite devastating fires the town retains its Old West character. A brick vault from an early bank stands along stores on the Main Street, which includes log-hewn and boardwalked restaurants, gift shops and quaint stores.

Sumpter Valley Railway

⇒ Resource: Sumpter Valley Railway
⇒ Location: Baker City, Dixie Mountain, Depot Park (near Sumpter), Prairie City
⇒ Management: Restoration efforts by Sumpter Valley Railway Restoration Inc., Oregon Parks & Recreation Dept., City of Prairie City, City of Baker City
⇒ Condition: Much of the original track is still in place.
⇒ Enhancement: Restoration is underway.
⇒ Protection: None needed.



Much of the original track of the Sumpter Valley Railroad still lies through the Blue Mountains timber belt. Portions have been restored and clearly identified with signage at a highway pullout on Dixie Mountain and extensively at Depot Park. Here, visitors can hike through the forest to view original railway tracks and switchbacks.

At the Burnt River Valley near the former bustling town of Whitney, the original engine has been restored and visitors can travel on a portion of the original narrow gauge line. The train ride travels through an Oregon Natural Habitat Area. Artifacts of this historic roadway are on display at the Oregon Trail Museum at Baker City and at the depot itself and some artifacts are located at a city park at Prairie City.

Train rides are advertised and there has been publicity of restoration efforts. The Sumpter Valley Railway visitor station's proximity to Sumpter, where a historic gold dredge stands, ties together for further efforts in encouraging visitors to see both sites.

The strategy of restoration is well underway. More is planned by Malheur National Forest and Sumpter Valley Railroad Restoration Inc.

Gold Dredge

⇒ Resource: Gold Dredge
⇒ Location: Sumpter, south edge of town
⇒ Management: Oregon State Parks
⇒ Condition: Salvageable.
⇒ Enhancement: Complete restoration and promote.
⇒ Protection: Under restoration.

This 72-ton, 4 story tall Gold Dredge churned new river passages as it turned over land in search of gold. It is a popular visitor attraction with an informative sign and a hiking trail which circles this monstrous piece of machinery. Tailings from the operations of the dredge are evident and can be seen from the route. The process of dredge mining began in 1913 in this area, and by this method all topsoil and stone was sifted down to bedrock. The gold dredge at Sumpter cost $300,000 and produced more than $4.5 million in gold. It operated near Sumpter from 1935 to 1954, and was the last operating gold dredge in the Gold Belt of the Blue Mountains. The dredge is under renovation, and huge pieces of machinery related to its use and gold mining in general have been brought back to the site along the interpretive walking trail.

The Powder River, near the dredge and piles of tailings, is a popular site for viewing waterfowl.

Gold was discovered at Sumpter in 1862 and the town quickly boomed. Before a devastating fire roared through town, the community boasted a few dozen hotels and saloons, mercantile, liveries and a red light district. The vault of a former bank, destroyed by fire, still stands along the Main Street with a sign depicting its history.

One of the old hotels (now a Bed & Breakfast establishment) still stands on a hill overlooking the town, and the many shops along the main street reflect the Gold Rush heritage in their appearances -- rough wood exteriors, wood boardwalks, log structures, and even a few boulders painted gold and labeled as "Sumpter nuggets."

A new motel is constructed of logs in keeping with the town's heritage. Four times during the summer the town receives an influx of at least 5,000 visitors at once as they peruse a popular outdoor antiques market. The market fills streets, yards and virtually any available space in the town.

Sumpter is a popular stay-over location for snowmobilers in the winter, who avail themselves of the high mountain lodging and restaurant facilities which are in close proximity to snowmobile trails throughout the mountains.

There is a potential sidetrip: From Sumpter follow the Gold Belt 15 miles winding upward to 6,000 feet to the barely inhabited ghost town of Granite. This is the smallest incorporated town in Oregon. Old wood structures still standing are marked as pharmacy, dance hall, brothel, mercantile, one-room school, church, etc.

From here one can wind higher in the mountains about 12 miles to the former gold-based town of Greenhorn--once with 5,000 miners & residents, now all that remains are a few scattered buildings across an overgrown high mountain prairie. The original wrought-iron and wood Greenhorn jail now stands on the grounds of the Grant County Historical Museum at Canyon City.

Baker City (Pop. 9,585)

⇒ Resource: Community.
⇒ Location: Interstate 84.
⇒ Management: Municipality.
⇒ Condition:
⇒ Enhancement: Downtown revitalization
⇒ Protection: None needed.

The community is undergoing substantial development as a result of an influx of annual visitors to the Oregon Trail Interpretive Center at nearby Flagstaff Hill. Another museum, the Oregon Trail Historical Museum, highlights local history and houses several interesting collections. Historic Baker City Inc. oversees renovations on more than 100 buildings in the designated historic district, with the Geiser Grand Hotel (currently under renovation) as the jewel on the crown to these efforts.

Oregon Trail Interpretive Center

⇒ Resource: Interpretive Center.
⇒ Location: Flagstaff Hill off Highway 86.
⇒ Management: BLM.
⇒ Condition: Excellent
⇒ Enhancement: None needed.
⇒ Protection: None needed.

This museum is located on Flagstaff Hill, which provides panoramic views of Baker Valley and the Elkhorn and Wallowa Mountains. The epic adventure of the Oregon Trail is depicted by full scale models and living history presentations.

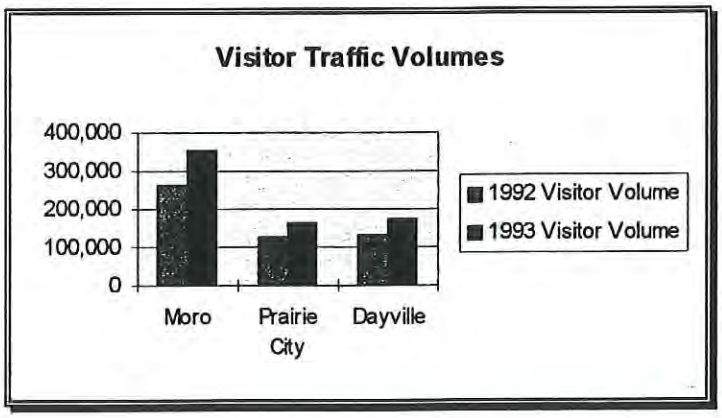
Transportation

Visitor Traffic Volume

The table and chart below show visitor volume along the Journey Through Time Tour Route for 1992 and 1993. Data is in visitor vehicles per year. Further analysis and methodology is provided in the Appendix. Highways 26 and 97 are the highest volume roads on the route. As a comparison, Fossil, which is on Highway 19, probably receives slightly more visitor traffic than Condon, which gets about 17,000 vehicles per year.

County	Location	'92 Vis. Volume	'92 % Visitors	'93 Vis. Volume	'93 % Visitors	% Increase 92-93
Sherman	Hwy 97 6.3 W of The Dalles	262,435	30%	351,130	40%	34%
Grant	Hwy 26 .2 E of Prairie City	125,195	24%	162,790	31%	30%
Grant	Hwy 26 1.9 E of Dayville	133,955	39%	172,280	48%	29%

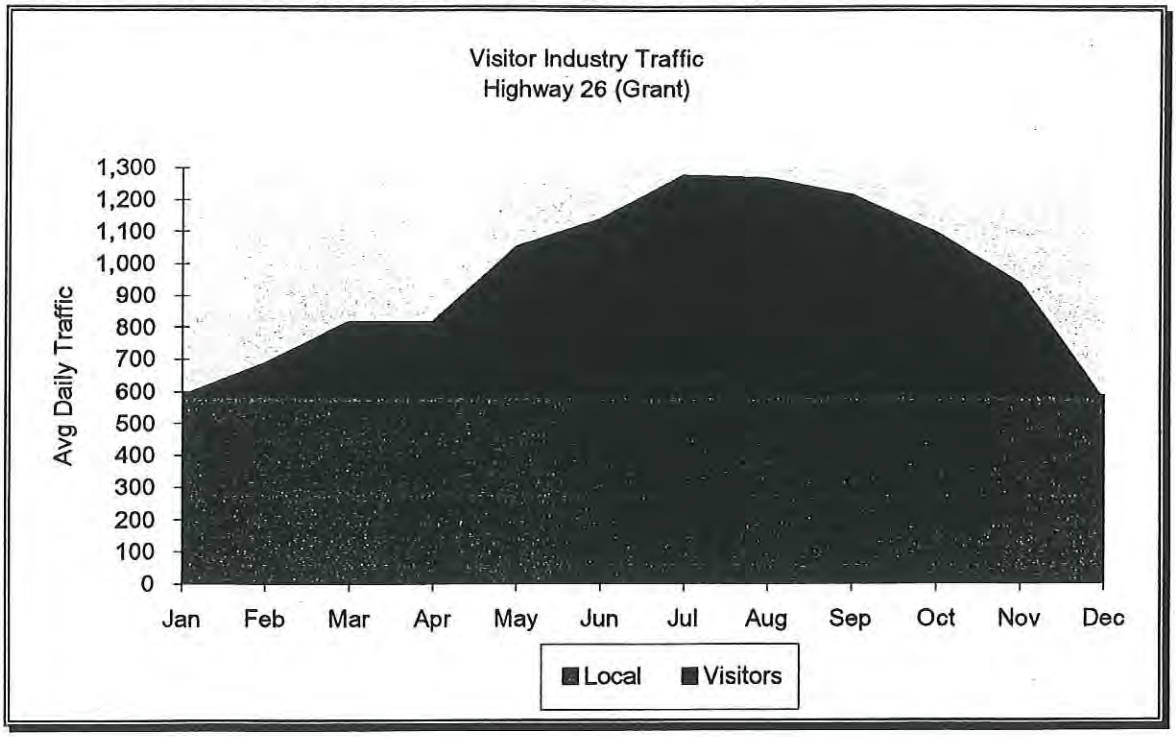
The data shows an approximately 30% increase in 1993, attributable in part to the Oregon Trail celebration and in part to the fact that 1992 was a low volume year. Visitor traffic will probably not maintain its 1993 level, but will drop back somewhat. However, it does show the kind of impact that can occur due to visitor industry promotion. If the Journey Through Time route is successful, visitor volume may meet or exceed 1993 levels.



Seasonality

The chart below shows seasonality of visitor industry travel in the region. The data shows a relatively long visitor season, from May through November. The fall season is probably due to hunting traffic. Activities and events along the Journey Through Time

Tour Route that could entice more visitation during January through April would be of definite benefit to the region's visitor industry businesses.



Road Conditions and Hazards

Access Oregon funding has significantly improved conditions along Highway 26 in recent years. The trip from Prineville to John Day has improved, and work was completed last season on the section near Prairie City. The section west of Picture Gorge can be hazardous, and the long term plan is to straighten this section and bypass Picture Gorge. This would help move traffic safely, as well as preserve this special place, which would still be accessible by motor vehicle.

The most difficult stretch of roadway on the Journey Through Time Tour Route is the section west of Fossil on Highway 216, which is very curvy and has steep grades. Travel is slow, especially for large vehicles.

Baker City to Sumpter: Highway 7

Winding mountainous highways, improved. Numerous 30-35 mph curves. Runs mostly through US Forest Service land. Portions lie in snow zones; well-maintained.

Austin Junction to Picture Gorge: Highway 26

Major highway reconstruction over Tipton, Dixie Summits and down to Prairie City completed last year; new guardrails, widening, straightening.

Prairie City to Picture Gorge: Highway 26

Sections scheduled for widening in 1996 and banks will be sloped to reduce rock fall. Five miles with 35 mph curves scheduled for reconstruction in 1997. Through Picture Gorge the highway will receive an overlay in 1997.

ODOT Area Resource Manager, Dale M. Johnson, notes more than 500 big game animals are hit by vehicles each year on Highway 26.

Picture Gorge to Fossil: Highway 19

Reconstruction of a 14 mile stretch was completed in 1992. Eighteen miles from milepost 74 to Spray city limits under construction at this time. Rock fall areas, curving roads.

Fossil to Biggs

Highway 218 winds through canyons and hilly terrain, with many slow curves. Highway 97 is a main tracking route with gradual curves and more level ground.

Biggs to Maryhill

A bridge over Columbia River offers a panoramic view; Highway 14 parallels the Gorge and is part of a designated Washington Scenic Route.

Signing

As part of the Oregon Travel Signing System, signs have been installed from Prairie City to Fossil. Signing include route shields, as place identification signs and other signs. The portion of the route from Maryhill to Fossil, and from Prairie City to Baker City, do not have signs. The region has not identified a source of funding for these signs. The location at Shaniko is most critical, since the turn from US 97 onto Highway 216 could be easily missed.



Economic Impact

The traffic analysis showed an approximately 30% increase in visitor traffic in 1993. If the Journey Through Time Tour Route were able to attract that level of increase, or some portion of that level, then certain economic impacts could be expected to occur. These impact would depend on the percentage of total visitor expenditures that were made in the region (% share or capture).

> If the Journey Through Time Tour Route attracts an additional 40,000 visitor vehicles per year, the economic impact could be as much as 94 jobs.

The Oregon Trail Celebration caused about an additional 40,000 visitor parties to travel Highway 26. At three per party, that equates with approximately 120,000 additional visitors. If the Journey Through Time Tour Route were able to attract an additional 120,000 visitors, and each spent a full day on the route, then the impacts would be approximately those indicated in scenario 3, in the table below. The scenario assumes that half stay in Motels (60,000) and half camp (60,000). Job creation, if the region captures 90% of their expenditures, would be about 94 jobs. These visitors would contribute an additional $5.8 million to the economy.

Scenario 2 assumes half this level of activity, and scenario 1 assumes 25% of this level of activity.

Journey Through Time Scenarios: Increased Heritage Tourism Traffic

Motel/Bed and Breakfast Stays

Revenue	Increase Person/days	Expenditures	Total Expenditures	75% Share	80% Share	90% Share
Scenario 1	15,000	$70.10	$1,051,552	$788,664	$841,241	$946,397
Scenario 2	30,000	$70.10	$2,103,103	$1,577,328	$1,682,483	$1,892,793
Scenario 3	60,000	$70.10	$4,206,207	$3,154,655	$3,364,966	$3,785,586

Jobs	Increase Person/days	Expenditures	Total Expenditures	75% Share	80% Share	90% Share
Scenario 1	15,000	$70.10	$1,051,552	12.7	13.6	15.3
Scenario 2	30,000	$70.10	$2,103,103	25.4	27.1	30.5
Scenario 3	60,000	$70.10	$4,206,207	50.9	54.3	61.1

Camping Stays

Revenue	Increase Person/days	Expenditures	Total Expenditures	75% Share	80% Share	90% Share
Scenario 1	15,000	$37.34	$560,172	$420,129	$448,138	$504,155
Scenario 2	30,000	$37.34	$1,120,345	$840,259	$896,276	$1,008,310
Scenario 3	60,000	$37.34	$2,240,690	$1,680,517	$1,792,552	$2,016,621

Jobs	Increase Person/days	Expenditures	Total Expenditures	75% Share	80% Share	90% Share
Scenario 1	15,000	$37.34	$560,172	6.8	7.2	8.1
Scenario 2	30,000	$37.34	$1,120,345	13.6	14.5	16.3
Scenario 3	60,000	$37.34	$2,240,690	27.1	28.9	32.5

Marketing

Marketing Strategy

The Marketing Strategy for the Journey Through Time Tour Route is under development as part of the North Central Regional Strategies Tourism Strategic Plan. Marketing will include advertising and media campaigns, as well as visitor information to be used as fulfillment. A number of marketing projects are being initiated now, with the expectation that they will be folded into the overall marketing strategy when it is completed and funded.

Initial marketing efforts include development of media kits and brochures/tearsheets about the route. A "Journey on the Journey Through Time Celebration" in the fall of 1996 will kick off promotion efforts. More detail is provided below. Journey Through Time committees will help coordinate the marketing program.

In-State Marketing

The Journey Through Time Tour Route looks to Interstate 84 as a significant source of visitors. The tour route serves as an alternate route between Baker City and Biggs. Based on surveys of existing visitors, many visitors also come from Central Oregon, the Willamette Valley and western Idaho.

For this reason, it is important to market the route at tourism attractions and stopping points along I-84, including the Oregon Trail Interpretive Center, Baker City, Ontario, The Dalles, the Gorge Discovery Center and Multnomah Falls. Michael Wetter & Associates is now working on a visitor information panel to be installed at Travel Information Council rest area info centers along I-84.

Marketing efforts include working with the Oregon Tourism Commission to become part of the Commission's in-state marketing campaign, which has the objective of getting Oregonians to see Oregon. The Oregon Tourism Commission staff will assist in development of Journey Through Time media kits. Funding is being sought for development of "Journey on the Journey Through Time" Celebration brochures.

The Eastern Oregon Visitors Association and Oregon Trail Marketing Coalition have offered fulfillment services for Journey Through Time marketing materials. When completed, brochures on the Celebration and the route itself will be included in the anticipated 20,000 mailings by EOVA/OTMC during 1996. These brochures will also be distributed through area Chambers of Commerce, Convention and Visitor Bureaus, museums and businesses.

The "Journey on the Journey Through Time Celebration" is set for Sept. 21-29, 1996, as a means of drawing attention to the tour route. This coincides with Oregon Archaeology Week. Festivities such as living history performances, Old West fun, music in parks, business promotions, art shows, special museum exhibits and demonstrations are planned at each of the 17 communities along the tour route.

"Journey Through Time" souvenirs are under development and will be sold at retail outlets along the route. A lodging owner has agreed to provide toll-free reservation services for visitors who attend the Celebration.

Baker City has agreed to help launch the Celebration as part of its annual wine festival, a wheat harvest festival will be held at the community of Grass Valley, a FossilFest will be held at the Town of Fossil, and the John Day Fossil Beds National Monument will hold on site tours, interpretation and special programs during the Celebration. Living history performances will be held at several of the communities along the route and at the Sherman County Historical Museum and Oregon Trail Interpretive Center.

Thirty-seven volunteers are coordinating this Celebration. It has the potential to attract national attention.

Other Marketing

The Maryhill Museum of Art near Goldendale, Washington, has agreed to serve as a distribution center for Journey Through Time marketing materials. This will include brochures on the "Journey on the Journey Through Time" celebration. Area Chambers of Commerce, convention and visitor bureaus and museums will also distribute marketing materials for the route.

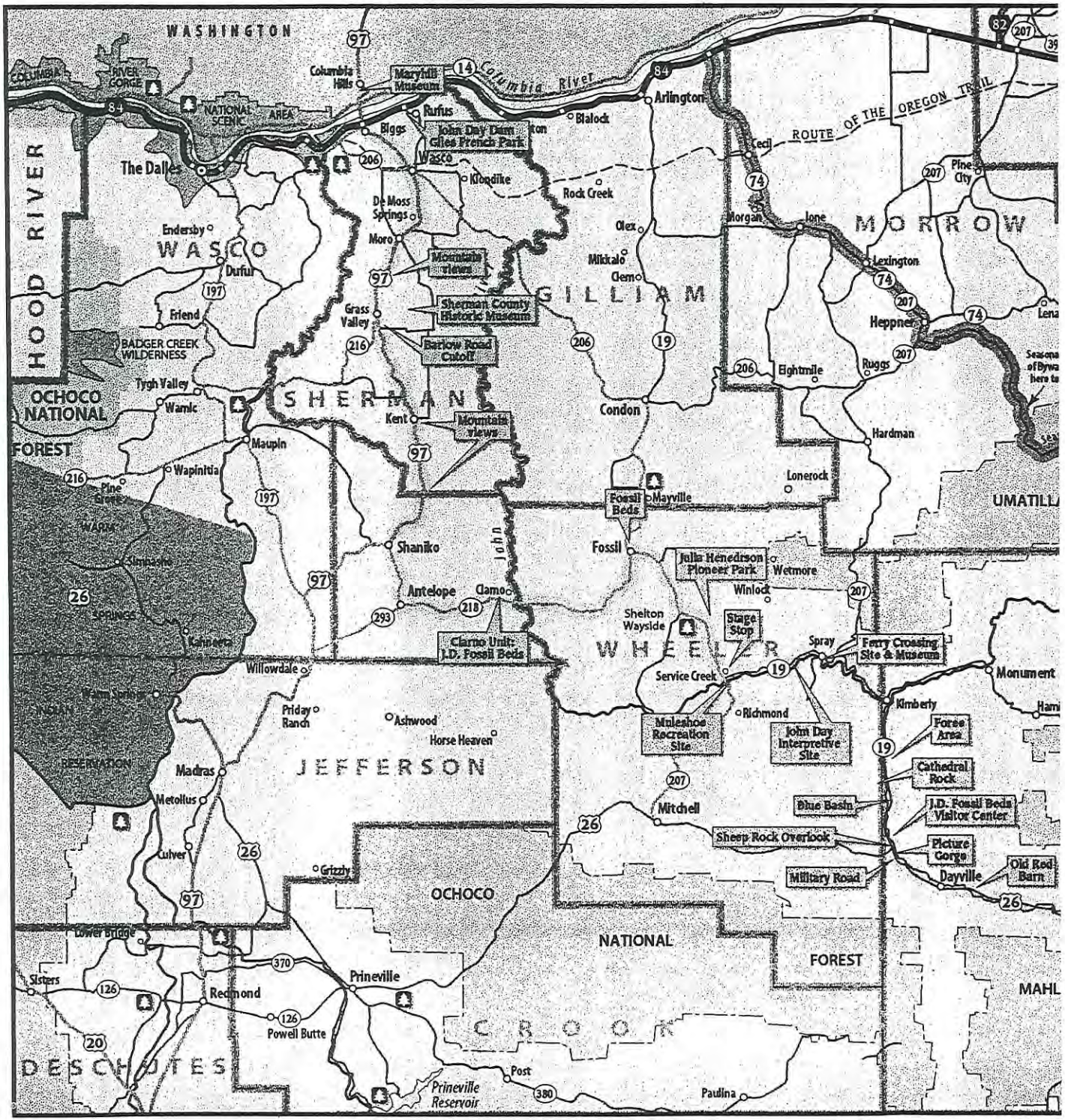
Kiosks

Visitor information kiosks have been installed east of Prairie City and at the Town of Fossil, and are under development at Baker City and Moro. These feature information about the Journey Through Time Tour Route and are an important point of information dissemination.

The kiosks include a map of the route, points of interest, general route description and business advertising. Advertising revenues support kiosk maintenance and provide a source of marketing funds for further promotion of the route. Some of the information that appears in the kiosks is provided in the Appendix.

Tour Route Tearsheets

Tour route brochures or flyers have been designed. These are nearly finished and will be desktop published to keep costs down. They include a map of the route, general route information and business advertising.


WASHINGTON
COLUMBIA RIVER GORGE NATIONAL SCENIC AREA
Columbia Hills
Maryhill Museum
Columbia River
Arlington
Blalock
Rufus
Biggs
John Day Dam Giles French Park
The Dalles
Wasco
Klondike
Rock Creek
Cecil
ROUTE OF THE OREGON TRAIL
Pine City
Morgan
Ione
MORROW
HOOD RIVER
De Moss Springs
Endersby
WASCO
Moro
Mountain Views
Olex
Mikkalo
Clemo
Lexington
Heppner
Durfur
Friend
Grass Valley
Sherman County Historic Museum
GILLIAM
BADGER CREEK WILDERNESS
Barlow Road Cutoff
Eightmile
Ruggs
Tygh Valley
OCHOCO NATIONAL FOREST
Warmic
SHERMAN
Kent
Condon
Hardman
Maupin
Wapinitia
Pine Grove
Fossil Beds
Mayville
Lonerock
UMATILLA
WARM SPRINGS INDIAN RESERVATION
Shaniko
John Day
Fossil
Julia Henedrson Pioneer Park
Wetmore
Winlock
Antelope
Clarno
Shelton Wayside
Stage Stop
Clarno Unit: J.D. Fossil Beds
WHEELER
Spray
Ferry Crossing Site & Museum
Willowdale
Service Creek
Monument
Kimberly
Friday Ranch
Ashwood
Horse Heaven
Richmond
Muleshoe Recreation Site
John Day Interpretive Site
Forest Area
Madras
JEFFERSON
Cathedral Rock
Metolius
Mitchell
Blue Basin
J.D. Fossil Beds Visitor Center
Sheep Rock Overlook
Picture Gorge
Culver
Grizzly
Military Road
Dayville
Old Red Barn
OCHOCO NATIONAL FOREST
Lower Bridge
Sisters
Prineville
Redmond
Powell Butte
CROOK
DESCHUTES
Prineville Reservoir
Post
Paulina

Appendix: Points of Interest and Map

This leg of the Journey Through Time Tour Route originates at the Oregon Trail Interpretive Center, a vivid representation of the Oregon Trail experience. From here, it travels over a mountain pass to the John Day Valley. The corridor from Baker City to John Day was once booming with gold mining activity. The Sumpter Valley Railroad followed a perilous course through the Blue Mountains to deliver timber to Baker City and to serve the gold mining industry. Mining is now mostly just history, but timber continues to be an important industry.

Oregon Trail Interpretive Center

This museum is located on Flagstaff Hill, which provides panoramic views of Baker Valley and the Elkhorn and Wallowa Mountains. The epic adventure of the Oregon Trail is depicted by full scale models and living history presentations.

Historic Baker City

Tour Baker City's historic business district and view early settler artifacts and gem collections at the Oregon Trail Regional Museum. Visitor services are available.

Griffin Gulch

Gold was discovered here in October 1861, setting off the era of boom towns in the region.

Road to Auburn

More than 5,000 miners crowded this quickly-established town in 1861 after gold was discovered at nearby Griffin Gulch. By 1862 the post office was discontinued, as the miners moved on.

Sumpter Valley Railway

Track the Sumpter Valley Railway through the timber belt in the Blue Mountains. This narrow-gauge railway ran between Baker City and Prairie City at the turn of this century.

McEwen: Former Rail and Stage Stop

McEwen was a station on the Sumpter Valley Railway and the starting point for the westbound stageline into the John Day Valley.

Sumpter Valley Railroad Depot

The restored railway now carries visitors from an Oregon Wildlife Habitat Area, where tailings from dredge mining are piled high, and the town of Sumpter.

Sumpter: Gold-Mining Town

Take a side trip to Sumpter, two miles away, and step back in the Old West. Gold was discovered here in 1862. One of the dredges that created the mine tailings is banked along the river. It last operated in 1954.

Whitney: Ghost Town

This lumber town celebrated its heyday in the early part of this century. Across the meadow stands the abandoned sawmill, built in 1911.

Tipton Summit

Elevation: 5,097 feet. Here a highway pullout tells of battling winter snows with up to seven locomotives pushing wedge plows at once.

Historic Sumpter Valley Railroad Interpretive Site

View switchbacks of the Sumpter Valley Railroad. Interpretive trail.

Austin and Bates: Former Mill Town and Former Stage Stop

Austin was an important stop along the stage route which ran between Baker City and John Day. Bates was built in 1919 by a lumber mill for its employees. In 1964 the mill was torn down and many of the town buildings were moved to other places, such as Prairie City.

Dixie Mountain Summit

Elevation: 5,240 feet. View switchbacks of the Sumpter Valley Railway.

Strawberry Mountain Overlook.

Enjoy a spectacular view of the Strawberry Mountain Range. An interpretive marker and a covered wagon visitor information kiosk provide visitor information.

Prairie City / Dewitt Depot Museum

Here was a major shipping point for cattle from the John Day Valley to Baker City. Tour the depot museum, a site on the National Historic Register. The museum's 11 rooms showcase the railroad, lumber and early settler days. Visitor services are available.

John Day

John Day was an early 1800's explorer who crossed central and eastern Oregon, but there are no accounts of his travels bringing him to this fertile valley. The City of John Day provides visitor services. Several museums are in the vicinity.

Seventh Day Adventist Church, John Day

This 19th Century church is on the National Historic Registry and is a fine example of early architecture in this region.

Kam Wah Chung Museum

This former Chinese store, religious shrine and meeting place has been restored and now is a museum. The exhibits give a look at the past through the eyes of the Chinese laborers who came to the area to work in the gold mines. The Kam Wah Chung is internationally significant as one of the best representations of the lives of 19th century Chinese immigrants.

Canyon City: Gold Mining Town

During the Gold Rush here, 1862-1880, more than $26 million in gold was mined. The 1876 St. Thomas Episcopal Church is on the National Historic Registry and several historic stone buildings line the downtown. Once the Largest City in Oregon. Visitor services are available.

From the John Day Valley to Clarno, the Journey Through Time follows the course of the John Day River, the longest free flowing river in the continental US. The John Day Fossil Beds National Monument is located at several sites along this portion of the route. Here, 50 million years of the earth's geological history are interpreted. The fossil beds are one of the most significant fossil sites in the United States. Farming and ranching are the most important industries.

Stone Barn of Mt. Vernon, Famed Horse

This stone barn was built to protect Mt. Vernon, a famous local race horse, who gave his name to the town. The community was famous for its hot springs, offering what it called "the water that heals." Visitor services are available.

Dayville: Horse Racing Town

This stagestop community was famous at the turn of this century for its race horse events, attracting people from all over. It offers a restful stop and lots of small town charm. Visitor services are available.

Military Road: Canyon City to The Dalles

To the west, along the base of the ridge, one can view the grooves of the former Military Road, which ran from Canyon City to The Dalles. The US Government established military posts throughout this region following clashes between settlers and Indians in the late 1870's.

Picture Gorge: Ancient Tribal Trade Route

Ancient petroglyphs mark the rock wall along the river. Here, ancient Native American trade routes intersected. These routes ran from the Great Plains to the Pacific, and from what is now Mexico to Canada.

Sheep Rock Overlook

The scenic viewpoint at Sheep Rock provides wayside exhibits highlighting outstanding examples of volcanic debris.

John Day Fossil Beds National Monument Visitor Center

Exhibits here hold huge fossils of extinct flora and fauna. The John Day Fossil Beds National Monument is the only place on earth where there is a visible, fossilized record of 50 million years of geological activity. The fossil beds are managed by the National Park Service. The visitor center is located on the Cant Ranch, which was a well-known 19th Century haven, offering elegant respite for weary travelers.

Blue Basin

To experience the John Day Fossil Beds National Monument, walk along the "Island in Time" interpretive trail into blue green canyons; or take the longer "Overlook" trail to the rim of Blue Basin for the spectacular view of the valley's badlands. Interpretive exhibits and fossils are easily viewed along the trail.

Cathedral Rock

This large block of the John Day Formation slid down from the high bluff to the west. Coming to rest, it forced the river around it.

Foree Area

This part of the John Day Fossil Beds National Monument includes the "Flood of Fire" loop trail. The site includes a picnic area and two small hiking trails.

Kimberly: Merging of the Waters

At this former stagestop the North Fork, Middle Fork and South Fork of the John Day River come together. The scenic John Day is the longest free-flowing waterway in the United States. A park provides river access. Visitor services are available.

Spray: Ferry Crossing Site

Here stood a ferry crossing for horse-drawn freight vehicles carrying passengers, cattle and gold from points in eastern Oregon to The Dalles.

John Day River Interpretive Site

An interpretive marker provides information about the John Day River.

Muleshoe Recreation Site

Located on the John Day River, this Bureau of Land Management facility has 11 campsites, a picnic and day use area and boat launch.

Service Creek: Stagestop

An important stagestop, named for Sarvis, an early 20th Century settler who tended travlers' needs along this trade route. Service Creek offers excellent river access. Visitor services are available.

Julia Henderson Pioneer Park

Scenic site of the Annual Eastern Oregon Pioneer Picnic held on the 3rd weekend of July. An interpretive marker tells the story of the park.

Fossil: Public Fossil Beds

Fossil, settled in the 1880's, was named for a fossilized mammoth bone found near the site. Today Fossil is the Wheeler County Seat and home of the Fossil Museum. Public fossil beds are open for digging. Visitor services are available.

Clarno Unit, John Day Fossil Beds National Monument

Interpretive trails and exhibits feature the scenic Palisades Cliff and fossils found throughout this area.

From Clarno to Maryhill, the Journey Through Time traverses through wheat and grass lands across the Columbia Plateau. The route intersects the Oregon Trail at Moro. The route terminates at the Maryhill Museum of Art, which displays a national-caliber collection.

Antelope

Herds of antelope still roam the hills surrounding town. In the 1980's Antelope was called Rajneeshpuram, when the area was controlled by a former religious sect. Visitor services are available.

Shaniko: Wool Shipping Center

Shaniko was once known as the "Wool Shipping Center of the World," and served as the southern terminus for the Columbia Southern Railroad. The historic Shaniko Hotel is a popular stop. Services are available.

Mountain Views from the Columbia Plateau

From this point view scenic Mt. Jefferson and Mt. Hood in Oregon, and Mt. Adams in Washington.

Grass Valley

Legend here tells of the days when this wheat-growing valley was a sea of grass, so tall that a man on horseback could barely be seen. A rest area and services are available.

Moro / Sherman County Historical Museum

The award winning Sherman County museum tells the history of the area. The Barlow Road was an alternate route of the Oregon Trail. The opening of this trail eliminated the need for a harrowing float trip through the Columbia River Gorge to the Willamette Valley.

De Moss Springs

Wayside Park with interpretive sign.

John Day Dam/Giles French Park

Visitor information and facilities.

Wasco

Wasco is the Native American word meaning maker of basins. Visitor services are available.

Biggs

This community served as a trade center for early settlers, and was a traditional salmon-harvesting site for Native Americans. Biggs offers visitor services.

Maryhill Museum - Stonehenge

This historic mansion showcases sculptures by Rodin, a Native American gallery, rare chess sets, Queen Marie of Romania Royal Regalia, Russion Icons, European & American paintings, a gift shop, cafe and picnic grounds. A ghost town and replica of Stonehenge are nearby.

Two Rivers Resource Management Plan Record of Decision (1986)

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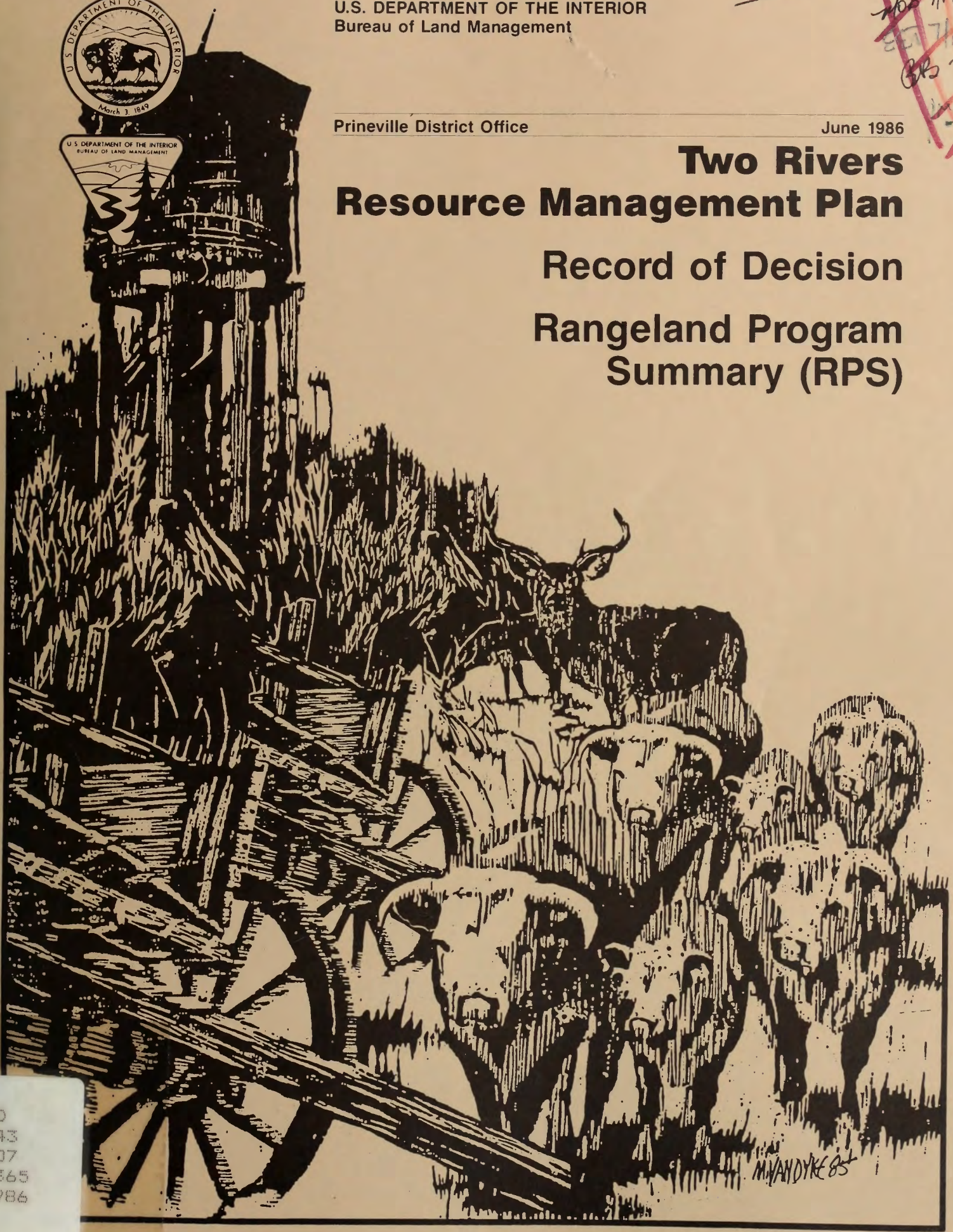
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June 1986

Two Rivers Resource Management Plan

Record of Decision

Rangeland Program Summary (RPS)



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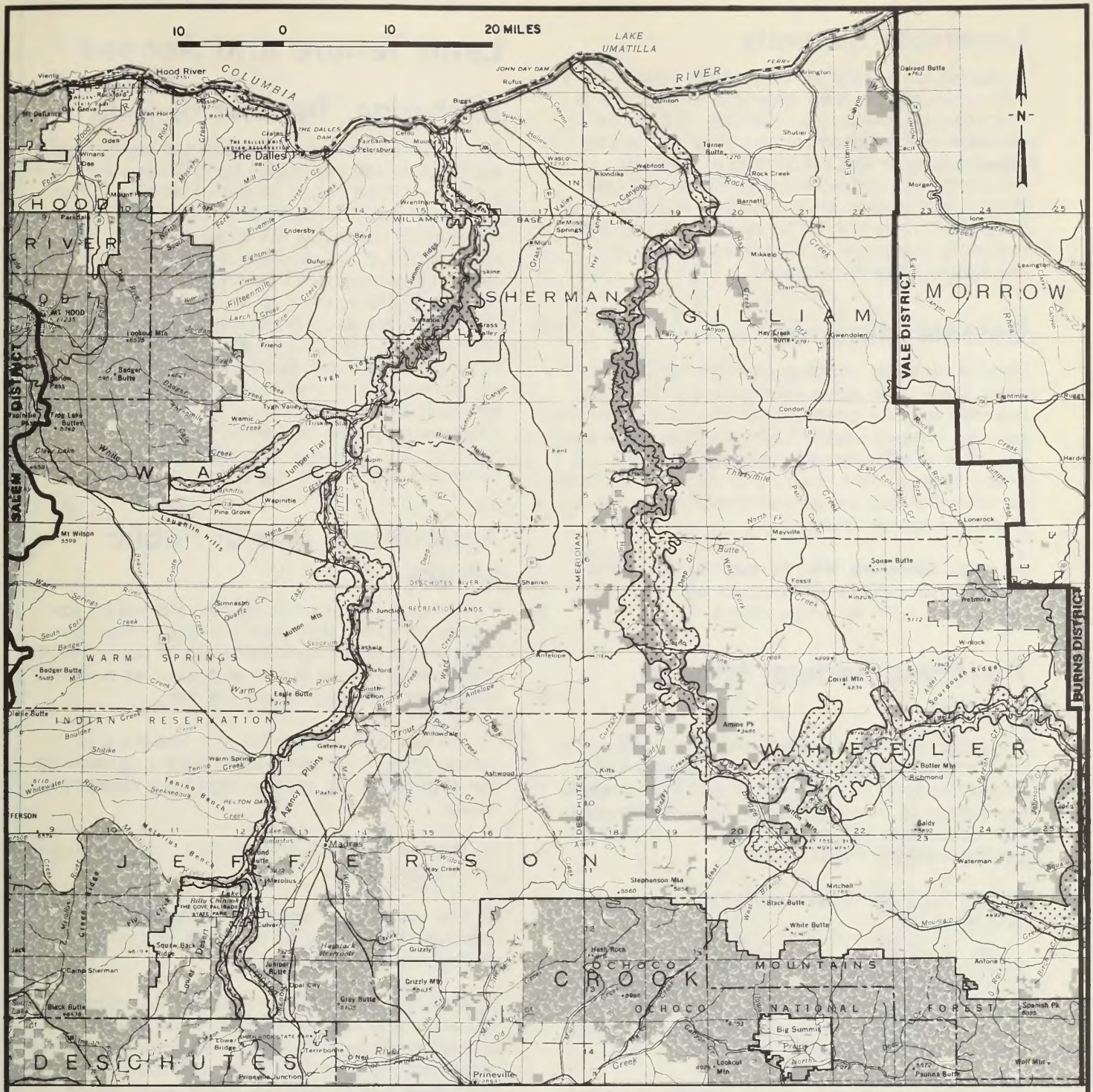
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10 0 10 20 MILES
LAKE UMATILLA
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Hood River
The Dalles
JOHN DAY DAM
THE DALLES DAM
BASE LINE
WILLAMETTE MERIDIAN
HOOD RIVER
SHERMAN
GILLIAM
MORROW
VALE DISTRICT
WASCO
JEFFERSON
WARM SPRINGS INDIAN RESERVATION
WHEELER
DESCHUTES
CROOK
OCHOCO NATIONAL FOREST
OCHOCO MOUNTAINS
BURNS DISTRICT
SALEM DISTRICT
DESCHUTES RIVER RECREATION LANDS
Madras
Prineville
Condon
Fossil
Mayville
Shaniko
Antelope
Kent
Grass Valley
Simnasho
Pine Grove
Wapinitia
Tygh Valley
Friend
Dufur
Endersby
Mt Hood
Mt Wilson
Badger Butte
Eagle Butte
Gray Butte
Grizzly Mtn
Juniper Butte
Opal City
Haystack Reservoir
Lake Billy Chinook
Cove Palisades State Park
Round Butte
Metolius
Camp Sherman
Black Butte
Squaw Back Ridge
Ashwood
Willowdale
Gateway
Plainview
Paxton
Warm Springs
Tenino
Seekseequa Junction
Pelton Dam
Shitike
Whitewater
Lower Bridge
Terrebonne
Powell Butte
Redmond
Culver
Grizzly
Hash Rock
Stephenson Mtn
Mitchell
Black Butte
White Butte
Antone
Big Summit Prairie
Lookout Mtn
Wolf Mtn
Spanish Pk
Paulina Butte
Squaw Butte
Corral Mtn
Amine Pk
Butler Mtn
Richmond
Baldy
Waterman
Wintock
Pretmore
Lonerock
Kinzua
Rufus
Biggs
Celilo
Wasco
Klondike
Webfoot
Shutler
Turner Butte
Rock Creek
Barnett
Dalreed Butte
Ione
Lexington
Heppner
Mikkelo
Hay Creek Butte
Kiwendolen
Eightmile
Rhea Creek
Thirtymile
Lookout Mtn
Badger Pass
Frog Lake Butte
Clear Lake
Wamic
Tygh Ridge
Jordan
Larch Creek
Fifteenmile
Summit Ridge
Skiff
Sherars Falls
Maupin
Jumper Flat
Laughlin Hills
Muttonmts
Simnasho
Quartz
Warm Springs River
Whitewater River
Metolius River
Deschutes River
Lake Creek
Willow Creek
Trout Creek
Plainview
Agency Plains
Gateway
Ashwood
Willowdale

Utility and Transportation Corridors

All utility/transportation corridors identified by the Western Regional Corridor Study of May 1980, prepared by the Ad Hoc Western Utility Group and shown on Map 10 are currently occupied and will be designated without further review. Corridor widths vary, but are a minimum of 2,000 feet. No additional crossing sites on the BLM managed portions of the Deschutes and John Day rivers will be permitted. No facilities will be allowed parallel to the railroad right of way in the Deschutes Canyon. Applicants will be encouraged to locate new facilities (including communication sites) adjacent to existing facilities to the extent possible.

All rights of way applications will be reviewed using the criteria of following existing corridors wherever practical and avoiding proliferation of separate rights of way. Recommendations made to applicants and actions approved will be consistent with the objectives of the RMP. All designated areas of critical environmental concern and wilderness study areas will be considered right of way exclusion areas. Public lands will continue to be available for local rights of way, including multiple use and single use utility/transportation corridors following existing routes, communication sites, and roads. Issuance of leases and/or patents under the Recreation and Public Purposes Act and other permits or leases for development of public lands will also continue. Applications will be reviewed on an individual basis for conformance with the Two Rivers RMP to minimize conflicts with other resources or users.

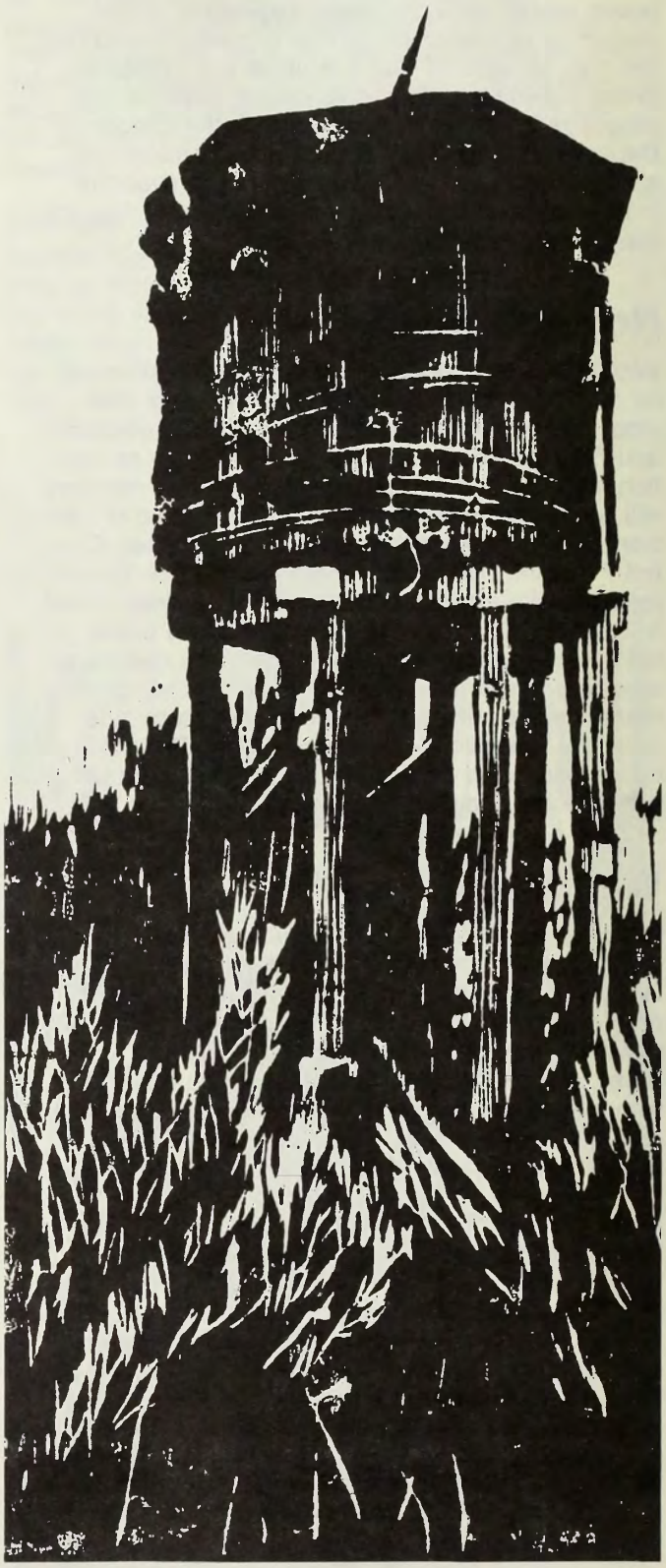
Visual Resources

Before the BLM initiates or permits any major surface disturbing activities on public land, an analysis will be completed to determine adverse effects on visual qualities. Activities that will result in significant, long term adverse effects on the visual resources of the John Day or Deschutes River canyons in areas normally seen from these rivers will not be permitted.

Activities within other areas of high visual quality that may be seen might be permitted if they do not attract attention or leave long term visual changes on the land. Activities in other areas may change the landscape but will be designed to minimize any adverse effect on visual quality.

Wilderness

Areas under wilderness review will continue to be managed following the guidance of the Bureau's Interim Management Policy for Lands Under Wilderness Review. This policy will be in effect until areas are released from interim management. Areas designated wilderness will be managed under the guidelines of BLM's Wilderness Management Policy.



Old railroad water tower at Harris Canyon

Two Rivers Resouce Management Plan (2001; 66 *Federal Register* 44153)

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Sec. 2, lots 7, 8, 9, 10 and 11, SE¼NE¼, and NE¼SE¼.

EXCEPTING therefrom the following 2 tracts of land:

1. Certificate of Survey No. 2347–M.

2. Amended Tract 1, Certificate of Survey No. 2347–M.

PARCEL H: T. 1 S., R. 26 E.,

Sec. 1, SW¼;

EXCEPTING therefrom the following 3 tracts of land:

1. That part conveyed to the State of Montana for the benefit and use of its State Highway Commission by Bargain and Sale Deed recorded September 22, 1950, in Book 377, Page 461, under Document #468688, records of Yellowstone County, Montana, more particularly described as follows:

''A tract of land in SE¼SE¼SW¼, sec. 1, T. 1 S., R. 26 E., more particularly described as follows:

Beginning at a point in the said SE¼SE¼SW¼, which said Point is North 53.0 feet, and West 379.0 feet, more or less, from the South quarter corner of said sec. 1;

thence from said point of beginning N. 31°12½′ W., 285.9 feet;

thence S 28°47½′ W., 285.9 feet;

thence N. 88°47½′ E., 285.9 feet to the point of beginning.''

2. That part described as Certificate Of Survey No. 823 on file in the office of the Clerk and Recorder of said County, under Document #627700.

3. Certificate of Survey No. 2865.

PARCEL I: That part of the NW¼NW¼ of sec. 1 and the NE¼NE¼ of sec. 2, T. 1 S., R. 26 E., described as Tract 1, of Certificate of Survey No. 2347–M on file in the office of the Clerk and Recorder of said County, under Document #1371733.

EXCEPT Amended Tract 1, Certificate of Survey No. 2347–M.

The area described contains 765 acres in Yellowstone County.

2. This withdrawal will expire 20 years from the effective date of this order unless, as a result of a review conducted before the expiration date pursuant to Section 204(f) of the Federal Land Policy and Management Act of 1976, 43 U.S.C. 1714(f) (1994), the Secretary determines that the withdrawal shall be extended.

Dated: July 31, 2001.

Gale A. Norton,

Secretary of the Interior.

[FR Doc. 01–21178 Filed 8–21–01; 8:45 am]

BILLING CODE 4310–DN–P

DEPARTMENT OF THE INTERIOR

Bureau of Land Management

[OR–054–1220–DC; GP01–0132]

John Day River Management Plan, Two Rivers Resource Management Plan Amendments, John Day Resource Management Plan Amendment, Two Rivers Resource Management Plan Amendment, and Baker Resource Management Plan Amendment

AGENCY: Bureau of Land Management, Central Oregon Field Office, Prineville District, Interior.

ACTION: In compliance with the National Environmental Policy Act (NEPA) of 1969 and 40 CFR 1505.2 notice is hereby given that the Bureau of Land Management (BLM) has prepared a Record of Decision (ROD) for John Day River Management Plan, Two Rivers Resource Management Plan Amendment, John Day Two Rivers Resource Management Plan Amendment, and Baker Resource Management Plan Amendment. This document was signed by the Oregon/Washington State Director on February 28, 2001.

SUMMARY: The ROD finalizes the proposed decisions identified in the John Day River Proposed Management Plan, Two Rivers and John Day Resource Management Plan Amendments and Final Environmental Impact Statement (FEIS). The ROD also Amends the Baker Resource Management Plan. This additional Amendment does not involve any substantive change in the Decision from the proposed decision in the FEIS but does recognize that about 5 miles of the North Fork of the John Day River within the planning area falls within the Baker Resource Area.

The ROD authorizes certain future non-grazing actions that will require further planning, analysis, and subsequent decisions prior to implementation. Implementation of such decisions may be subject to appeal to the Interior Board of Land Appeals under 43 CFR 4.411. Persons interested in being notified of future actions pertaining to the John Day River should notify the Central Oregon Field Office Manager, Prineville BLM, P.O. Box 550, 3050 NE Third Street, Prineville OR 97754.

All grazing related decisions that were specifically described and/or defined in the RMP are considered final land use plan decisions and are not appealable under 43 CFR 4160 or 43 CFR 4.470. This includes decisions such as adjustments in season of use and exclusion of livestock from campgrounds. Under 43 CFR 4100.0–5 individuals, groups, or organizations who have an interest in livestock management on specific allotments must identify themselves in writing to the Central Oregon Resource Area Field Office Manager at the above address. Interested publics will be notified of any future grazing decisions and provided the opportunity to comment or appeal as appropriate.

Interested citizens not already on the mailing list may review the Record of Decision via the internet on the Prineville BLM website at *http://www.or.blm.gov/Prineville/*. A hardcopy or a CDROM of the EIS may be requested from the Prineville District by calling (541) 416–6700.

DATES: The decision may be implemented on the date of publication.

FOR FURTHER INFORMATION CONTACT: Dan Tippy, Prineville BLM at (541) 416–6700.

SUPPLEMENTARY INFORMATION: Twenty two protests were submitted during the 30 day protest period for the John Day River Proposed Management Plan, Two Rivers and John Day Resource Management Plan Amendments and Final Environmental Impact Statement. All of the protests were responded to and resolved by the Director of the Bureau of Land Management. Resolution of the protests resulted in two adjustments that are described in the Record of Decision.

The purpose of the Plan and Amendments is to manage BLM lands and to cooperate with other land managers to protect and enhance river values associated with the John Day Wild and Scenic River (located between river mile 10 and river mile 157 of the John Day River) and the South Fork of the John Day Wild and Scenic River (South Fork of the John Day River from about river mile 6 to about river mile 59). The river values associated with the John Day Wild and Scenic River include scenic, recreational, fish, wildlife, geologic, paleontological, and archeological values have been determined to be outstandingly remarkable on the John Day Wild and Scenic River while Botanical and Ecological values were considered significant. On the South Fork of the John Day River scenery, recreation, fish, wildlife, and botanical values are considered outstandingly remarkable while geological, prehistoric uses, and traditional uses are considered significant values.

The decision will protect and enhance river values by modifying existing management of scenery, grazing,

agriculture, forestlands, rangeland restoration, recreation, mining and minerals within the planning area. For other resources and concerns existing management guidance was considered sufficient to protect and enhance river values. The Decision identifies certain lands within the planning area as suitable for disposal or suitable for acquisition.

Dated: July 18, 2001.

A. Barron Bail,

Prineville District Manager.

[FR Doc. 01–21138 Filed 8–21–01; 8:45 am]

BILLING CODE 4310–33–P

DEPARTMENT OF THE INTERIOR

Minerals Management Service

Agency Information Collection Activities: Submitted for Office of Management and Budget (OMB) Review; Comment Request

AGENCY: Minerals Management Service (MMS), Interior.

ACTION: Notice of a revision of a currently approved information collection (OMB control number 1010–0061).

SUMMARY: To comply with the Paperwork Reduction Act (PRA) of 1995, we are submitting to OMB for review and approval an information collection request (ICR), titled ''Oil Transportation Allowances.'' We are also soliciting comments from the public on this ICR.

DATES: Submit written comments on or before September 21, 2001.

ADDRESSES: Submit written comments directly to the Office of Information and Regulatory Affairs, OMB, Attention: Desk Officer for the Department of the Interior (OMB Control Number 1010–0061), 725 17th Street, NW., Washington, DC 20503. Also, submit copies of your written comments to Carol Shelby, Regulatory Specialist, Minerals Management Service, MS 320B2, P.O. Box 25165, Denver, Colorado 80225. If you use an overnight courier service, the MMS courier address is Building 85, Room A–614, Denver Federal Center, Denver, Colorado 80225. You may also submit your comments at our email address mrm.comments@mms.gov. Include the title of the information collection and the OMB control number in the ''Attention'' line of your comment. Also include your name and return address. Submit electronic comments as an ASCII file avoiding the use of special characters and any form of encryption. If you do not receive a confirmation that we have received your email, contact Ms. Shelby at (303) 231–3151 or FAX (303) 231–3385.

FOR FURTHER INFORMATION CONTACT: Carol Shelby, Regulatory Specialist, telephone (303) 231–3151, FAX (303) 231–3385, email *Carol.Shelby@mms.gov.*

SUPPLEMENTARY INFORMATION:

Title: Oil Transportation Allowances.

OMB Control Number: 1010–0061.

Bureau Form Number: Form MMS–4110.

Abstract: The Department of the Interior (DOI) is responsible for matters relevant to mineral resource development on Federal and Indian Lands and the Outer Continental Shelf (OCS). The Secretary of the Interior (Secretary) is responsible for managing the production of minerals from Federal and Indian lands and the OCS; for collecting royalties from lessees who produce minerals; and for distributing the funds collected in accordance with applicable laws. The Secretary also has an Indian trust responsibility to manage Indian lands and seek advice and information from Indian beneficiaries. MMS performs the royalty management functions for the Secretary.

When a company or an individual enters into a lease to explore, develop, produce, and dispose of oil from Indian lands, that company or individual agrees to pay the Indian tribe or allottee a share (royalty) of the value received from production from the leased lands. Royalty rates are specified in the lease document. To determine whether the amount of royalty tendered represents the proper royalty due, it is first necessary to establish the proper value of the oil that is being sold or otherwise disposed of in some other manner, as well as the proper costs associated with allowable deductions.

The lease creates a business relationship between the lessor and the lessee. The lessee is required to report various kinds of information to the lessor relative to the disposition of the leased minerals. Such information is similar to data which are reported to private and public mineral interest owners and are generally available within the records of the lessee or others involved in developing, transporting, processing, purchasing, or selling of such minerals. The information collected includes data necessary to assure that the royalties that are computed and paid are appropriate.

MMS normally accepts the gross proceeds accruing to the lessee under its arm's-length oil sales contract, less allowable transportation deductions, as representing proper value for royalty. We will also accept, for royalty valuation purposes, the prices in other than arm's-length oil sales contracts, less applicable transportation deductions, if the criteria in the benchmarks at 30 CFR 206.52(c) are met, and provided that the value is not less than gross proceeds accruing to the lessee under 30 CFR 206.52(h). In some circumstances, lessees are authorized to deduct from royalty payments the reasonable actual cost of transporting the royalty portion of the oil from the lease to a delivery point remote from the lease. Transportation allowances are a part of the product valuation process that MMS uses to determine if the lessee is reporting and paying the proper royalty amount.

Submission of the information in this collection (Form MMS–4110) is necessary when claiming a transportation allowance on an Indian lease. MMS is requesting OMB approval for a 3-year extension of this current ICR as well as approval for minor revisions necessary to make Form MMS–4110 compatible with our reengineered financial and compliance systems. Proprietary information that is submitted is protected, and there are no questions of a sensitive nature included in this information collection.

Frequency: Annually.

Estimated Number and Description of Respondents: 3 Indian lessees.

Estimated Annual Reporting and Recordkeeping ''Hour'' Burden: 5 hours. See the following chart for the components of the burden estimate. In estimating the burden, we assumed that respondents perform certain functions, such as records maintenance, in the normal course of their business activities. These functions are considered usual and customary and therefore are not listed in the following estimate even though records maintenance is an MMS regulatory requirement.

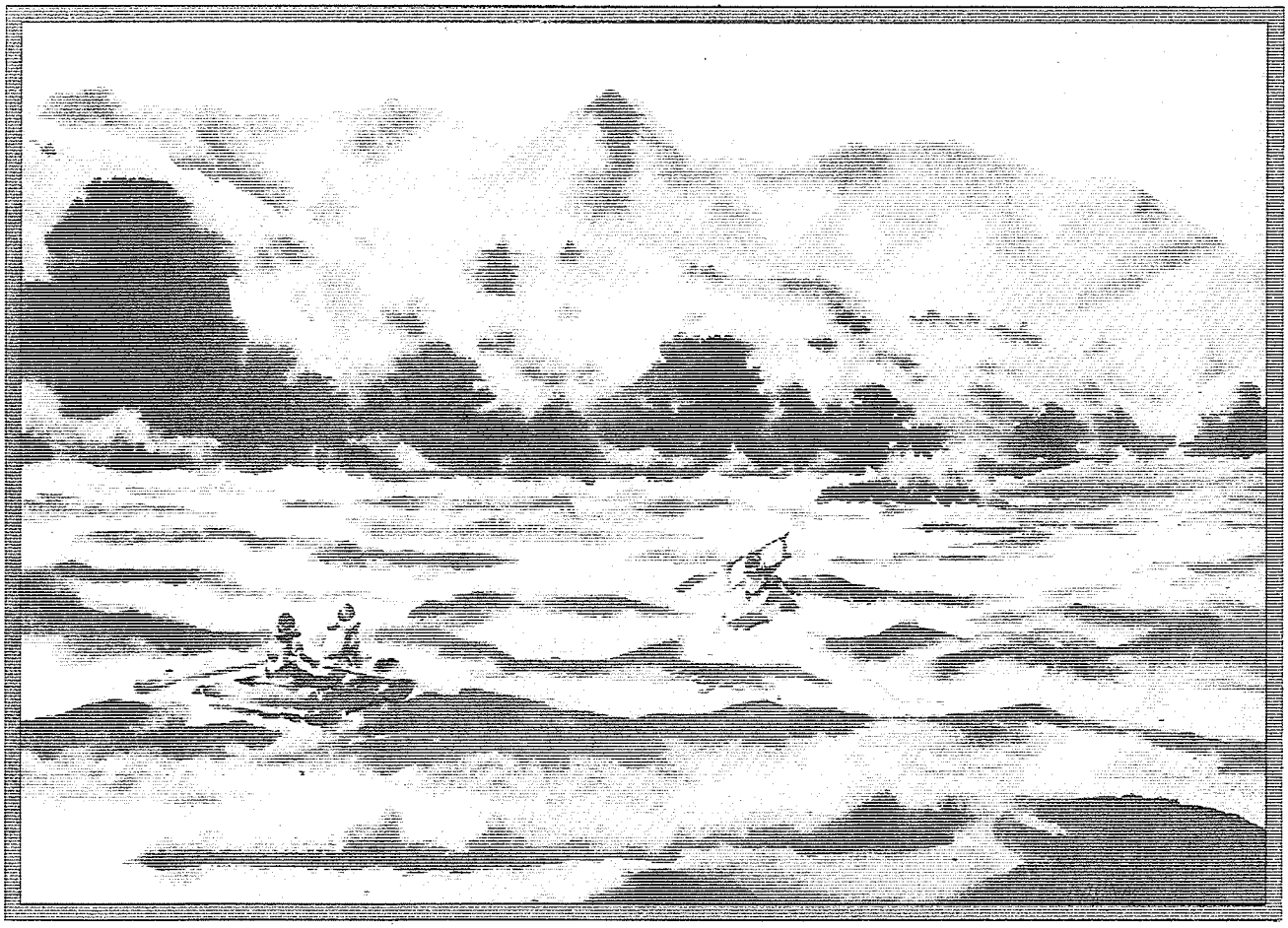
Supplement to the Lower Deschutes River Management Plan – Final Decision

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SUPPLEMENT TO THE LOWER DESCHUTES RIVER MANAGEMENT PLAN

Final Decision

Lower Deschutes River Allocation System



Bureau of Land Management
Bureau of Indian Affairs
Confederated Tribes of the Warm Springs Reservation
State of Oregon

June 1997

Dear Deschutes River User:

The various agencies having management responsibilities along the lower 100 miles of the Deschutes River Canyon completed a comprehensive plan for the river in 1993, but deferred the decision on allocation of boating use. This document completes the plan and provides the framework for a permit system along the Lower Deschutes River, should it become necessary.

The plan was prepared with joint participation and consultation among federal, state, tribal and local government agencies. As required in the plan update and amendment process, the supplement ensures continued progress toward plan objectives. The supplement is based on assessment of impacts and provision of mitigating measures, particularly concerning potential economic effects. The supplement is consistent with the plans and policies of federal, state and local governments and of the Confederated Tribes of the Warm Springs. The BLM Supplemental Record of Decision, as required under the National Environmental Policy Act for this Decision is included in Appendix A.

Public workshops were held in March 1996 for the supplement and in February 1997 for the proposed decision. Hearings were held in April of 1996. A 60 day public comment period was provided in 1996 and a draft proposed final decision was provided in advance of the 1997 workshops.

A working group for the Lower Deschutes River comprised of river users and agency staff was established by the Deschutes Provincial Advisory Committee, an advisory group to the Bureau of Land Management and the Forest Service, in February 1997. The working group provides recommendations to the agency managers for implementation of the management plan for the Lower Deschutes River.

Allocation has been a contentious issue along the Lower Deschutes River. The supplement brings the issue to a resolution after considerable public dialogue. The supplement allows for continued public involvement in the implementation of non-permit measures and any future permit system. We thank you for your continued interest and participation in management along the Deschutes River.

Bureau of Land Management

Bureau of Indian Affairs

Confederated Tribes of Warm Springs

Oregon Parks and Recreation Department

Oregon Department of Fish and Wildlife

Oregon Marine Board

Oregon State Police

Local Government Representative
for the City of Maupin, Jefferson County, Sherman County and Wasco County

Table of Contents

Page

Chapter 1 -- Introduction
- A. Background 1
- B. Purpose and Need for the Decision 4
- C. Public Involvement 5

Chapter 2 -- Limited Entry System Decision
- A. Background 7
- B. Implementation Strategy Decision 9
- C. Allocation System Decision 10
- D. Consistency with Management Plan Analysis Factors and Criteria 18

Glossary 23

Appendix A -- Record of Decision 25

Appendix B -- Public Comment Response Analysis 29

CHAPTER 1 -- INTRODUCTION

A. Background

In a state known for its stunning variety of finely sculptured landscapes, the Lower Deschutes River canyon is considered a masterpiece of nature. Native Americans have held the river in reverence for thousands of years. Oregonians rallied in support of the Deschutes with statewide voter approval of scenic waterway status, and a massive campaign to finance the purchase of riverfront property.

People are lured to the Deschutes as a cool and refreshing escape from the surrounding desert, but more importantly they are drawn to the river by a silver ribbon of wild fish. For as long as anyone can remember, Indians with long handled dip nets have swept the narrow chutes below Sherars Falls, probing the submerged cliffs to locate salmon and steelhead on their trip home from the Pacific. The netters stand on platforms perched along a jagged edge of volcanic rock and reveal age old secrets to their sons and grandsons while awaiting the telltale thump of a fish that is vital to their timeless ceremonial and subsistence way of life.

Sportsmen come to wade the shallow riffles and cast flies or spinners over broad-shouldered native trout they affectionately call "redsides," and boaters flock to the scene with inflatable boats and shiny oars that slide through the rapids in heart-stirring rhythms. Through close and repeated interactions with the river environment, people learned to recognize and appreciate the unique qualities which shape its character. For many, the feelings grew passionate, and the passion cultivated an ethic intolerant of threats to the Lower Deschutes.

The federal government is obligated by its treaty and trust responsibilities with the Tribes of Middle Oregon, and mandates of the National Wild and Scenic Rivers Act, to protect the Deschutes River for present and future generations. The Confederated Tribes of Warm Springs exercised their rights and expressed an eternal interest by designating the Lower Deschutes a Tribal Wild and Scenic River. The State of Oregon also has a responsibility to protect the Deschutes as mandated by the State Scenic Waterways Act.

The joint agencies, recognizing the importance of these responsibilities, completed and signed The Lower Deschutes River Management Plan (plan) in 1993. The plan incorporates input from all user groups and lays the groundwork for long-term protection of the river. The plan also provides guidelines for compatible recreation and establishes use limits for boaters, alleviating the potential for environmental abuse, overcrowding and user conflict. Use limits evolved from a growing need to safeguard the public interest and from a preference for recreational experiences emphasizing an inter-generational bond and appreciation for natural resources. This plan is jointly administered by the signatory governments under a cooperative management agreement.

The Lower Deschutes River is divided into four segments for management purposes. Segment 1 is from the Pelton Re-regulating Dam to the Deschutes Club locked gate. Segment 2 is from the Deschutes Club locked gate to Sherars Falls. Segment 3 is from Sherars Falls to Macks Canyon

and Segment 4 is from Macks Canyon to the confluence with the Columbia River. Management goals for each of the four river segments are listed in the plan. Natural resource values and environmental integrity are not to be compromised in any segment of the Lower Deschutes.

It was determined that in order to maintain a healthy environment, and continue a standard of high-quality recreation opportunities, use levels would need to be limited. The plan also determined the best way to limit use, if non-permit measures are unsuccessful, would be through an allocation system.

With regard to allocation, the plan states the following:

> *"No allocation methods using a permit system will be implemented for a period of three years after the date of final plan approval. Other management techniques will be emphasized to resolve user conflicts, reduce environmental effects and maintain seasonal use at 1990 levels. The managing agencies will aggressively pursue all reasonable measures during the 3-year period to avoid the need to implement a permit system.*
>
> *Immediately following the end of the 3-year period, a report will be published detailing the management actions taken, monitoring data and trends, and an evaluation of the success of non-permit measures. As ongoing monitoring identifies areas of concern, direct actions will be taken to manage use in those areas. Success of non-permit techniques will be evaluated based on three primary criteria:*
>
> 1. *All outstandingly remarkable values must be maintained or enhanced. Each river segment must have demonstrated improvement in the composition, vigor and function of riparian vegetation present. The overall trend in all high use recreation sites must be static or upward, with no evidence of significant deterioration due to recreation use. Baseline data will include the BLM campsite inventory photographs, vegetation monitoring, other remote sensing products and additional data contributed by other agencies.*
>
> 2. *Use pressure problems must be declining. Camping longer than the camp stay limit, camping on public lands closed to camping and vegetation damage related to vehicle use off existing roads, pioneering of new campsites and boat launch/landing sites must be declining on all river segments.*
>
> 3. *Seasonal use levels must be at or below the 1990 level for the last two years of the 3-year period on each segment. Daily use levels must be no more than ten percent over target levels on any day during the primary use season. If use exceeds the 1990 level for the last two seasons of the 3-year period (or any subsequent 2-year period), a permit system will be indicated for at least a portion of the season. The 1990 use level threshold for instituting a permit system may only be modified by agreement of all the managing agencies, with public review and clear rationale based on the above criteria.*

Any instance where daily use targets are not met for two consecutive years will indicate more restrictive measures are required. Permit types of allocation techniques, beyond the existing boater pass, will not be used to respond to fluctuations in use relative to daily use targets unless seasonal use limits are exceeded, the above criteria are not met, or non-permit measures have been unsuccessful.

Over the first two years of the 3-year period, the design of a permit system will be developed by the managing agencies. It should be noted that the Confederated Tribes in adopting this management plan, have also adopted a "Freedom of Choice" allocation system. The managing agencies will attempt to reach consensus on the allocation issue. The proposed Deschutes River allocation system will be published for public review and comment together with all supplemental analyses developed by the managing agencies. At least 60 days of public comment opportunity will be provided.

This will allow some allocation issues to be resolved by gathering more factual information or conducting additional analysis. This information will be displayed with the proposed permit system. Additional data collection and analysis will include:

1. *Cost of implementation for various allocation methods;*

2. *Combination of methods which best fits the Lower Deschutes River;*

3. *Desirability of quantifying public use privileges (guided and non-guided) on the Lower Deschutes River;*

4. *Desirability of tracking individuals on each permit rather than trip leader or party;*

5. *The effects of various allocation methods on different segments of the user public; and*

6. *Criteria identified in the Draft Lower Deschutes River Management Plan/Environmental Impact Statement, as well as other factors identified before or during the information gathering and analysis process.*

The Supplement to the Lower Deschutes River Management Plan was released for public review and comment in March, 1996. It evaluated all of the above criteria and also analyzed three management alternatives for allocating use.

The plan further states, *"the allocation decision will be made before the end of the 3-year period and adopted as part of the final plan."* (plan, pages 55-56) This decision document fulfills that requirement of the plan.

B. Purpose and Need for the Decision

The issue of allocation was surrounded by controversy during the planning process. For this reason, the plan distinguishes the design of an allocation system and its implementation as two separate issues. The purpose of this decision is threefold. One purpose is to design an allocation system that ensures the natural, social and economic objectives of the plan are achieved.

A second purpose is to institute a formal process to manage boating levels and make timely reductions in peak day use levels to reach daily targets prescribed in the plan. In other words, the second purpose is to describe how and when the allocation system will be implemented. The need to implement an allocation system is based on conformance with three criteria described on pages 2 and 3. If these criteria are not met within three years following plan approval, the plan calls for implementation of an allocation system.

The third purpose of this decision is to amend the 1993, final Lower Deschutes River Management Plan element describing how reductions in peak day use are to be made (plan, pages 51-54).

The goal of the Lower Deschutes Management Plan is:

> *"To manage the lower 100 miles of the Deschutes River canyon on a segment-by-segment basis to protect and enhance the river's outstandingly remarkable and related values while allowing the continuation of compatible existing uses, including a wide range of public outdoor recreation opportunities and minimizing user conflicts. These recreation opportunities will be provided in a manner that does not substantially impair the natural beauty of the river canyon, diminish its esthetic, fish and wildlife, scientific and recreational values and take into account the rights and interests of private landowners and Tribal treaty rights."* (plan, page 26)

Decisions in the plan related to use levels are designed to accomplish three primary objectives. The objectives were formulated to:

1. Provide a quality recreation opportunity that is consistent with the character of a particular river segment.

2. Reduce adverse impacts to soil, water, vegetation and other resources caused by large numbers of people.

3. Reduce crowding and competition.

As decisions were made regarding use levels, the managing agencies recognized that daily and seasonal boating use levels had to be addressed. Daily use levels are important because they determine the degree of competition that will be faced at launch ramps, campsites, fishing holes and throughout the recreational experience. Peak weekend use levels will be capped at daily target levels. Midweek days may eventually be capped at a lower daily level in order to meet seasonal use targets. This will generally provide an opportunity for less crowded conditions on weekdays. Seasonal limits maintain the opportunity for boaters to avoid large crowds of people on weekdays

and other times when use levels are below daily target levels during the boating season. Neither daily or seasonal use limits presently apply to the late fall, winter or early spring months.

The plan directed the managing agencies to consider implementing indirect and voluntary actions over a 3-year period (1993-1995) in an attempt to avoid having to implement an allocation system. As described by the plan, the intent of those actions is to: 1) maintain or enhance all outstandingly remarkable values; 2) reduce user conflicts and adverse environmental impacts; and 3) maintain boating use at 1990 levels.

Relative to use levels, the plan describes two factors that can initiate use limits on the Lower Deschutes. One is daily use levels and the other is seasonal use levels. The three scenarios in which user allocation is imposed are:

1. Daily use targets are exceeded by more that 10 percent on multiple days in any segment, and seasonal use levels are not exceeded; or

2. Seasonal use levels are exceeded by any amount in any segment and daily use targets are not exceeded; or

3. Both daily and seasonal use levels are exceeded.

The plan indicates that fluctuations up and down in daily use levels does not in and of itself warrant implementing an allocation system. The intent of the plan is to deal with daily and/or seasonal use levels that exhibit an upward trend over at least a two year period. Therefore, if seasonal use levels are not exceeded and daily use levels do not exceed the target by more than 10 percent, a limited entry system is not necessarily required.

Seasonal use levels have direct economic effects. Every visitor to the Lower Deschutes River contributes to the local economy through the purchase of goods and services. Local business owners are not so concerned with a decrease in business on a peak-use weekend, so long as off-setting increases occur during the non-peak use periods of the boating season. The intent of the plan is to maintain the economic base associated with boating on the Lower Deschutes River, while encouraging boaters to visit during non-peak periods so that undesirable social and environmental impacts caused by existing use patterns can be alleviated.

C. Public Involvement

In January 1993, the Lower Deschutes River Management Plan was completed and signed by the managing agencies after a long and extensive planning process. Many opportunities for public input and involvement were provided through public work groups, meetings and hearings. With the preparation of this Supplement to the Lower Deschutes River Management Plan, additional public input has been and will continue to be sought.

In January, 1995, Oregon State Parks and Recreation Department, through a contract with EDAW, a private consulting firm, produced a report entitled "Reservation Systems for Boating on the

Lower Deschutes River." This report provides part of the analysis supporting decisions in this document. In preparing its report, EDAW obtained public input from a representative cross-section of boaters on the Lower Deschutes River.

The Bureau of Land Management, released a separate report entitled "Draft Lower Deschutes River Split Allocation/Permit System Study" in December 1995. It also solicited input from selected river users and river managers.

The Deschutes River managing agencies held a series of public workshops and hearings designed to provide river users and managers the opportunity to discuss the use allocation process. Public workshops were held in Warm Springs, Maupin and Portland between March 19 and 21, 1996. Public hearings were held in Madras, The Dalles and Portland between April 16 and 18, 1996. The public comment period closed on May 6, 1996.

After the close of the public comment period the managing agencies evaluated the public comments. Some prominent examples of how public comment influenced the decision are:

1. The agencies' willingness to pursue non-permit measures as an alternate means to control boating use levels.

2. The creation of a working group with representation of both guided and non-guided interests.

3. The agreement by the agencies to phase into a common pool allocation system over a three-year period to ensure the ability of guides to adapt their business practices.

The public comment response analysis prepared by the agencies is included in Appendix B.

Management and Use Plan Update / Final Environmental Impact Statement – Oregon National Historic Trail

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Comprehensive Management and Use Plan
Final Environmental Impact Statement
California National Historic Trail
Pony Express National Historic Trail

Management and Use Plan Update
Final Environmental Impact Statement
Oregon National Historic Trail
Mormon Pioneer National Historic Trail



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NATIONAL HISTORIC TRAILS

United States Department of the Interior • National Park Service



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Comprehensive Management and Use Plan / Final Environmental Impact Statement
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NATIONAL HISTORIC TRAILS

This *Comprehensive Management and Use Plan / Final Environmental Impact Statement* for the Oregon, California, Mormon Pioneer, and Pony Express National Historic Trails is shaped, in part, by the planning requirements found in section 5(f) of the National Trails System Act. It focuses on the trails' purpose and significance, issues and concerns related to current conditions along the trails, resource protection, visitor experience and use, and long-term administrative and management objectives. Elements of the proposed plan have been developed in cooperation with federal, state, and local agencies, as well as nonprofit trails organizations — the entities that form the core of any partnership for national historic trails.

In 1978 Congress authorized the Oregon and Mormon Pioneer National Historic Trails to commemorate these significant routes of travel and to promote their preservation, interpretation, public use, and appreciation. In 1992 it authorized the California and Pony Express National Historic Trails. The National Trails System Act requires that comprehensive management and use plans be prepared for all national trails. Plans for the Oregon and Mormon Pioneer Trails were approved in 1981, but need to be updated to provide additional guidance on high-potential sites and segments, resource protection techniques, site certification, visitor use, interpretation, and cooperative management.

This comprehensive plan serves as a coordinating document that provides broad-based policies, guidelines, and standards for administering the four trails in such a manner as to ensure the protection of trail resources, their interpretation, and their continued use. Two alternatives for the administration of the trails are presented in this document. Both alternatives aim to balance resource preservation and visitor use, thus satisfying the purposes of the National Trails System Act "to provide for the outdoor recreation needs of an expanding population" and "to promote the preservation of, public access to, travel within, and enjoyment and appreciation of the open-air, outdoor areas and historic resources of the nation." Alternative 1 (continuation of current conditions) reflects the current wide variability in administration and management, resource protection strategies, interpretation, visitor experience, and use. The alternative notes how resource protection, trail marking, and interpretation are ongoing processes and how increasing levels of cooperation and coordination are becoming more common among the various partners. Alternative 2 (enhanced conditions and a historic trails partnership — the proposal) focuses on enhancing resource preservation and visitor use. To do so, it will be necessary to achieve the highest possible degree of cooperation among the partners, increase awareness of the need to work together, and communicate what is being planned and what is actually being done. This alternative calls for an improved visitor experience through integrated development and programming and a comprehensive strategy for resource protection, including an ambitious program to inventory and monitor resources that would bring together, in one location, information that is currently dispersed.

The *Draft Environmental Impact Statement* was on public review from August 21 to October 19, 1998. Close to 1,000 copies were distributed. Public meetings were held in late September and early October 1998 and were attended by approximately 180 people. Written comments were received from 32 federal, state, and local agencies, 1 Indian tribe, and about 105 organizations and individuals. This *Final Environmental Impact Statement* has been revised in response to substantive comments. There will be a 30-day no-action period after this document is released to the public, after which a record of decision for the selected alternative will be signed.

For further information about this document, contact Jere Krakow, Superintendent, NPS Long Distance Trails Office, 324 S. State St. #250, P.O. Box 45155, Salt Lake City, UT 84145; telephone 801-539-4095.

United States Department of the Interior / National Park Service

Summary

This document presents a proposed comprehensive management and use plan for the California and Pony Express National Historic Trails and updates the 1981 Oregon and Mormon Pioneer *Comprehensive Management and Use Plans*.

In 1978 Congress authorized the Oregon and Mormon Pioneer National Historic Trails to commemorate these significant routes of travel and to promote their preservation, interpretation, public use, and appreciation. In 1992 it authorized the California and Pony Express National Historic Trails. The National Trails System Act requires that comprehensive management and use plans be prepared. Plans for the Oregon and Mormon Pioneer were approved in 1981, but they need to be updated to provide additional guidance on high-potential sites and segments, resource protection techniques, site certification, visitor use, interpretation, and cooperative management.

The Oregon, California, Mormon Pioneer, and Pony Express National Historic Trails commemorate important aspects of American history in the 19th century.[1] They facilitated the settlement of a large portion of the western United States, fostered commerce, and encouraged the development of a transportation and communication network that brought the country closer together. While the trails opened the West to settlement, they also dramatically affected American Indian culture and resulted in the loss of much of their land and resources. The trails inspired a romantic movement in art, literature, and cinema that has had a tremendous impact on the American popular culture. The extensive resources associated with the trails offer the opportunity to understand the emigrant experience and its broad historic context.

The trails did not follow a single route, rather numerous branches and cutoffs were used by the emigrants heading west. These historic trail routes extend nearly 11,000 miles in portions of 12 states and include many significant cultural and natural resources, but at this time not all these historic routes are part of the authorized national historic trails.

No one entity can provide adequate protection for these extensive resources. The preservation of historic trails depends on information sharing and mutual assistance among trails partners in both the public and private sectors.

This *Comprehensive Management and Use Plan / Final Environmental Impact Statement* is shaped, in part, by the planning requirements found in section 5(f) of the National Trails System Act. It focuses on the trails' purpose and significance, issues and concerns related to current conditions along the trails, resource protection, visitor experience and use, and long-term administrative and management objectives. Elements of the proposed plan have been developed in cooperation with federal, state, and local agencies, as well as nonprofit trail organizations — the entities that form the core of any partnership for national historic trails.

This comprehensive plan serves as a coordinating document that provides broad-based policies, guidelines, and standards for administering the four trails to ensure the protection of trail resources, their interpretation, and their continued use.

This document recognizes the various jurisdictions and plans of all the partner agencies. While its goals and objectives have been reviewed and given general approval by the cooperating agencies, it is recognized that full implementation would require a series of amendments to existing land use plans. Such amendments would have to be pursued on a case-by-case basis after consideration of resource values and land uses.

When existing plans affecting historic trails are amended, or when new plans are drafted, it is recommended that the provisions of this document be incorporated in developing protection strategies.

The *Draft Environmental Impact Statement* was available for a 60-day public review from August 21 to October 19, 1998. Close to 1,000 copies were sent out for review. Public meetings were held in late September and early October at nine locations throughout the West and were attended by approximately 180 people. Written comments were received from 32 federal, state, and local agencies, 1 Indian tribe, and about 105 organizations and individuals. This *Final Comprehensive Management and Use Plan / Environmental Impact Statement* has been revised in response to substantive comments on the draft document. In accordance with the National Environmental Policy Act, all written responses from public agencies are reprinted in this document. Substantive comments from individuals have been summarized and responded to in a tablular format.

This *Final Environmental Impact Statement* associated with the *Comprehensive Management and Use Plan* is programmatic because the proposal does not call for any undertaking or action that would result in ground disturbances. Any future development would require detailed environmental analyses to be carried out as required by state and local regulations and the provisions of the National Environmental Policy Act and section 106 of the National Historic Preservation Act.

1. Whenever the four trails are addressed in this plan, a chronological order has been adopted as follows: Oregon, California, Mormon Pioneer, and Pony Express.

Two alternatives for the administration of the trails are presented in this document. Both alternatives aim to balance resource preservation and visitor use, thus satisfying the purposes of the National Trails System Act "to provide for the outdoor recreation needs of an expanding population" and "to promote the preservation of, public access to, travel within, and enjoyment and appreciation of the open-air, outdoor areas and historic resources of the Nation."

Alternative 1 (continuation of current conditions) reflects the current wide variability in administration and management, resource protection strategies, interpretation, visitor experience, and use. The alternative notes how resource protection, trail marking, and interpretation are ongoing processes and how increasing levels of cooperation and coordination are becoming more common among the various partners.

Alternative 2 (enhanced conditions and a historic trails partnership — the proposal) focuses on enhancing resource preservation and visitor use. To do so, it would be necessary to achieve the highest possible degree of cooperation among the partners, increase awareness of the need to work together, and communicate what is being planned and what is actually being done. This alternative calls for an improved visitor experience through integrated development and programming and a comprehensive strategy for resource protection, including an ambitious program to inventory and monitor resources that would bring together, in one location, information that is currently dispersed.

The National Park Service, the agency designated by the secretary of the interior to administer these four trails, has created a Long Distance Trails Office based in Salt Lake City. This office would take a leading role in implementing the proposed plan. As legally mandated, the Long Distance Trails Office, with the assistance of trail resource managers and trail advocacy groups, would administer the four trails for their preservation and appropriate public use and benefits. This office would foster better communication among federal, state, and local resource managers and various nonprofit trail organizations. It would also serve as a clearinghouse for information about trail routes, significant resources, and technical assistance for management, resource protection, interpretation, and visitor use.

Some components of this plan signal new approaches to the management of historic trails. A geographic information system (GIS) has been used to map most of the routes and the locations of all the high-potential sites and segments associated with the four trails. These data, in conjunction with the computerized data set of the trail resources generated during the planning process, would become the starting point for a systematic and coordinated effort to use the Salt Lake City office as the central repository for all trail-related resource information.

Some features of the proposal are similar to those presented in the *Comprehensive Management and Use Plans* for the Oregon and Mormon Pioneer Trails, such as the establishment of flexible management corridors and the identification of resource monitoring needs. This plan suggests a new approach for monitoring resources and assessing their vulnerability to excessive use. It also stresses the need to understand the relationship between the natural and cultural components of trail resources and the importance of landscapes in preserving the historic character of trails.

Cooperative partnerships among federal agencies, between federal and state agencies, and between public and private organizations — even including volunteers and landowners — are essential in bringing these trails to life. A 1995 servicewide memorandum of understanding signed by the Bureau of Land Management, the Forest Service, and the National Park Service pledges federal cooperation. The success of this plan depends on the trail partners and their cooperation.

Contents

Purpose of and Need for the Plan 1

Introduction 3
- Legislative Authority 4
- Purpose and Significance of the Trails 25
  - Oregon National Historic Trail 25
  - California National Historic Trail 25
  - Mormon Pioneer National Historic Trail 25
  - Pony Express National Historic Trail 25
- Administrative Objectives 26
  - Administration 26
  - Resource Protection 26
  - Interpretation, Visitor Experience, and Use 26
- Issues and Concerns 26
  - Administration and Management 26
  - Resource Protection 26
  - Interpretation and Visitor Experience 26
  - Use of National Historic Trails 27
  - Site Development and Marking 27

Historical Overview and Interpretive Themes 29
- Historical Overview 29
  - Cultural Contact and Clashes on the Overland Trails 29
  - Oregon and California Trails 29
  - Mormon Pioneer Trail 30
  - Pony Express Trail 30
- Interpretive Themes and Subthemes 31
  - Trailwide Themes 31
  - Geographic Regions and Subthemes 32
  - Trail-Specific Subthemes 33

Historic Routes and Significant Resources 35
- Historic Routes 35
  - Oregon National Historic Trail 35
  - California National Historic Trail 36
  - Mormon Pioneer National Historic Trail 40
  - Pony Express National Historic Trail 41
- Significant Resources 42
  - Oregon National Historic Trail: High-Potential Sites and Segments Update 42
  - California and Pony Express National Historic Trails: High-Potential Sites and Segments 42
  - Mormon Pioneer National Historic Trail: High-Potential Sites and Segments Update 43

Alternatives, Including the Proposed Action 45

Introduction 47

Alternative 1 (Continuation of Current Conditions) 49
- Administration and Management 49
  - Federal Level 49
  - State Level 50
  - Local Level 50
  - Servicewide Memorandum of Understanding 50
  - Cooperative Management Agreements 50
  - Public Awareness 50
  - Trail Marking 50
  - Volunteers and Liability 51
- Resource Protection 51
  - Protection Plan 51
  - Site Certification 52
  - Challenge Cost-Share Programs 52
  - Resource Monitoring 53
- Interpretation, Visitor Experience, and Use 53
  - Interpretation 53
  - Visitor Experience and Use 54

Alternative 2: Enhanced Conditions and a Historic Trails Partnership (The Proposal) 63
- Administration and Management 63
  - Federal Level 63
  - State Level 64
  - Local Level 64
  - Servicewide Memorandum of Understanding 64
  - Cooperative Management Agreements 64
  - Public Awareness 64
  - Trail Marking 65
  - Volunteers and Liability 65
  - Technical Task Forces / Review Teams 66
  - National Historic Trails Forum 66
- Resource Protection 66
  - Protection Plan 66
  - Site Certification 68
  - Challenge Cost-Share Programs 68
  - Resource Monitoring 68
- Interpretation, Visitor Experience, and Use 68
  - Interpretation 68
  - Visitor Experience and Use 70
- Recommendations for Further Study 70
  - Historic Resource Study 70
  - Archeological Resources 70
  - Landownership and Use along the Four Trails 70
  - GIS Mapping 70
  - American Indians 70
  - Verification of Trail Routes and Sites 70
  - United States Army 70
  - Additional Routes for the Oregon National Historic Trail 70
  - Additional Routes for the California National Historic Trail 71

Alternatives Considered but Rejected 77
- Trails West National Historic Park 77
- Protection and Management of the Premier Resources Associated with the Historic Trails 77

Affected Environment 89

Introduction 91

General Geographic Description of the Routes — California and Pony Express National Historic Trails 93
Trail Resources 95
- Regional Landscapes 95
- Mississippi and Missouri Rivers Starting Points 95
- Platte River 96
- Rocky Mountains / Continental Divide 96
- Snake River–Columbia Plateau / Pacific Northwest 97
- Cascade Range 97
- Great Basin 98
- Sierra Nevada 98

Cultural Landscapes 99
Archeological Resources 99
Historic Resources 99
Ethnographic Resources 99
- Cultural Sketches and Culture Areas 100
- The Lakota Sioux 100
- The Paiute People 101

Socioeconomic Conditions along the Trails 103
- Landownership and Use 103
- California National Historic Trail 104
- Pony Express National Historic Trail 104

Population 104
Income 105
Socioeconomic Conditions Within Affected States 105
- Missouri 105
- Illinois 105
- Iowa 105
- Kansas 106
- Nebraska 106
- Colorado 106
- Wyoming 106
- Idaho 107
- Utah 107
- Nevada 107
- Oregon 110
- California 110

Environmental Consequences 111

Introduction 113

Impacts on Trail Resources 115
- Air Quality 115
  - Alternative 1 115
  - Alternative 2 115
- Soils 115
  - Alternative 1 115
  - Alternative 2 115
- Water Quality 115
  - Alternative 1 115
  - Alternative 2 116
- Vegetation 116
  - Alternative 1 116
  - Alternative 2 116
- Wildlife 116
- Cultural Landscapes 116
  - Alternative 1 116
  - Alternative 2 116
- Archeological Resources 116
  - Alternative 1 116
  - Alternative 2 116
- Historic Resources 117
  - Alternative 1 117
  - Alternative 2 117
- Ethnographic Resources 117

Impacts on Interpretation, Visitor Experience, and Use 119
- Alternative 1 119
- Alternative 2 119

Impacts on Socioeconomic Conditions 121
- Economy 121
  - Alternative 1 121
  - Alternative 2 121
- Landownership and Use 121
- Access and Transportation 121

Other Impact Considerations 123
- Cumulative Impacts 123
- Unavoidable Adverse Effects 123
- Irreversible and Irretrievable Commitments of Resources 123
- Relationship between Short-Term Uses and the Maintenance and Enhancement of Long-Term Productivity 123

Compliance / Consultation and Coordination 125

Compliance 127
- Cultural Resources 127
- Natural Resources 127

Consultation and Coordination 129
- Federal Agencies 129
- American Indian Tribes 130
- State Agencies 130
- Local Agencies 131
- Trail Associations 131
- Planning Process and Public Involvement 131

Comments and Responses 135

Appendixes / Bibliography / Preparers / Index 207

Appendixes

A: National Trails System Act 209
B: Servicewide Memorandum of Understanding for Cooperative Management and Administration of National Historic Trails among the U.S. Department of the Interior, Bureau of Land Management and National Park Service, and the U.S. Department of Agriculture Forest Service 217
C: Solicitor's Opinion on the Oregon National Historic Trail 221
D: Solicitor's Opinion on the California National Historic Trail 223
E: California and Pony Express National Historic Trails: High-Potential Segments 227
F: California and Pony Express National Historic Trails: High-Potential Sites 241
G: Oregon National Historic Trail: High-Potential Segments 283
H: Oregon National Historic Trail: High-Potential Sites 289
I: Mormon Pioneer National Historic Trail: High-Potential Segments 313
J: Mormon Pioneer National Historic Trail: High-Potential Sites 317
K: Protection Tools 335
L: Federal Programs That Might Be of Assistance in Managing Trails 337
M: Wayside Design Guidelines 341
N: Recommended Signs 343
O: Illustrations of Logos for the Oregon, California, Mormon Pioneer, and Pony Express National Historic Trails 347
P: Visitor Experience Matrix 349

Bibliography 361

Preparers and Consultants 367

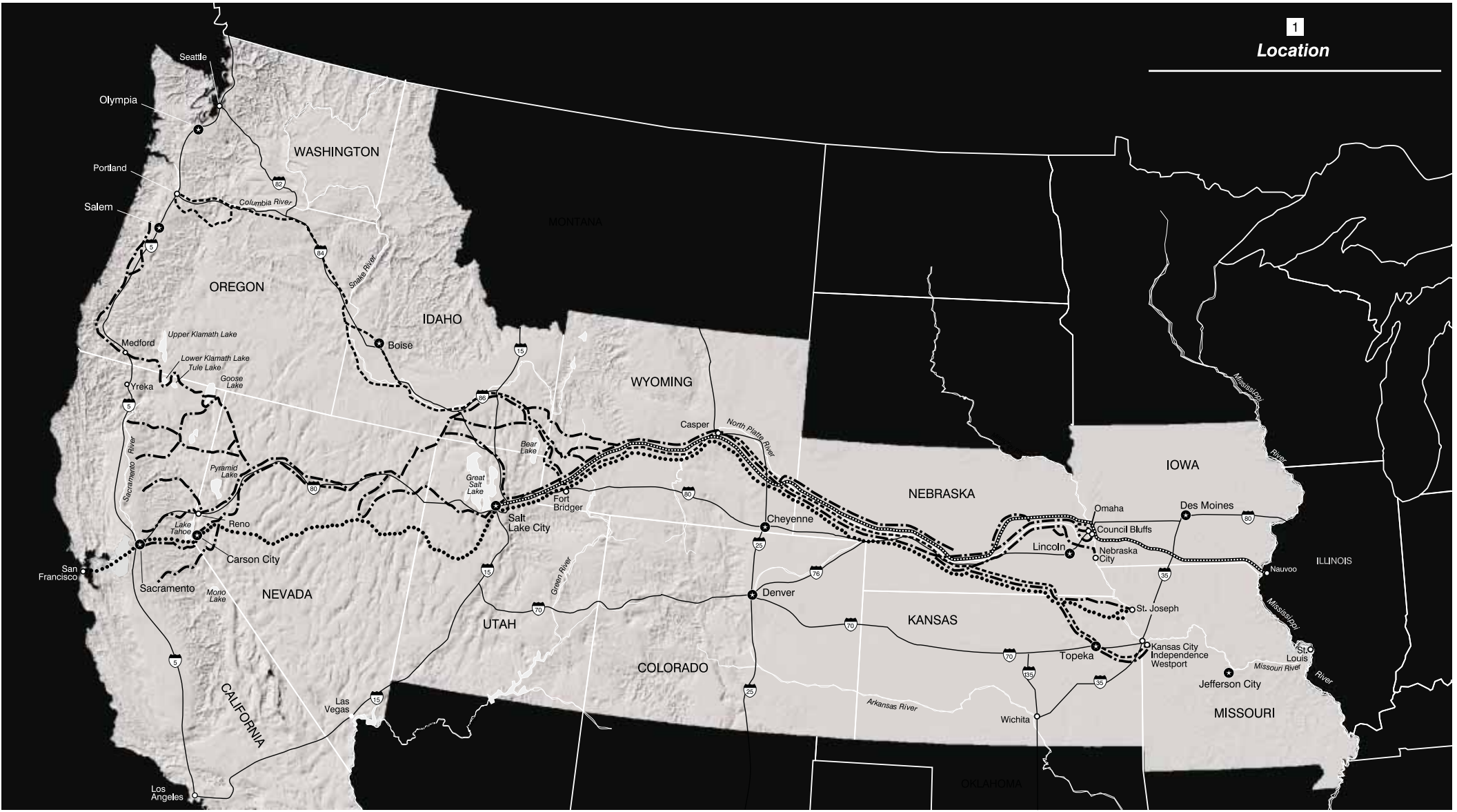
Index 369

Tables

1: Oregon National Historic Trail — Route Miles by State 35
2: California National Historic Trail — Route Miles by State 36
3: Mormon Pioneer National Historic Trail — Route Miles by State 40
4: Pony Express National Historic Trail — Route Miles by State 41
5: Oregon National Historic Trail: — High-Potential Sites and Segments by State 42
6: Oregon Pioneer National Historic Trail — Mileage of High-Potential Segments 42
7: California and Pony Express National Historic Trails — High-Potential Sites and Segments 43
8: California and Pony Express National Historic Trails — Mileage of High-Potential Segments by State 43
9. Mormon Pioneer National Historic Trail — High-Potential Sites and Segments by State 43
10: Mormon Pioneer National Historic Trail — Mileage of High-Potential Segments 43
11: Comparison of Alternatives 78
12: Comparison of Impacts 82
13: Landownership and Use along the California National Historic Trail (in miles) 103
14. Land Uses along the California National Historic Trail (in miles) 104
15: Landownership and Use along the Pony Express National Historic Trail (in miles) 105
16: Land Uses along the Pony Express National Historic Trail (in miles) 106
17: Counties Crossed by the Four National Historic Trails 108
18: Average Population Growth Rates for Counties Crossed by National Historic Trails between 1980 and 1994 109
19: Average Per Capita Income for Counties Crossed by the Trails 110
20: Responses to Individual Public Comments 198

Maps

1: Location (All Trails) x
2: Pony Express and California National Historic Trails (Missouri, Kansas, and Nebraska): High-Potential Sites and Segments 5
3: California and Pony Express National Historic Trails (Wyoming and Utah): High-Potential Sites and Segments 7
4: California National Historic Trail (Idaho and Oregon): High-Potential Sites and Segments 9
5: California and Pony Express National Historic Trails (Nevada and California): High-Potential Sites 11
6: California and Pony Express National Historic Trails (Nevada and California): High-Potential Segments 13
7: Oregon National Historic Trail (Missouri, Kansas, and Nebraska): High-Potential Sites and Segments 15
8: Oregon National Historic Trail (Wyoming and Utah): High-Potential Sites and Segments 17
9: Oregon National Historic Trail (Idaho and Oregon): High-Potential Sites and Segments 19
10: Mormon Pioneer National Historic Trail (Iowa and Nebraska): High-Potential Sites and Segments 21
11: Mormon Pioneer National Historic Trail (Wyoming and Utah): High-Potential Sites and Segments 23
12: Tribes Encountered along the Trails, 1840s, 1850s 28
13: Auto-Tour Route for all the Trails (Iowa, Missouri, Nebraska, and Kansas) 55
14 Auto-Tour Route for all the Trails (Wyoming and Utah) 57
15 Auto-Tour Route for all the Trails (Idaho and Oregon) 59
16: Auto-Tour Route for All the Trails (Nevada and California) 61
17: Environmental Settings (All Trails) 90


1
Location
Seattle
Olympia
Portland
Salem
WASHINGTON
OREGON
Columbia River
Snake River
MONTANA
IDAHO
Boise
Upper Klamath Lake
Lower Klamath Lake
Tule Lake
Goose Lake
Medford
Yreka
WYOMING
Casper
North Platte River
Bear Lake
Great Salt Lake
Fort Bridger
Salt Lake City
Pyramid Lake
Sacramento River
Lake Tahoe
Reno
Carson City
Sacramento
San Francisco
Mono Lake
NEVADA
Green River
UTAH
Cheyenne
Denver
COLORADO
Las Vegas
CALIFORNIA
Los Angeles
Arkansas River
Wichita
OKLAHOMA
NEBRASKA
Omaha
Council Bluffs
Lincoln
Nebraska City
Des Moines
IOWA
Mississippi River
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Purpose of and Need for the Plan



Introduction

The purpose of this document is to develop a comprehensive management and use plan for the California and the Pony Express National Historic Trails. This document also updates the 1981 *Comprehensive Management and Use Plans* for the Oregon and Mormon Pioneer National Historic Trails. Map 1 shows the congressionally authorized routes of the four trails.

The need for the plan is to comply with the requirements of the National Trails System Act, and to address management issues and concerns related to administration and management, resource protection, interpretation and visitor experience, uses of the national historic trails, and site development and marking. (The specific issues are further described beginning on page 26.)

This *Comprehensive Management and Use Plan / Final Environmental Impact Statement* is shaped, in part, by the planning requirements found in section 5(f) of the National Trails System Act (see appendix A). It focuses on the trails' purpose and significance, resource protection, visitor experience and use, and long-term administrative objectives. Elements of the proposed plan have been developed in cooperation with federal, state, and local agencies, as well as various nonprofit trail organizations — the entities that form the core of any partnership for national historic trails.

This plan serves as a coordinating document that provides broad-based policies, guidelines, and standards for administering the four trails in such a manner as to ensure the protection of trail resources, their interpretation, and their appropriate public use.

This document acknowledges the various management jurisdictions and plans of all the partner agencies. While this plan's goals and objectives have been reviewed and given general approval by the cooperating agencies, it is recognized that full implementation would require a series of amendments to existing land use plans. Such amendments would have to be pursued on a local basis after consideration of other, possibly conflicting, resource values and land uses.

However, when existing plans affecting historic trails are amended, or when new plans are drafted, it is recommended that the provisions of this document be incorporated in developing protection strategies.

The *Final Environmental Impact Statement* associated with this plan is programmatic because it does not propose any undertaking or action that would result in ground disturbances. Any future development would require detailed environmental analyses to be carried out as required by state and local regulations and the provisions of the National Environmental Policy Act and section 106 of the National Historic Preservation Act.

The National Park Service, as designated by the secretary of the interior, is responsible for the overall administration of these four trails and the management of lands and trail resources under NPS jurisdiction. Other federal, state, local, and private interests would continue to manage and/or develop trail resources on lands under their jurisdictions.

In 1995 a servicewide memorandum of understanding was signed by the National Park Service, the Bureau of Land Management, and the Forest Service — the agencies that manage most of the federal lands crossed by the four trails (see appendix B). The main purpose of the memorandum is to ensure and expand continued long-term interagency coordination and cooperation in planning, preserving, administering, and managing national historic trails. The servicewide memorandum of understanding emphasizes the need for quality public service and the efficient and effective expenditure of federal funds through cooperation among the federal agencies involved.

The memorandum clarifies the distinction between administrators and managers of trail resources. Administrative responsibilities include overall trailwide coordination, planning and marking, site and segment certification, resource preservation and protection, interpretation, cooperative/interagency agreements, and limited financial assistance to other government agencies, landowners, and interest groups. Management responsibilities rest with private landowners, government land managing agencies, and other organizations that have

TRAIL ADMINISTRATION AND MANAGEMENT

The Long Distance Trails Office in Salt Lake City, Utah, administers the Oregon, the California, the Mormon Pioneer, and the Pony Express National Historic Trails. It does not manage trail resources on a day-to-day basis. The responsibility for managing trail resources remains in the hands of the current trail managers at the federal, state, local, and private levels.

The Long Distance Trails Office serves as a clearinghouse for comprehensive trail resource data, provides information on different resource management strategies used at sites throughout the corridors, and guides the development of the interpretive program for the trails. In addition, it can assist partners in overall coordination efforts, as well as the preparation of memorandums of understanding, cooperative agreements, and site certifications.

The plan is designed to be flexible enough that any current or potential historic trails partners could use it to help design and implement protection, management, trail marking, and interpretive efforts. This plan provides the "common ground" on which all historic trails partners can meet, communicate, and assist one another in creating more efficient strategies for resource protection, management, visitor use, interpretation, and public awareness.

ownership jurisdiction. They include planning and developing trail segments or specific sites, site interpretation, site stabilization and protection, and managing visitor use.

In 1995 the National Park Service established the Long Distance Trails Office in Salt Lake City, Utah, to improve interstate and interregional coordination. This office is responsible for implementing this plan, but it does not manage trail resources. Specific responsibilities of the trails office include coordinating and supporting the protection of trail resources, marking and interpreting the trails, designating and marking an auto-tour route, and identifying and certifying high-potential sites.

The availability of the *Draft Environmental Impact Statement* for a 60-day public review was announced in the *Federal Register* on August 18, 1998. Close to 1,000 copies were sent out for review. Public meetings were held in late September and early October at nine locations throughout the West and were attended by approximately 180 people. Written comments were received from 32 federal, state, and local agencies, 1 Indian tribe, and about 105 organizations and individuals. This *Comprehensive Management and Use Plan / Final Environmental Impact Statement* has been revised in response to substantive comments on the draft document. Substantive comments, as defined by the Council on Environmental Quality, are those that (1) question the accuracy of information, (2) question the adequacy of the environmental analysis, (3) present reasonable alternatives to those presented in the plan, and (4) cause changes or revision in the proposal. In accordance with the National Environmental Policy Act, all written responses from public agencies are reprinted in this document. Substantive comments from individuals have been summarized and responded to in table 20.

This *Comprehensive Management and Use Plan / Final Environmental Impact Statement*

- describes the purpose and significance of each trail
- addresses the planning requirements outlined in section 5 of the National Trails System Act
- addresses issues and concerns related to resource protection
- addresses issues and concerns related to interpretation and visitor use
- establishes the long-term objectives for the administration of the four trails
- presents a proposed plan for the comprehensive administration of the trails, as well as a no-action alternative that would continue existing administrative programs
- assesses the impacts of implementing the proposed plan and the no-action alternative
- provides general maps of the national historic trails

The proposed plan provides a framework for federal, state, and local governments, as well as private organizations and individuals, to cooperatively maintain, protect, and manage the resources associated with the trails. In addition, this plan guides the development of an interpretive program and outlines a range of activities for visitor experience and use.

This document fulfills the legislative requirement for comprehensive management and use plans for the California and Pony Express National Historic Trails, and it updates earlier plans for the Oregon and the Mormon Pioneer National Historic Trails. These two plans were developed independently from each other and make no provision for the overlapping nature of these routes.

Only the 1,400-mile original wagon route that Brigham Young and the Pioneer Party followed in 1846–47, between Nauvoo, Illinois, and Salt Lake City, Utah, has been authorized by legislation as the Mormon Pioneer National Historic Trail. Only the primary route of the Oregon Trail has been authorized as a national historic trail. Only the routes and cutoffs identified in the National Park Service's 1987 *Eligibility / Feasibility Study and Environmental Assessment for National Historic Trail Authorization* have been authorized as the California and Pony Express National Historic Trails.

The Department of the Interior's Office of the Solicitor has established that additional routes and cutoffs determined to be directly associated with a national historic trail may be added through (1) a study to determine the feasibility and suitability of designating such routes as components of a national historic trail, and (2) subsequent congressional action amending the original act for a particular trail.

For the California and the Pony Express Trails, this plan identifies high-potential sites and segments as required by the National Trails System Act (see appendixes E and F and maps 2-6). According to the National Trails System Act, high-potential historic sites are

> those historic sites related to the route, or sites in close proximity thereto, which provide opportunity to interpret the historic significance of the trail during the period of its major use. Criteria for consideration as high potential sites include historic significance, presence of visible historic remnants, scenic quality, and relative freedom from intrusion.

High-potential route segments are

> those segments of a trail which would afford a high quality recreation experience in a portion of the route having greater than average scenic values or affording an opportunity to vicariously share the experience of the original users of a historic route.

Historic sites and segments associated with the trails, either listed on or determined eligible for listing on the National Register of Historic Places, are included in the list of high-potential sites. Other historic resources that may be worthy of management consideration may in the future be considered for inclusion among the list of high-potential sites and segments if research confirms their significance and integrity.

Updates of the list of high-potential sites and segments for the Oregon and the Mormon Pioneer National Historic Trails are included (see appendixes G-H, I-J, and maps 7-11).

Federally owned sites and segments of these trails are considered federal protection components and should receive special attention by managing agencies to enhance their trail-related values.

Many high-potential resources are not under federal jurisdiction. In those cases the National Trails System Act (sec 3 (a) (3)) authorizes a procedure whereby landowners can have their historic sites certified as components of a national historic trail (see appendix K for a more detailed description of the certification procedure).

Legislative Authority

The Oregon and the Mormon Pioneer Trails were authorized as national historic trails by Congress in 1978 (see National Trails System Act, sections 5 (a) (3) and (4), respectively). In 1992 Congress established the California and Pony Express National Historic Trails (see National Trails System Act sec. 5 (a) (18) and (19), respectively. The 1992 legislation amending the National Trails System Act directs the secretary of the interior to

> provide for the development and maintenance of [these] trails within federally administered areas.

The legislation also directs the secretary to

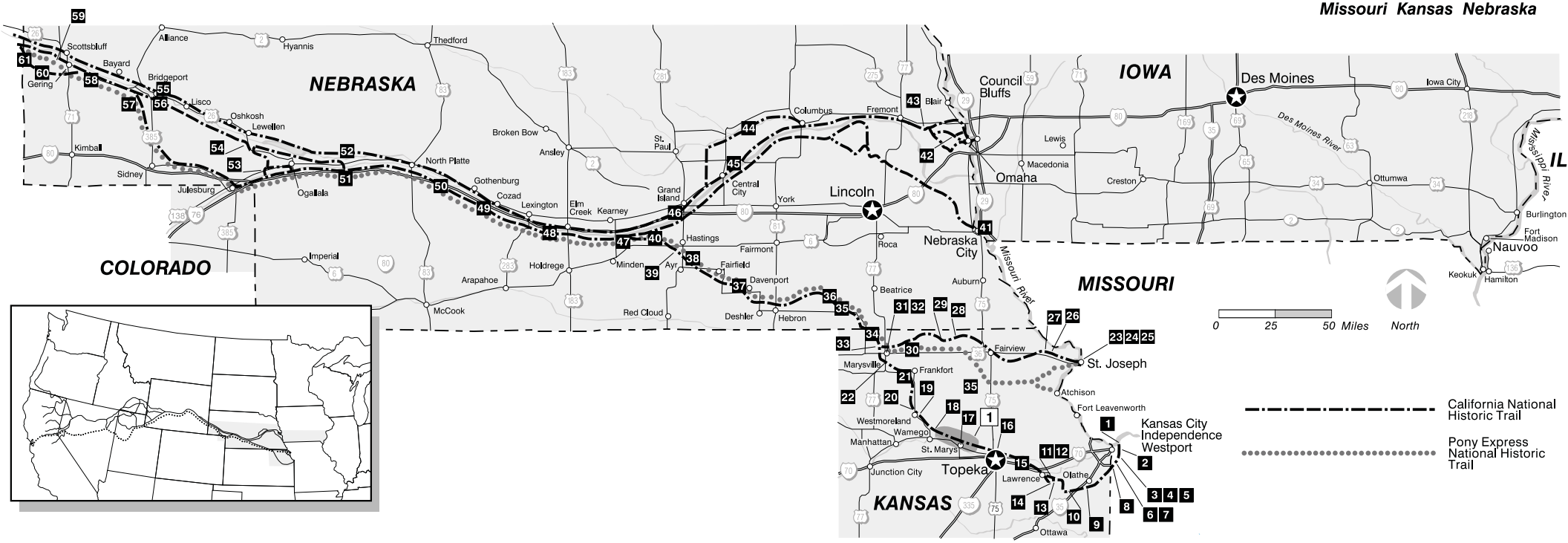
> cooperate with and encourage those states through which the trails pass to operate, develop, and maintain any portions of these trails which are located outside the boundaries of federally administered areas.

The National Trails System Act also authorizes the secretary of the interior to enter into cooperative agreements with states, local governments, landowners, and private organizations or individuals to help operate, develop, and maintain trail portions outside federal jurisdiction. These cooperative agreements can include provisions for limited financial or technical assistance to encourage participation in trail management activities. Cooperative agreements can also secure volunteer assistance for the protection and management of the trails and their related resources.

High-Potential Sites and Segments

California National Historic Trail
Pony Express National Historic Trail

Missouri Kansas Nebraska



HIGH-POTENTIAL SEGMENTS

Kansas

1 St. Marys-Red Vermillion Crossing

HIGH-POTENTIAL SITES

Missouri

1 Upper Independence Landing (Wayne City)
2 Independence Courthouse Square Complex
3 Santa Fe Trail Park Ruts
4 Rice-Tremonti Home
5 Eighty-fifth Street Ruts
6 Heart (Hart) Grove Campground
7 Minor Park/Red Bridge Crossing of the Big Blue River
8 New Santa Fe

Kansas

9 Lone Elm Campground
10 Parting of the Oregon-California and Santa Fe Trails
11 Lower Bluejacket Crossing of the Wakarusa River
12 Upper Bluejacket Crossing of the Wakarusa River
13 Blue Mound
14 Upper Wakarusa Crossing/ Blanton's Bridge
15 Pellant Ruts
16 Kansas River Crossing/ Papin's Ferry
17 St. Marys Mission
18 Vieux Cemetery/Red Vermillion Crossing
19 Scott Spring
20 Coon Creek/Marshall Grave
21 Black Vermillion Crossing
22 Alcove Spring

Missouri

23 St. Joseph Riverfront Ferry Landing
24 Pony Express Stable Pike's Peak Stable)
25 Patee House (Eastern Terminus)

Kansas

26 Swale Leading to Wolf River Crossing
27 Iowa, Sac, and Fox Presbyterian Mission
28 Nemaha River Crossing
29 Clear Creek Swale
30 Guittard's Station Swales
31 Marysville Pony Express Barn
32 Marshall Ferry on the Big Blue River
33 Junction of the St. Joe and Independence Roads
34 Hollenberg Station

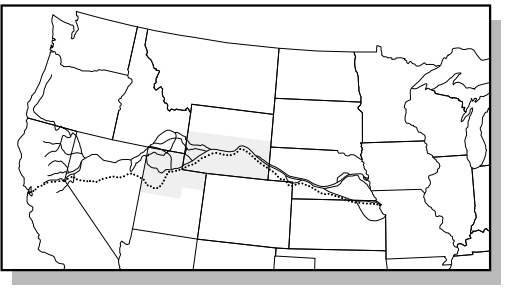
Nebraska

35 Rock Creek Station
36 George Winslow Grave
37 The Narrows
38 Ayr Ruts
39 Thirty-Two Mile Station
40 Susan Hail Grave/Sand Hill Station
41 Nebraska City Complex
42 Military Road Ruts
43 Crossing of the Elkhorn River
44 Lower Loup River Ford
45 Lone Tree Site
46 Murdock Site
47 Fort Kearny
48 Plum Creek
49 Dan Smith's West Ranch
50 Fort McPherson
51 O'Fallon's Bluff
52 Sand Hill Ruts
53 California Hill/Upper Crossing of the South Platte River
54 Ash Hollow Complex/ Windlass Hill
55 Ancient Bluff Ruins
56 Amanda Lamin Grave
57 Courthouse Rock/Jail Rock
58 Chimney Rock
59 Scotts Bluff National Monument/Mitchell Pass
60 Robidoux Pass
61 Horse Creek Treaty Grounds

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NATIONAL HISTORIC TRAILS

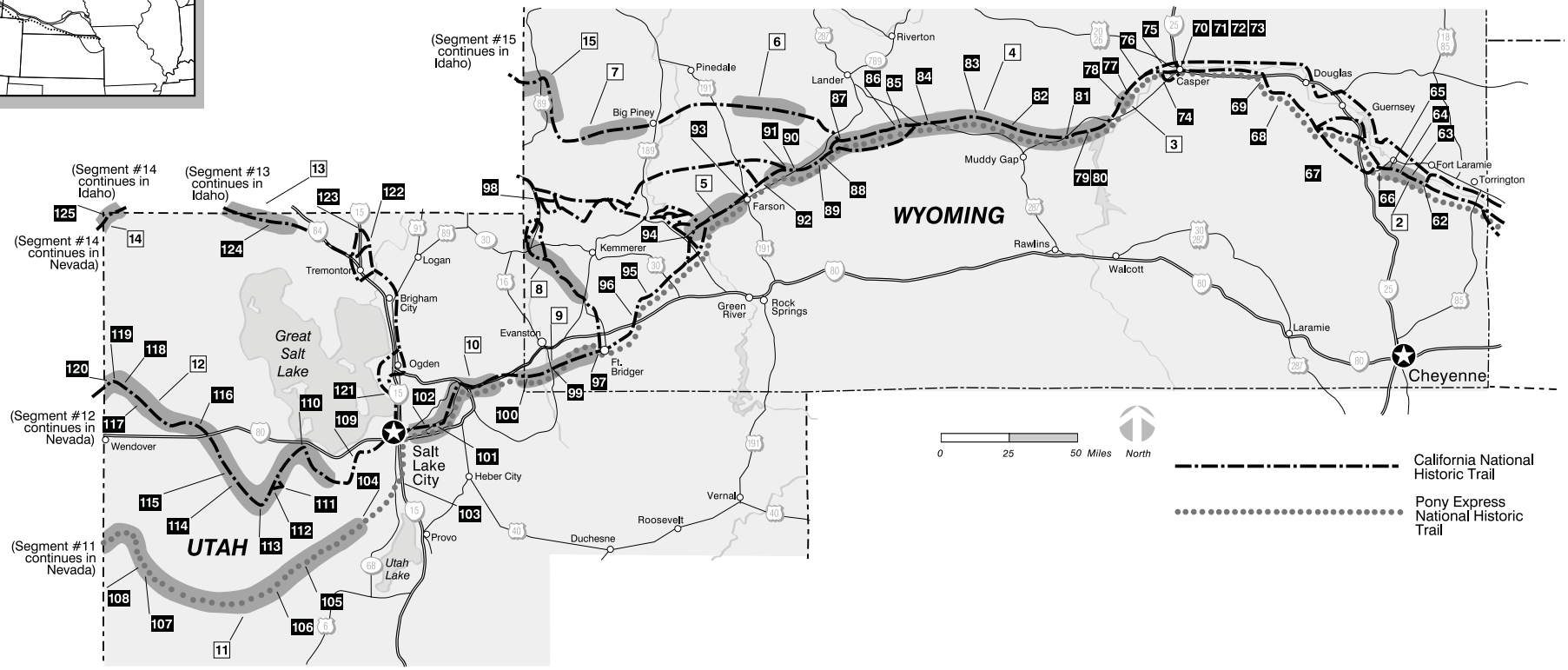
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High-Potential Sites and Segments

California National Historic Trail
Pony Express National Historic Trail

Wyoming Utah



HIGH-POTENTIAL SEGMENTS

Wyoming

- 2 Fort Laramie to Warm Springs
- 3 Prospect Hill
- 4 South Pass (Horse Creek to Little Sandy Crossing)
- 5 Big Sandy to Green River
- 6 Anderson Ridge to Buckskin Crossing
- 7 North Piney Creek to Smiths Fork
- 8 Bear River Divide

Wyoming & Utah

- 9 Fort Bridger to Cache Cave

Utah

- 10 Castle Rock to This Is the Place Heritage Park

Utah & Nevada

- 11 Fairfield to Ruby Valley (Simpson Segment)
- 12 Grantsville to Franklin River Crossing

Utah & Idaho

- 13 Curlew Valley to Salt Lake Cutoff Junction

Idaho, Utah, & Nevada

- 14 Granite Pass to Humboldt River

Wyoming & Idaho

- 15 Auburn to Wayan

HIGH-POTENTIAL SITES

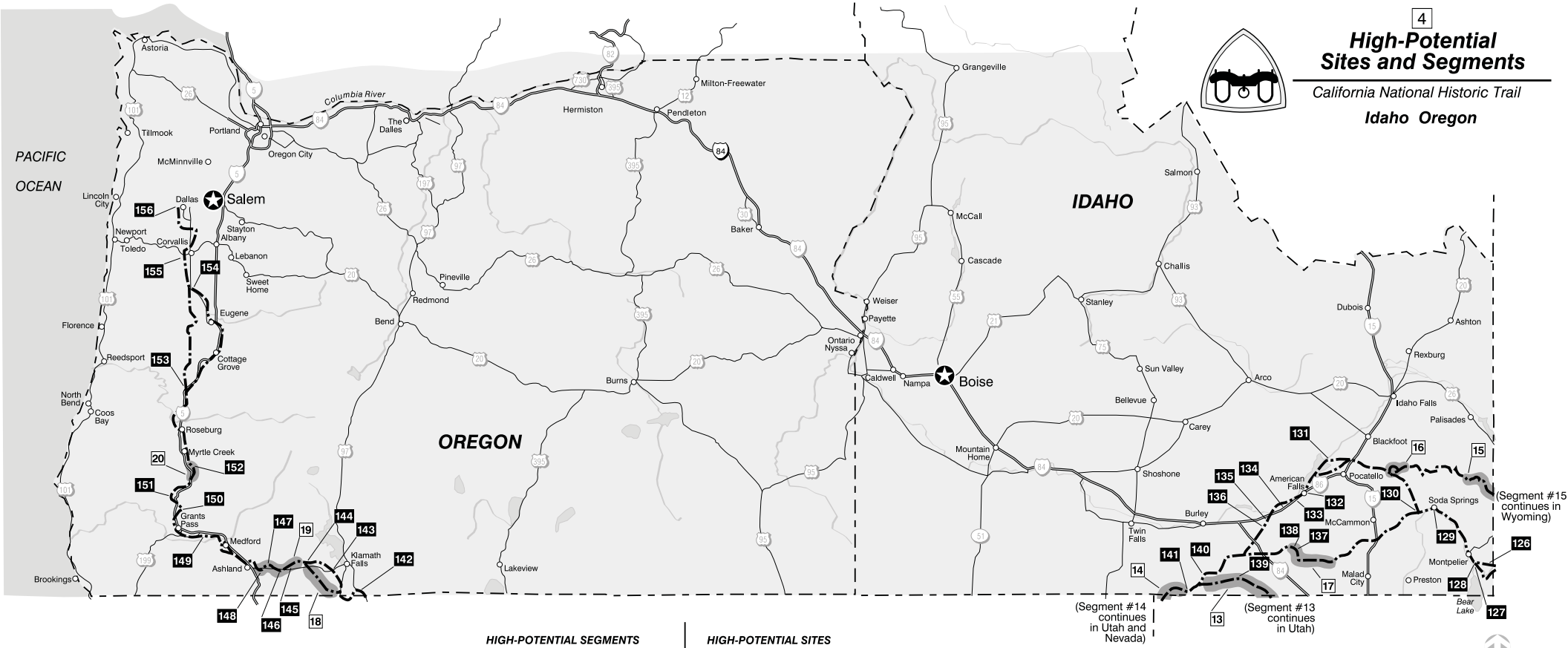
Wyoming

- 62 Fort Laramie
- 63 Mexican Hill
- 64 Register Cliff
- 65 Guernsey Ruts (Deep Rut Hill)
- 66 Warm Springs Canyon
- 67 Laramie Peak
- 68 Ayres Natural Bridge
- 69 Unthank Grave
- 70 Reshaw Bridge (Richard's Second Bridge)
- 71 Mormon Ferry (1849)
- 72 Fort Caspar
- 73 Upper Platte Ferry and Ford (1847)
- 74 Bessemer Bend/ Red Buttes Crossing
- 75 Emigrant Gap
- 76 Avenue of Rocks
- 77 Willow Springs
- 78 Prospect Hill
- 79 Saleratus Lake
- 80 Independence Rock
- 81 Devil's Gate
- 82 Split Rock
- 83 Three Crossings/ Deep Sand Route
- 84 Ice Slough
- 85 Rocky Ridge Station
- 86 Rocky Ridge
- 87 Burnt Ranch (Ninth Crossing of the Sweetwater River)
- 88 South Pass
- 89 Pacific Springs
- 90 Dry Sandy Crossing
- 91 Parting of the Ways
- 92 Little Sandy Crossing
- 93 Big Sandy Crossing
- 94 Lombard Ferry (Green River Mormon Crossing)
- 95 Church Butte
- 96 Name Rock
- 97 Fort Bridger
- 98 West End of the Sublette Cutoff
- 99 Bear River Crossing
- 100 The Needles

Utah

- 101 Big Mountain Pass
- 102 Little Mountain Summit
- 103 Indian Ford on the Jordan River
- 104 Camp Floyd/ Stagecoach Inn
- 105 Faust's Station
- 106 Simpson Springs
- 107 Boyd Station
- 108 Willow Springs Station
- 109 Benson's Mill
- 110 Timpie Point
- 111 Spring at Dell Ranch
- 112 Rock Ledge Overlook
- 113 Hope Wells
- 114 Redlum Spring
- 115 Big Hill at Hastings Pass
- 116 Grayback Hills
- 117 Floating Island
- 118 Playa Wagon Tracks
- 119 Donner Spring
- 120 Halls Spring
- 121 Haight Creek
- 122 Hampton Ford on the Bear River
- 123 Rocky Ford on the Malad River
- 124 Pilot Springs
- 125 Goose Creek

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4

High-Potential Sites and Segments

California National Historic Trail

Idaho Oregon



HIGH-POTENTIAL SEGMENTS

Utah & Idaho

13 Curlew Valley to Salt Lake Cutoff Junction

Idaho, Utah, & Nevada

14 Granite Pass to Humboldt River

Wyoming & Idaho

15 Auburn to Wayan

Idaho

16 Portneuf Crossing to the Narrows of Ross Fork

17 Arbon Valley to Sublett Reservoir

Oregon

18 Bear Valley

19 Cascade Mountain Crossing

20 Canyon Creek Pass

HIGH-POTENTIAL SITES

Idaho

126 Thomas Fork Crossing

127 Big Hill

128 Smith's Trading Post

129 Soda Springs Complex

130 Sheep Rock (Soda Point)

131 Fort Hall

132 American Falls

133 Massacre Rocks

134 Register Rock

135 Coldwater Hill

136 California Trail Junction/ Raft River Crossing

137 Summit Springs

138 Sublett Creek Canyon

139 Raft River Narrows

140 City of Rocks Complex
Emigrant Canyon Springs
Salt Lake Cutoff Junction
Pinnacle Pass
Twin Sisters

141 Granite Pass

Oregon

142 Natural Bridge on Lost River

143 Upper Klamath River Crossing

144 Lower Klamath River Crossing

145 Jenny Creek Wagon Slide

146 Tub Springs State Wayside

147 Cascade Mountain Summit

148 Junction of the Trappers Trail to California and the Applegate Trail

149 Valley of the Rogue State Park

150 Grave Creek

151 Wolf Creek Tavern State Heritage Site

152 Canyonville Pioneer Park

153 Pleasant Valley/ Yoncalla Complex

154 Long Tom River Crossing

155 Mary's River Crossing

156 Dallas/La Creole Creek Complex

California National Historic Trail

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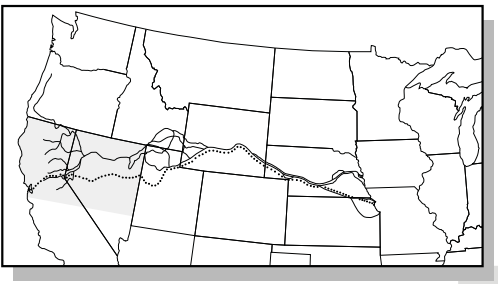
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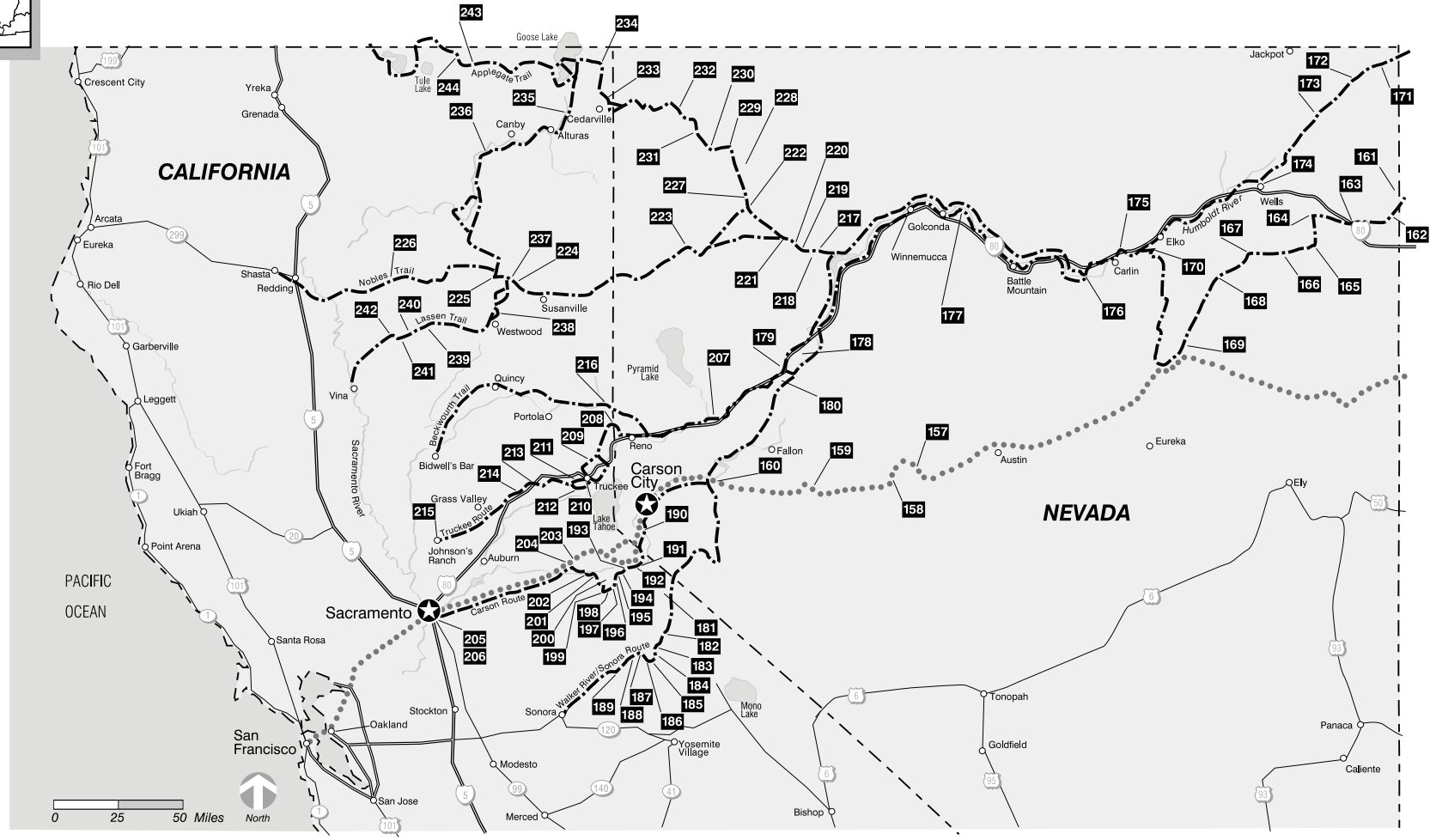
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High-Potential Sites

California National Historic Trail
Pony Express National Historic Trail

Nevada California





HIGH-POTENTIAL SITES

Nevada

157 Edwards Creek Station
158 Cold Springs Station
159 Sand Springs Station
160 Fort Churchill
161 Pilot Peak
162 Bidwell Pass
163 Silver Zone Pass
164 Big Springs
165 Flowery Lake Springs
166 Mound Springs
167 Warm Springs
168 Sulphur Hot Springs
169 Cave Creek
170 Overlook of the South Fork of the Humboldt River Gorge
171 Record Bluff
172 Rock Spring
173 Thousand Springs Valley
174 Humboldt Wells
175 Carlin Canyon
176 Gravelly Ford
177 Iron Point
178 Humboldt Sink
179 Parting of the Truckee and Carson Routes
180 Humboldt Bar

California

181 Little Lost Canyon
182 Upper Levitt Meadow
183 Browder Flat
184 Approach to Fremont Lake
185 Upper Little Emigrant Valley
186 Hubbs Grave Site
187 Relief Camp
188 Commemorative Iron Tire
189 Burst Rock (Birth Rock)

Nevada

190 Mormon Station

California

191 Woodfords Station
192 Snowshoe Thompson Cave and Ruts
193 Hope Valley
194 Devil's Ladder/Carson Pass
195 East Shore Caples Lake
196 West Shore Caples Lake
197 Emigrant Valley
198 Covered Wagon Summit/West Pass
199 Plasse Trading Post
200 Melissa Coray Peak
201 Tragedy Springs
202 Leek Spring Valley
203 Brockliss Bridge Crossing
204 Union House
205 Sutter's Fort
206 B. F. Hastings Building

Nevada

207 Fernley Ruts

California

208 Dog Valley Overlook and Slide
209 Donner Camp Site
210 Donner Memorial State Park
211 Donner Pass
212 Roller Pass
213 Bear Valley
214 Mule Spring
215 Johnson's Ranch
216 Beckwourth Pass

Nevada

217 Willow Springs
218 Antelope Springs
219 Antelope Pass
220 Kamma Pass
221 Rabbithole Springs
222 Black Rock/Black Rock Springs
223 Deep Hole Springs

California

224 Bridge Creek/Nancy Allen Grave
225 Pine Creek Valley
226 Manzanita Chute

Nevada

227 Double Hot Springs
228 Lassen and Clapper Burial site

California

229 Mud Meadows
230 Fly Canyon Wagon Slide
231 High Rock Canyon
232 Bruff's Singular Rock

California

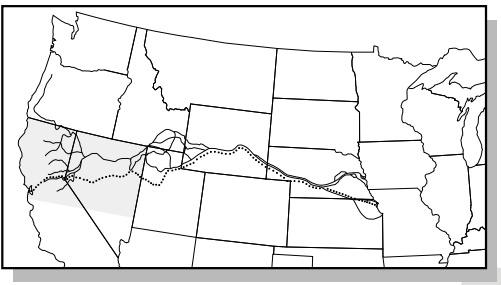
233 Seyfeyth's Hot Springs/Surprise Valley
234 Fandango Pass (Lassen's Pass)
235 Conical Rocks
236 Hanging Rock
237 Feather Lake
238 Duck Lake
239 Deer Creek Meadows
240 The Narrows
241 Bruff's Camp
242 Steep Hollow
243 Fiddlers Green
244 Bloody Point

California National Historic Trail
Pony Express National Historic Trail

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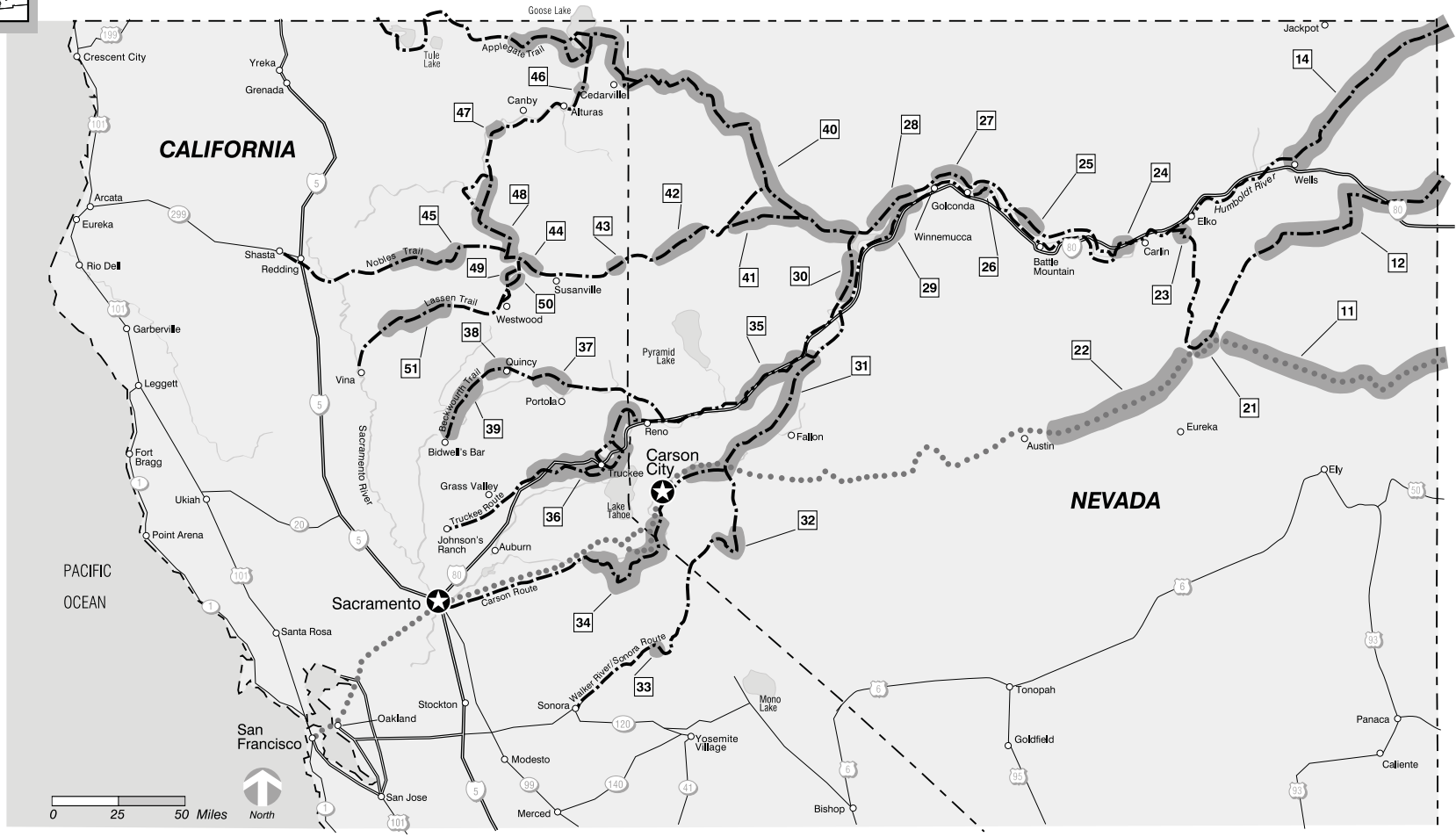


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High-Potential Segments

California National Historic Trail
Pony Express National Historic Trail

Nevada California



HIGH-POTENTIAL SEGMENTS

Utah & Nevada

11 Fairfield to Ruby Valley (Simpson Segment)

12 Grantsville to Franklin River Crossing

Idaho, Utah, & Nevada

14 Granite Pass to Humboldt River

Nevada

21 Overland Canyon

22 Overland Canyon to Simpson Park Station

23 South Fork Humboldt River Gorge

24 Carlin to Gravelly Ford

25 North Battle Mountain to Ellison

26 Iron Point to Edna Mountain Pass

27 Golconda to Winnemucca

28 Humboldt River - North Side Trail

29 Humboldt River - South Side Trail

30 Rye Patch Reservoir to Woolsey

31 Humboldt Sink to Dayton

32 Mickey Canyon

California

33 Summit Creek Canyon

Nevada & California

34 Genoa to Union House

Nevada

35 Humboldt Sink to Fernley

California

36 Verdi to Steephollow Crossing

37 Grizzly Valley/Grizzly Ridge

38 Quincy to Spanish Ranch

39 Bucks Summit to Lake Oroville

Nevada & California

40 Lassen Meadows to Pothole Springs

Nevada

41 1856 Nobles Trail Junction to Granite Creek

42 Deep Hole Springs to Smoke Creek Canyon

California

43 Rush Creek Valley to Viewland

44 Bridge Creek to Feather Lake

45 Butte Creek to Manzanita Chute

46 Trail to North Fork of Pit River

47 Pit River Canyon

48 Pit River to Feather Lake

49 Clover Valley Branch to Robbers Creek

50 Norvell Flat Branch to Robbers Creek

51 Deer Creek Meadows to Acorn Hollow

California National Historic Trail

Pony Express National Historic Trail

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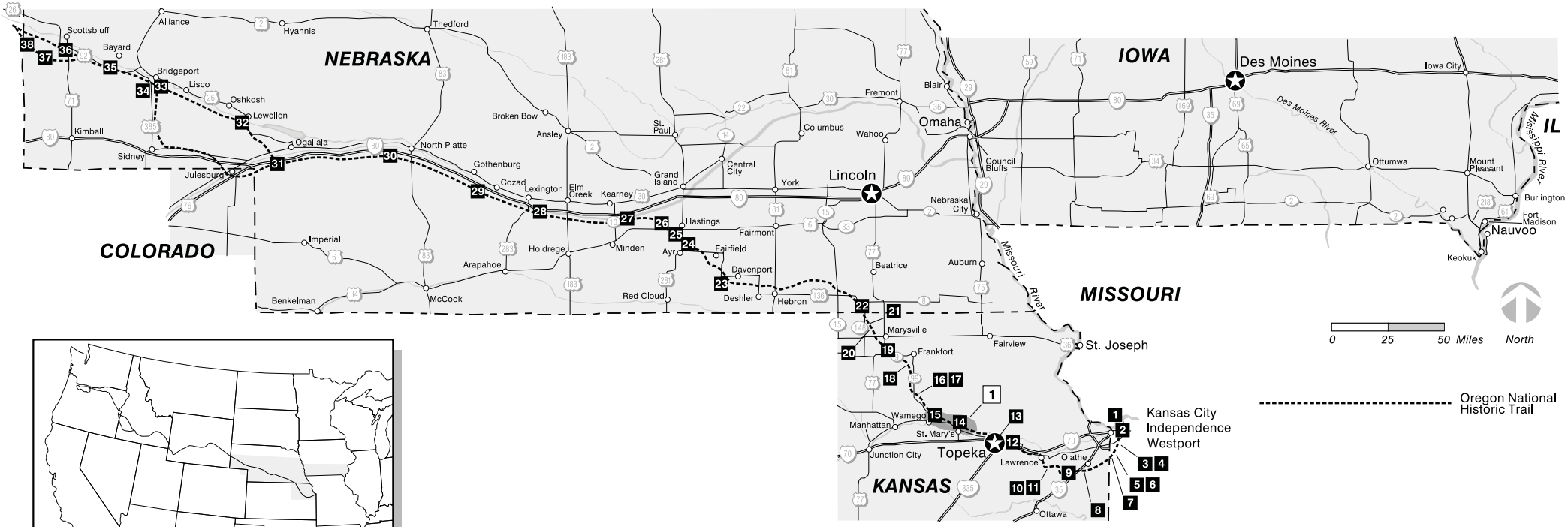
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High-Potential Sites and Segments

Oregon National Historic Trail

Missouri Kansas Nebraska



HIGH-POTENTIAL SEGMENTS

Kansas

1 St. Marys-Red Vermillion Crossing

HIGH-POTENTIAL SITES

Missouri

** 1 Upper Independence Landing (Wayne City)
2 Independence Courthouse Square Complex
* 3 Santa Fe Trail Park Ruts
* 4 Eighty-fifth Street Ruts
* 5 Heart (Hart) Grove Campground
** 6 Minor Park/Red Bridge Crossing of the Big Blue River
7 New Santa Fe

Kansas

8 Lone Elm Campground
** 9 Parting of the Oregon-California and Santa Fe Trails
10 Blue Mound
* 11 Upper Wakarusa Crossing/ Blanton's Bridge
* 12 Pellant Ruts
** 13 Kansas River Crossing/ Papin's Ferry
14 Saint Marys Mission
** 15 Vieux Cemetery/Red Vermillion Crossing
16 Scott Spring
* 17 Coon Creek/Marshall Grave
* 18 Black Vermillion Crossing
19 Alcove Spring
20 Junction of St. Joe and Independence Roads
21 Hollenberg Station

Nebraska

22 Rock Creek Station
23 The Narrows
24 Ayr Ruts
25 Thirty-two Mile Station
26 Susan Hail Grave/ Sand Hill Station
27 Fort Kearny
28 Plum Creek
29 Dan Smith's West Ranch
30 O'Fallon's Bluff
31 California Hill/Upper Crossing of the South Platte River
32 Ash Hollow Complex/Windlass Hill
33 Amanda Lamin Grave
34 Courthouse Rock/Jail Rock
35 Chimney Rock
36 Scotts Bluff National Monument/ Mitchell Pass
37 Robidoux Pass
38 Horse Creek Treaty Grounds

* New Site
** New Name

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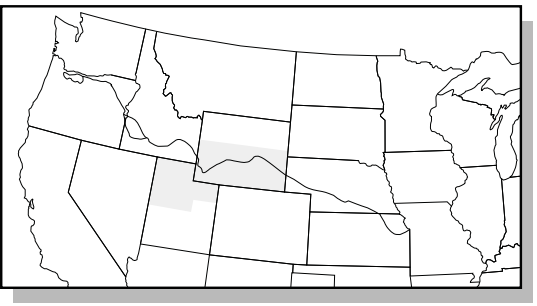
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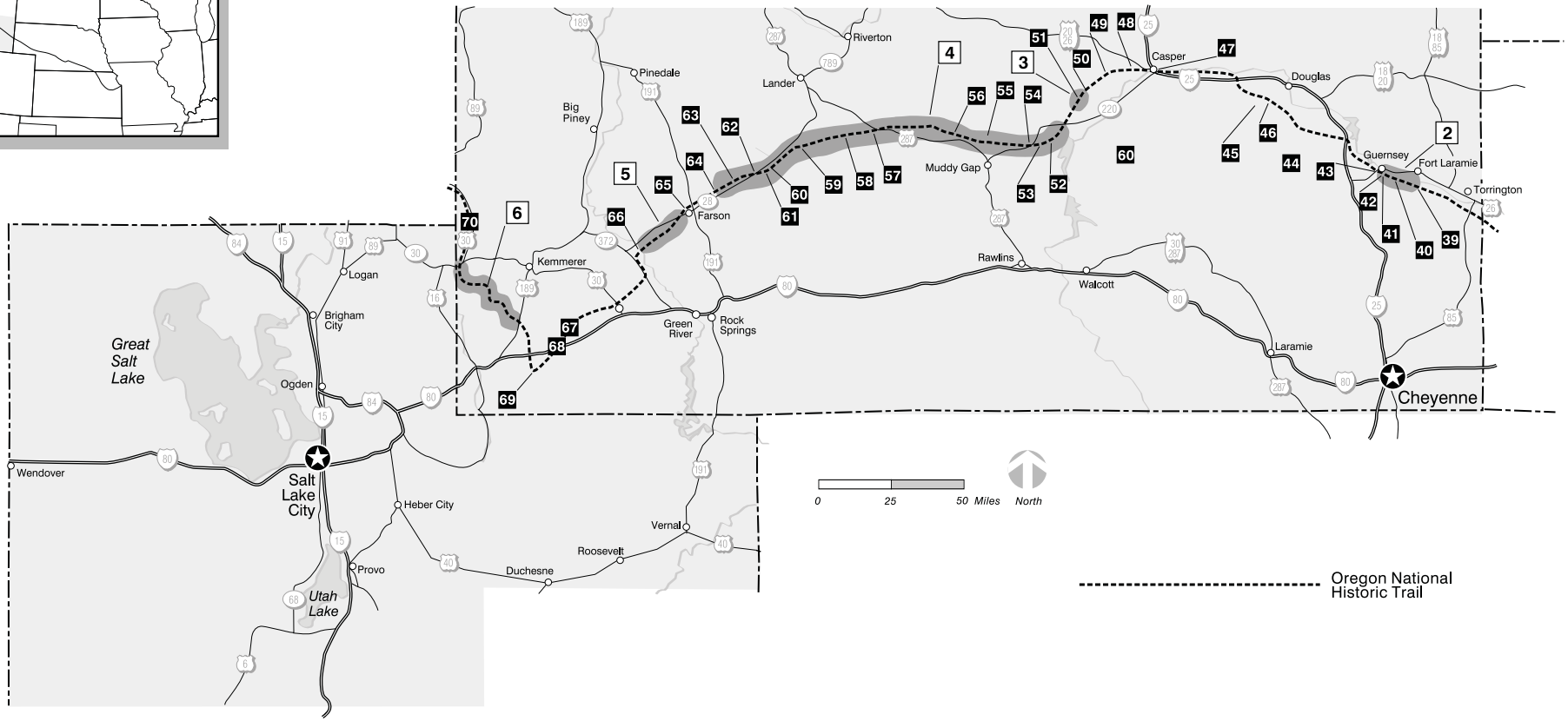
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High-Potential Sites and Segments

Oregon National Historic Trail

Wyoming Utah





HIGH-POTENTIAL SEGMENTS
Wyoming

- 2 Fort Laramie to Warm Springs
- 3 Prospect Hill
- 4 South Pass (Horse Creek to Little Sandy Crossing)
- 5 Big Sandy to Green River
- 6 Bear River Divide

HIGH-POTENTIAL SITES
Wyoming

- 39 Fort Laramie
- ✳ 40 Mexican Hill
- 41 Register Cliff
- ✳✳ 42 Guernsey Ruts (Deep Rut Hill)
- ✳ 43 Warm Springs Canyon
- ✳ 44 Laramie Peak
- 45 Ayres Natural Bridge
- 46 Hembree Grave
- 47 Mormon Ferry (1849)
- ✳ 48 Emigrant Gap
- ✳✳ 49 Avenue of Rocks
- 50 Willow Springs
- ✳ 51 Prospect Hill
- ✳ 52 Saleratus Lake
- 53 Independence Rock
- 54 Devil's Gate
- 55 Split Rock
- ✳✳ 56 Three Crossings/ Deep Sand Route
- ✳✳ 57 Ice Slough
- 58 Rocky Ridge
- 59 Burnt Ranch (Ninth Crossing of the Sweetwater River)
- 60 South Pass
- 61 Pacific Springs
- ✳✳ 62 Dry Sandy Crossing
- 63 Parting of the Ways
- ✳ 64 Little Sandy Crossing
- ✳ 65 Big Sandy Crossing
- 66 Lombard Ferry (Green River Mormon Ferry)
- 67 Church Butte
- 68 Name Rock
- 69 Fort Bridger
- 70 West End of the Sublette Cutoff

✳ New Site
✳✳ New Name

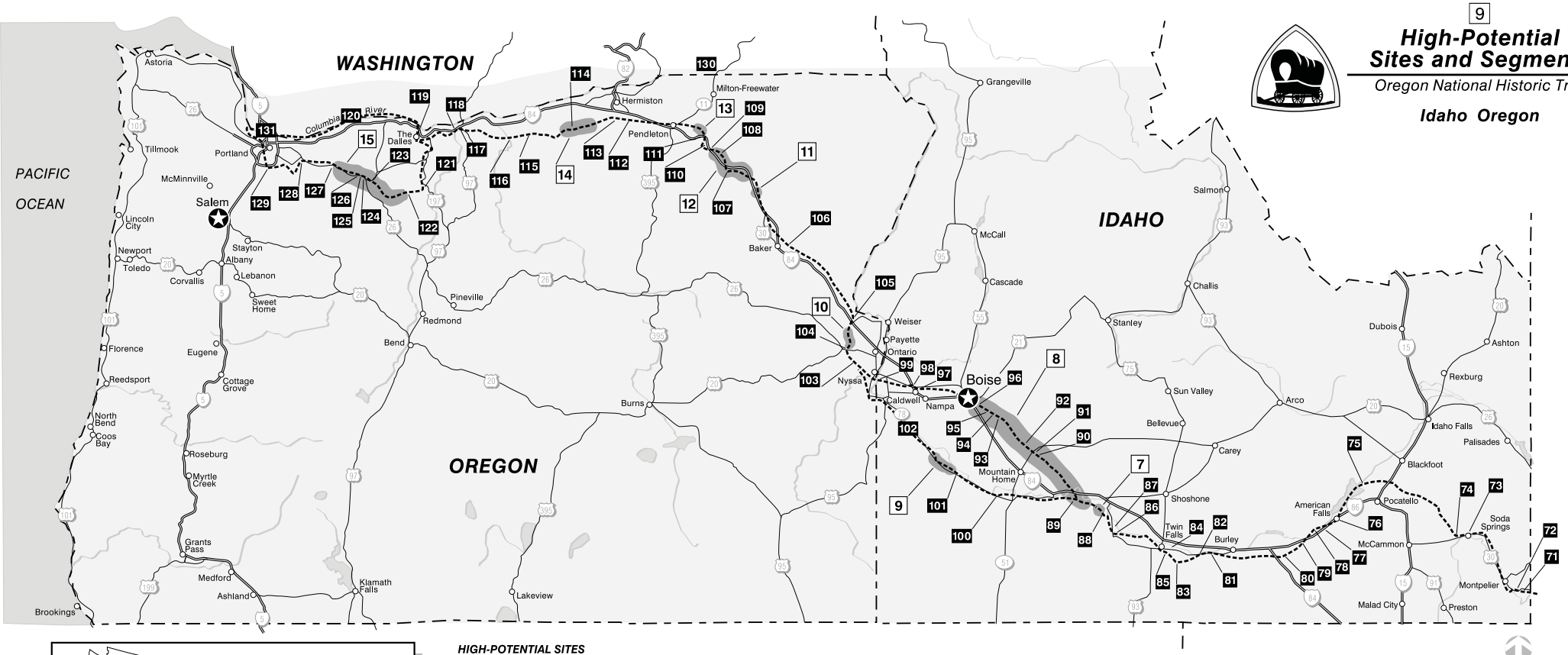
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High-Potential Sites and Segments

Oregon National Historic Trail

Idaho Oregon





0 25 50 Miles North

Oregon National Historic Trail

HIGH-POTENTIAL SEGMENTS

Idaho

7 Hagerman Fossil Beds
8 North Trail
9 Sinker Creek

Oregon

10 Alkali Springs
11 Ladd Canyon
12 Blue Mountain
13 Emigrant Hill
14 Boardman
15 Barlow Road

HIGH-POTENTIAL SITES

Idaho

71 Thomas Fork Crossing
* 72 Big Hill
73 Soda Springs Complex
74 Sheep Rock
75 Fort Hall
76 American Falls
77 Massacre Rocks
* 78 Register Rock
* 79 Coldwater Hill
80 California Trail Junction/ Raft River Crossing
81 Milner Ruts (Cedars Emigrant Campsite)
* 82 Caldron Linn
83 Stricker Store/Rock Creek Station
84 Shoshone Falls
85 Rock Creek Crossing
86 Kanaka Rapids
** 87 Thousand Springs Complex
88 Upper Salmon Falls
89 Three Island Crossing
** 90 Teapot Dome Hot Springs
91 Rattlesnake Station
92 Canyon Creek Station
** 93 Inscription Rock
* 94 Ditto Station
* 95 Indian Creek Station
96 Bonneville Point
97 Ward Massacre Site
98 Canyon Hill Ruts
99 Fort Boise (Hudson's Bay Company)
100 C.J. Strike Ruts
101 Utter Massacre Site
102 Givens Hot Springs

Oregon

103 Keeney Pass
104 Vale Complex
105 Farewell Bend
** 106 Flagstaff Hill/National Historic Oregon Trail Interpretive Center
107 Hilgard Junction
* 108 Blue Mountain Crossing Interpretive Park
109 Meacham
110 Emigrant Springs
111 Deadman Pass
112 Echo Complex
113 Echo Meadows
114 Well Spring
115 Fourmile Canyon
** 116 John Day River Crossing
117 Biggs Junction
** 118 Deschutes River Crossing
119 The Dalles Complex
120 Cascades of the Columbia
121 Tygh Valley
122 Barlow Gate
123 Barlow Pass Complex
* 124 Government Camp
125 Laurel Hill
126 West Barlow Tollgate
127 Wildwood Recreation Area
* 128 Philip Foster Farm
* 129 Oregon City Complex

Washington

130 Whitman Mission
131 Fort Vancouver

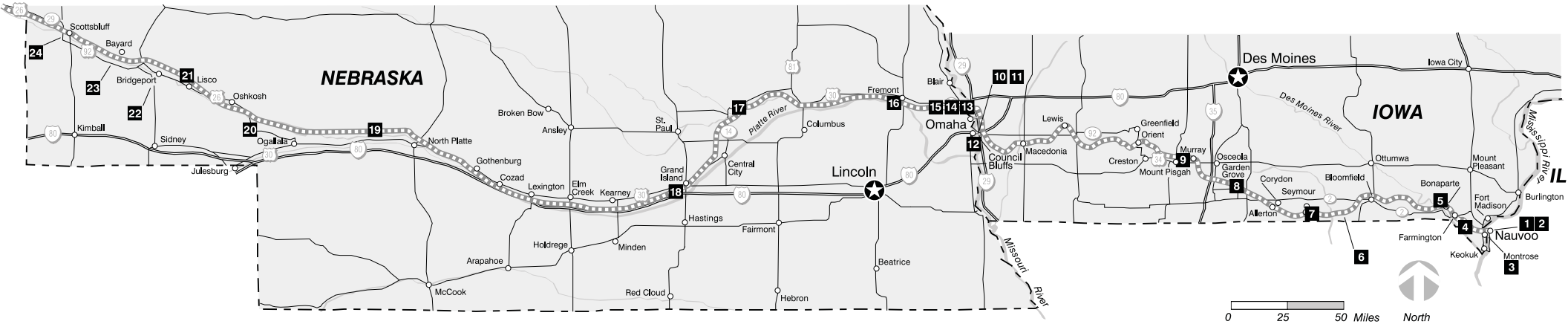
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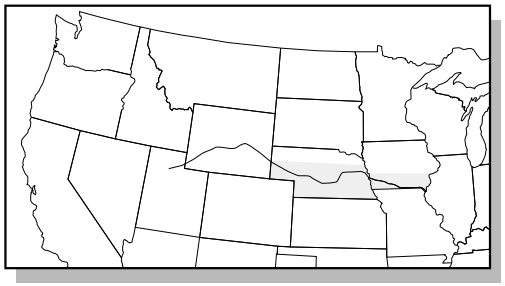
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High-Potential Sites and Segments

Mormon Pioneer National Historic Trail

Iowa Nebraska





Mormon Pioneer National Historic Trail

HIGH-POTENTIAL SITES

Illinois

1 Nauvoo National Historic District
2 Nauvoo Landing

Iowa

3 Montrose Landing
4 Sugar Creek Camp
5 Des Moines River Crossing
6 Chariton River Crossing
✳✳ 7 Locust Creek Camp (Come, Come Ye Saints)
8 Garden Grove
9 Mount Pisgah
✳✳ 10 Grand Encampment
✳ 11 Kanesville Tabernacle
✳✳ 12 Middle Mormon Ferry (Missouri River)

Nebraska

✳✳ 13 Winter Quarters Complex
✳ 14 Military Road Ruts
15 Crossing of the Elkhorn River
16 Liberty Pole Camp
✳✳ 17 Lower Loup River Ford
✳ 18 Murdock Site
✳✳ 19 Sand Hill Ruts
✳ 20 Ash Hollow Complex/ Windlass Hill
21 Ancient Bluff Ruins
✳ 22 Courthouse Rock/Jail Rock
✳ 23 Chimney Rock
✳ 24 Scotts Bluff National Monument/ Mitchell Pass

✳ New Site
✳✳ New Name

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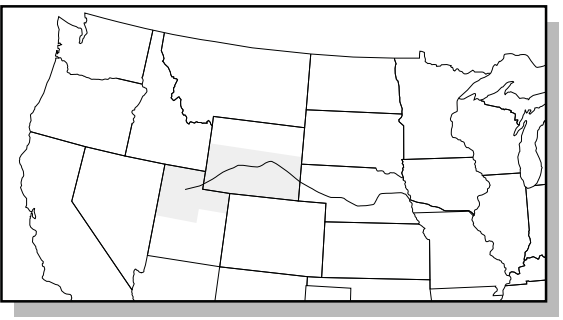
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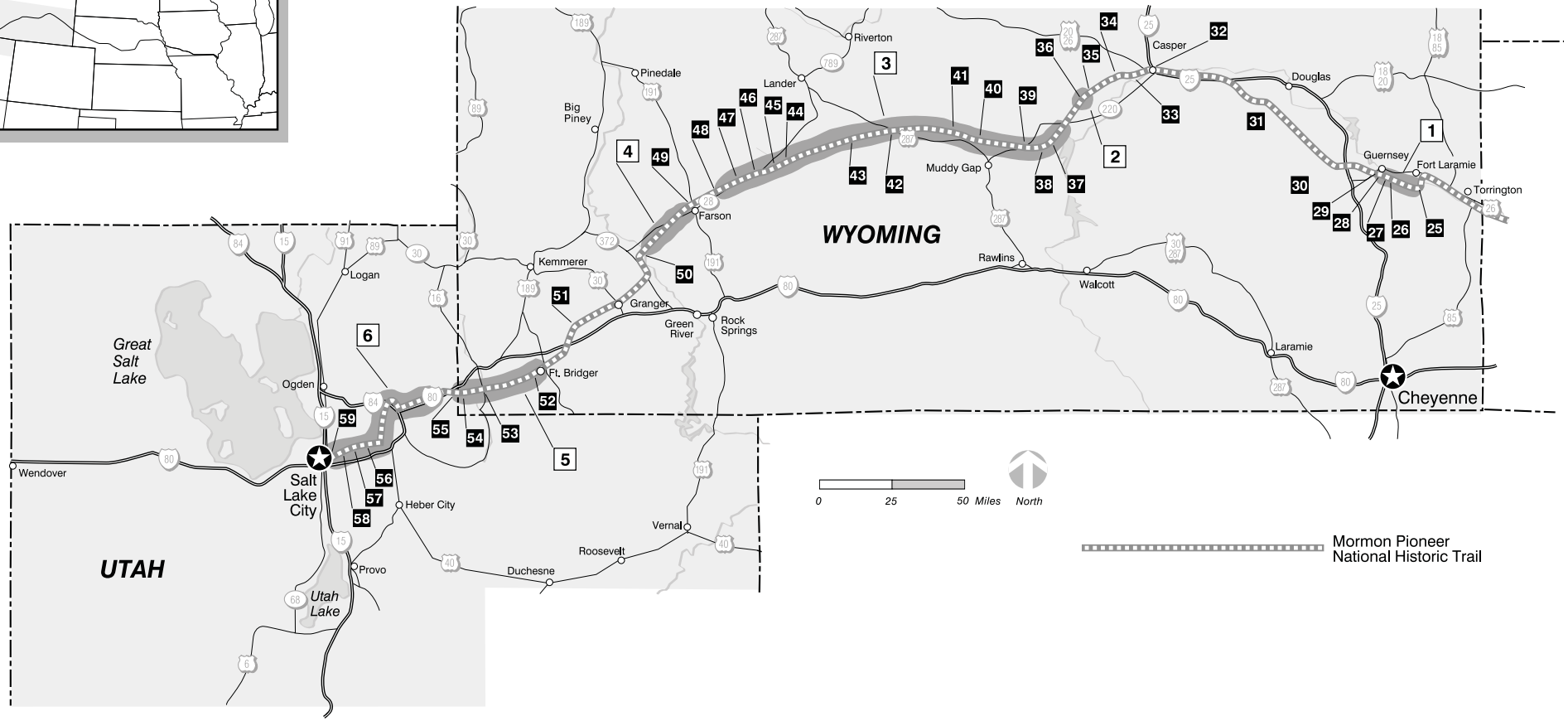
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High-Potential Sites and Segments

Mormon Pioneer National Historic Trail

Wyoming Utah





HIGH-POTENTIAL SEGMENTS

Wyoming

1. Fort Laramie to Warm Springs
2. Prospect Hill
3. South Pass (Horse Creek to Little Sandy Crossing)
4. Big Sandy to Green River
5. Fort Bridger to Cache Cave
6. Castle Rock to This Is the Place Heritage Park

HIGH-POTENTIAL SITES

Wyoming

- 25 Fort Laramie
- ✳ 26 Mexican Hill
- 27 Register Cliff
- ✳✳ 28 Guernsey Ruts (Deep Rut Hill)
- 29 Warm Springs Canyon
- ✳ 30 Laramie Peak
- 31 Ayres Natural Bridge
- 32 Upper Platte Ferry and Ford (1847)
- 33 Bessemer Bend/Red Buttes Crossing
- 34 Avenue of Rocks
- 35 Willow Springs
- 36 Prospect Hill
- ✳ 37 Saleratus Lake
- 38 Independence Rock
- ✳ 39 Devil's Gate
- ✳ 40 Split Rock
- ✳ 41 Three Crossings/ Deep Sand Route
- 42 Ice Slough
- ✳ 43 Rocky Ridge
- 44 South Pass
- 45 Pacific Springs
- ✳ 46 Dry Sandy Crossing
- 47 Parting of the Ways
- ✳✳ 48 Little Sandy Crossing
- ✳ 49 Big Sandy Crossing
- 50 Lombard Ferry (Green River Mormon Ferry)
- 51 Church Butte
- ✳✳ 52 Fort Bridger
- 53 Bear River Crossing
- 54 The Needles

Utah

- 55 Cache Cave
- 56 Big Mountain Pass
- 57 Little Mountain Summit
- 58 Last Camp
- ✳✳ 59 This Is the Place Heritage Park

✳ New Site
✳✳ New Name

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Appendix E. California and Pony Express National Historic Trails: High-Potential Segments

APPENDIX E. CALIFORNIA AND PONY EXPRESS NATIONAL HISTORIC TRAILS—HIGH-POTENTIAL SEGMENTS

NO	SEGMENT NAME	LENGTH (miles)	COUNTY/ STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	TRAIL	THREATS TO RESOURCES/ VISITOR SERVICES
1	St. Marys-Red Vermillion Crossing	16	Shawnee, Pottawatomie, KS	Manhattan	This segment begins three miles northwest of present-day Rossville and follows U.S. Highway 24 along the north side of the Kansas River to St. Marys Mission. From St. Marys, Oregon Trail Road follows the actual route of the Oregon-California Trail along the foot of the Kansas River Bluffs, past Oregon Trail Park, to Red Vermillion Crossing. This 11 miles of twisting gravel road has been graded, but its alignment has not been significantly changed. The Kansas River flood plain was swampy, forcing the emigrants to follow a path along a bench at the edge of the bluffs. Edwin Bryant eloquently described his day's travel on May 22, 1846: "The trail along which we have traveled Today . . . runs over a high undulating country, exhibiting a great variety of rich scenery. As the traveler rises the elevated swells of the prairie, his eye can frequently take in at a glance, a diameter of 60 or 80 miles of country, all clothed at this season with the deepest verdure and the most luxuriant vegetation."	Vermillion Creek Crossing is listed	Private	Oregon, California (Independence Road)	None known. Oregon Trail Park has a shelter house and restroom.
2	Fort Laramie to Warm Springs	14	Goshen, Platte, WY	Torrington	The trail remains virtually intact and continuous, except when crossed by pipelines and county roads, from the climb out of the Laramie River Valley to Mexican Hill. Huge swales are visible in places; the junction of various branches is clearly visible where the Bluff and River routes join east of Mexican Hill.	Not listed	Public (Wyoming National Guard)/Private	Oregon, California, Mormon Pioneer, Pony Express	National Guard activities near Guernsey impact the area.
3	Prospect Hill	3	Natrona, WY	Casper	Just west of Willow Springs is a low ridge called Prospect Hill. Here emigrants climbed 400 feet to gain their first sight of the Sweetwater Mountains to the west. The view, or prospect, of the gentle valley gave travelers hope for better water and an easier road ahead.	Determined eligible	Public (BLM)/ Private	Oregon, California, Mormon Pioneer	Mineral development threatens the historic viewshed. There is a BLM interpretive panel at the top of the hill.

NO	SEGMENT NAME	LENGTH (miles)	COUNTY/ STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	TRAIL	THREATS TO RESOURCES/ VISITOR SERVICES
4	South Pass (Horse Creek to Little Sandy Crossing)	145	Natrona, Carbon, Fremont, Sublette, Sweetwater, WY	Casper, Bairoil, Rattlesnake Hills, Lander, South Pass, Farson	The quality of the resources and the visual experience make South Pass one of the most impressive segments on the entire trail. It starts where the trail fords Horse Creek and heads southwest to cross Wyoming Highway 220 a half mile northeast of Steamboat Rock. The segment continues southwest past present-day Pathfinder Reservoir to strike the Sweetwater River south of Saleratus Lake. Following the banks of the Sweetwater, the route heads generally west—past Independence Rock; around Devil's Gate; past Soda Lake, Split Rock, and Castle Rock—to Three Crossings. The segment follows the main trail along the Sweetwater, fords the river three times within two miles at Three Crossings, passes Names Rock, and fords again at Fifth Crossing. Some emigrants chose to take the Deep Sand Route to the south to avoid these river crossings. The segment next passes Ice Slough; crosses Warm Springs Creek; passes the Seminoe Cutoff junction; fords the Sweetwater three more times at Sixth, Seventh, and Eighth crossings; and arrives at the foot of Rocky Ridge. The trail climbs away from the Sweetwater River to cross the high, barren, and rocky ridgeline of Rocky Ridge. Passing north of Lewiston Lakes and crossing Strawberry, Rock, and Willow creeks, the trail leaves the Sweetwater River at the Ninth Crossing—a site known as Burnt Ranch. The route then climbs past Twin Mounds and crosses the Wind River Range and the Continental Divide at South Pass. On July 12, 1849, Edwin Bryant recorded his impressions as he crossed South Pass on his way to California: "There is, I believe, considerable misconception in regard to the South Pass of the Rocky Mountains. The general supposition is, that it is a difficult and narrow passage by steep ascent and descent, between elevated mountain-peaks. This conjecture is very far from the fact. The gap in the mountain is many miles in breadth, and . . . the ascent up the Platte and Sweetwater has been so gradual, that although the elevation of the Pass above the sea is . . . between seven and eight . . . thousand feet [actually 7,412 feet], yet from the surface we have travelled over, we have been scarcely conscious of rising to the summit of a high ridge of mountains." Descending into the Pacific drainage, the segment passes Pacific Springs and Plume Rock, crosses Dry Sandy Creek, and follows the north side of Dry Sandy Creek past Parting of the Ways to end at Little Sandy Crossing.	South Pass is a National Historic Landmark	Public (BLM)/ Private	Oregon, California, Mormon Pioneer, Pony Express	Mining exploration around Lewiston and Dickie Springs has been a low-level threat to the trail and its viewshed for many years. If large-scale development is proposed, the threat would increase greatly. Ranchette development on the upper Sweetwater River near Split Rock is a concern.
5	Big Sandy to Green River	50	Sweetwater, WY	Farson, Rock Springs	This segment begins at the Big Sandy Crossing near present-day Farson, site of the Big Sandy Pony Express station. It follows unimproved roads southwest along the north side of the Big Sandy River and passes the Big Timber Pony Express Station. The segment ends at the Lombard Ferry crossing of Green River, three miles north of the confluence of the Big Sandy and Green rivers.	Not listed	Public (BLM, BOR)/ Private	Oregon, California, Mormon Pioneer, Pony Express	Access to the eastern end of the segment is possible from Wyoming Highway 28 at a state historical marker. The segment crosses public and private lands. Visitors should acquire written permission from private landowners before entering private land. Access is not continuous along the trail by automobile. Travelers may park their vehicles and hike portions of the trail.
6	Anderson Ridge to Buckskin Crossing	27	Fremont, Sublette, WY	South Pass, Farson, Pinedale	Part of the Fort Kearny-South Pass-Honey Lake Wagon Road, or the Lander Road, this segment begins at Anderson Ridge and runs northwest. It crosses the Sweetwater River and climbs the Wind River Mountains to cross the Continental Divide near Jensen Meadows. It then descends to Buckskin Crossing on the Big Sandy River, where it ends.	Not listed	Public (BLM)/ Private	California (Lander Road)	None known.

NO	SEGMENT NAME	LENGTH (miles)	COUNTY/ STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	TRAIL	THREATS TO RESOURCES/ VISITOR SERVICES
7	North Piney Creek to Smiths Fork	42	Sublette, Lincoln, WY	Afton, Fontenelle Reservoir	The almost-pristine landscape along this segment of the Lander Road offers an opportunity to experience impressive trail remnants. It begins at North Piney Creek, follows a gravel road across Johnson Ridge, ascends South Piney Creek, passes the David Bond and Snyder Basin emigrant graves, climbs through Thompson Pass, passes the Elizabeth Paul Grave on La Barge Creek, goes through La Barge Meadows, ascends to Wagner Pass, and ends on Smiths Fork.	Not listed	Public (BLM, USFS-Bridger National Forest)/Private	California (Lander Road)	None known.
8	Bear River Divide	31	Uinta, Lincoln, WY	Kemmerer	The Oregon-California Trail follows two-track and ranch roads for 31 miles as it crosses the rugged Bear River Divide. The segment begins where the trail crosses U. S. Highway 189 near Cumberland Gap, crosses Cumberland Flats, ascends Little Muddy Creek and Chicken Creek, crosses the Bear River Divide, descends Bridger Creek, and ends at Wyoming Highway 89.	Not listed	Public (BLM)/ Private	Oregon, California	None known.
9	Fort Bridger to Cache Cave	44	Uinta, WY; Summit, UT	Evanston, Ogden	This segment includes a series of high-quality trail remnants, historic resources, and natural landmarks. It begins at Fort Bridger; ascends Cottonwood Creek, passing between Bridger Butte and Sugar Loaf Butte; climbs onto Bigelow Bench; descends to Muddy Creek; ascends Soda Hollow; and climbs the flanks of Aspen Mountain. The trail crosses the rim of the Great Basin at Aspen Mountain. Its elevation of more than 8,300 feet makes it the highest point on the trail thus far. The segment then descends Sulphur Creek to cross the Bear River, climbs up Coyote Creek past the Needles, crosses Yellow Creek, and ends at Cache Cave, an elongated cavity in a yellow sandstone formation.	Not listed	Public (BLM)/ Private	California (Hastings Cutoff), Mormon Pioneer, Pony Express	None known.
10	Castle Rock to This Is the Place Heritage Park	51	Summit, Morgan, Salt Lake, UT	Ogden, Salt Lake	Beginning at Castle Rock, a geologic formation that towers 200 feet above the trail, this segment goes down Echo Canyon to the present-day town of Echo, where it turns northwest along the Weber River, past Witch Rocks, to present-day Henefer. After crossing the Weber River, the trail turns south up Main Canyon to Hogsback Summit. It then goes down Dixie Hollow, up Broad Hollow, and descends to East Canyon Creek (now inundated by East Canyon Reservoir). The trail then ascends East Canyon Creek to Little Emigration Canyon. The four-mile trail through Little Emigration Canyon climbs 1,400-feet to the top of Big Mountain, the longest sustained climb on the entire trip thus far. Today, it provides a rare opportunity to walk a pristine section of the original trail in Utah. From Big Mountain Pass, the trail descends Clear Creek to Mountain Dell Canyon, makes its last ascent to Little Mountain Summit, and follows Emigration Canyon to This Is the Place Heritage Park.	Not listed	Public (USFS-Wasatch National Forest, Utah Division of Parks and Recreation)/ Private	California (Hastings Cutoff), Mormon Pioneer, Pony Express	None known.

NO	SEGMENT NAME	LENGTH (miles)	COUNTY/ STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	TRAIL	THREATS TO RESOURCES/ VISITOR SERVICES
11	Fairfield to Ruby Valley (Simpson Segment)	217	Tooele, Juab, UT; White Pine, NV	Rush Valley, Lynndyl, Fish Springs, Wildcat Mountain, Currie, Kern Mountains, Ruby Lake	George M. Chorpenning's field superintendent, Howard Egan, developed much of this segment for the mail and freight service called the Jackass Express, which operated on this route between 1858 and 1860. Captain James H. Simpson surveyed the trail for the army in 1859. The Pony Express, stage and freighting operations, and the Lincoln Highway used the route well into the 20th century. This segment begins at Camp Floyd/Stagecoach Inn State Park, climbs through Fivemile Pass, crosses Rush Valley, passes through Faust, climbs Lookout Pass, and arrives at Simpson Springs. The segment from Simpson Springs to Callao (Willow Springs Station) is particularly pristine. It crosses Old River Bed (just north of Table Mountain), traverses Dugway Valley, climbs through Dugway Pass, passes Fish Springs and Boyd stations, and arrives at Callao. The route then goes north through Overland Canyon, turns south and crosses Deep Creek (just north of Ibapah), and enters present-day Nevada. The segment descends West Deep Creek; crosses Antelope Valley; ascends Spring Valley Creek; crosses the Schell Creek Range; descends Schell Creek; crosses Steptoe Valley, the Cherry Hill Range, and Butte Valley; climbs the Butte Mountains; crosses Long Valley; climbs over the Maverick Springs Range; and ends on the west side of Ruby Valley at Fort Ruby Spring.	National Historic Landmarks (Stagecoach Inn and Camp Floyd)	Public (BLM, Utah Division of Parks and Recreation)/ Private	Pony Express	Part of this segment is a designated National Backcountry Byway, administered by the BLM. BLM maintains interpretive sites at Faust Junction, Simpson Springs Station, Boyd Station, and Canyon Station. Simpson Springs also has a replica station. Camp Floyd/Stagecoach Inn State Park has a restored inn, visitor center, and a BLM wayside exhibit.
12	Grantsville to Franklin River Crossing	177	Tooele, UT; Elko, NV	Tooele, Bonneville Salt Flats, Newfoundland Mountains, Wendover, Elko	Extensive sections of pristine trail can be found in this segment, some discovered only recently. The segment is a combination of gravel roads, 4x4 two-tracks, and some sections that should only be attempted by horseback or on foot. It starts on the northwest corner of present-day Grantsville, runs northwest to round the northern end of the Stansbury Mountains at Timpie Point, and turns southwest along the western edge of Skull Valley to reach Hope Wells, the last good water before reaching Donner Spring (83 miles away). The route traverses Skull Valley, passes Redlum (or Redden) Spring, and crosses the Cedar Mountains at Hastings Pass. From Hastings Pass, the route climbs over Grayback Hills and heads northwest across the seemingly endless salt flats of the Great Salt Lake Desert. Composed of sand dunes and mud flats, this was the worst section of the Hastings Cutoff for emigrants and animals alike. In places the flat surface was firm and in others soft and wet with salt water. The trail passes the isolated butte of Floating Island, crosses the Silver Island Mountains at Donner-Reed Pass, and arrives, at last, at the oasis of Donner Spring. The route turns southwest around the shoulder of Pilot Peak and enters present-day Nevada. It passes Halls Spring and climbs through Bidwell Pass and Silver Zone Pass (in the Toano Mountains on today's I-80). While traveling across Pilot Creek Valley east of Silver Zone Pass, John Wood lamented: "This morning we traveled over one of the most uninhabitable parts of God's creation; not a thing but the bare earth to be seen, but I suppose if it was not for these there would be no pretty places." The segment then passes Big Springs, Flowery Lake Springs, Mound Springs, and Warm Springs and ends at the Franklin River Crossing in Ruby Valley.	Not listed	Public (BLM)/ Private	California (Hastings Cutoff)	None known.
13	Curlew Valley to Salt Lake Cutoff Junction	45	Box Elder, UT; Cassia, ID	Tremonton, Grouse Creek, Oakley	The Salt Lake Cutoff was developed to bypass the desert trail established by Lansford W. Hastings. The route goes north from Salt Lake City along the base of the Wasatch Mountains, past Brigham City, and turns northwest into southern Idaho. This segment starts in Curlew Valley; travels west past Pilot, Emigrant, and Cedar springs; traverses the Raft River Narrows; passes Emigrant Canyon Spring; and rejoins the main California Trail near City of Rocks.	Not listed.	Public (BLM, Idaho Department of Parks and Recreation)/ Private	California (Salt Lake Cutoff)	None known. City of Rocks National Reserve maintains a small museum in Almo and plans to place interpretive wayside exhibits throughout the park.

NO	SEGMENT NAME	LENGTH (miles)	COUNTY/ STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	TRAIL	THREATS TO RESOURCES/ VISITOR SERVICES
14	Granite Pass to Humboldt River	98	Cassia, ID; Box Elder, UT; Elko, NV	Oakley, Grouse Creek, Jackpot, Wells, Double Mountain	This California Trail segment begins at Granite Pass on the Utah/Idaho border. The route descends from Granite Pass to Goose Creek and ascends gradually along Goose Creek, past Record Bluff, to Little Goose Creek. From Little Goose Creek an impressive four-mile hiking segment on the original trail climbs over the ridge to Big Draw. The trail then passes Rock Spring, Emigrant Springs, and Chicken Springs. From Chicken Springs to the head of Thousand Springs Valley is a three-mile hiking segment on original trail. Halfway down Thousand Springs Valley is another two-mile section of ruts. The route next ascends West Brush Creek Canyon, where five miles of trail can be hiked or driven over a largely intact historical viewshed. The original 1843 trail descended Bishop Creek to the Humboldt River. The route of the segment through today's town of Wells was developed in 1845. After crossing Willow Creek, this segment descends Town Creek to Humboldt Wells, the source of the Humboldt River. The trail turns northwest, crosses a sand ridge on a three-mile hiking or four-wheel-drive route, and descends again to the Humboldt River, where it ends.	Not listed	Public (BLM)/ Private	California	None known. The route is a BLM Backcoutry Byway from Goose Creek to U.S. Highway 93.
15	Auburn to Wayan	25	Lincoln, WY; Caribou, ID	Soda Springs	Ruts are very evident in the rugged terrain crossed by this Lander Road segment. Beginning just north of Auburn, Wyoming, the route ascends the north bank of Stump Creek to the Idaho border. In Idaho, the route heads northwest along the west bank of Stump Creek, past the site of the Oneida Salt Works, to the mouth of Terrace Canyon. The route ascends Terrace Canyon, passes Lane's grave on Lanes Creek, and ends on Gravel Creek, south of the town of Wayan. The trail through the Caribou National Forest is marked with concrete posts and the ruts are very evident.	The Terrace Canyon portion of the Stump Creek ruts is listed.	Public (USFS-Caribou National Forest)/Private	California (Lander Road)	None known.
16	Portneuf Crossing to the Narrows of Ross Fork	12	Carabou, Bingham, Bannock, ID	Palisades, Blackfoot	This segment, containing several traces of the Lander Road, begins at the crossing of the Portneuf River on the Fort Hall Indian Reservation. It continues west across rolling rangeland and descends Ross Fork to intersect the main Oregon-California Trail at the Narrows of Ross Fork.	Not listed	Private (Fort Hall Indian Reservation)	California (Lander Road)	None known.
17	Arbon Valley to Sublett Reservoir	25	Oneida, Power, Cassia, ID	Malad City, Oakley	The Hudspeth Cutoff was opened by a large Missouri party led by Benoni M. Hudspeth and John J. Meyers in July 1849. The route went west from Soda Springs and avoided the long swing north to Fort Hall. This segment begins in Arbon Valley, approximately four miles south of Buist, Idaho, and ends at Sublett Reservoir, on the east side of the Raft River Valley. This is a very remote and evocative section of trail. A series of primitive roads, often the original trail itself, follow the emigrant route through a largely undisturbed landscape. The trail passes Twin Springs, ascends South Fork Rock Creek, climbs to Summit Springs, descends Sublett Creek Canyon, and ends at the eastern edge of Sublett Reservoir. Ruts can still be seen at Summit Springs and descending Sublett Creek Canyon.	Not listed	Public (BLM, USFS-Sawtooth National Forest, Curlew National Grassland)/ Private	California (Hudspeth Cutoff)	The segment needs to be marked and interpreted for public use.
18	Bear Valley	10	Klamath, OR	Klamath Falls, Medford	This potential hiking segment extends from Bear Valley to the Lower Klamath River Crossing. In 1847, Levi Scott opened this alternate route to cut several miles off the original route.	Not listed	Public/Private	California (Applegate Trail)	The segment needs trail development and marking. There are markers and an Applegate Trail Coalition wayside at the Lower Klamath River Crossing.

NO	SEGMENT NAME	LENGTH (miles)	COUNTY/ STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	TRAIL	THREATS TO RESOURCES/ VISITOR SERVICES
19	Cascade Mountain Crossing	30	Klamath, Jackson, OR	Medford	With excellent hiking potential, this segment stretches from the Klamath River and over the summit of the Cascade Mountains to the confluence of Tyler Creek with Emigrant Creek, near the head of Emigrant Lake and the Rogue River Valley. Lindsay Applegate described this country as “an immense forest, principally of yellow pine.” Today, Green Springs Highway crosses, parallels, and runs within a mile or two of the route. The crossing took the exhausted travelers up to four days, and killed many oxen. J. Quinn Thornton recalled that on October 13, 1846, “Some of the emigrants were busied in making arrangements for diminishing in some manner the weight of the load in their wagons. Others were silent, and appeared to be stupefied with their distresses. Children were crying for bread. Over all this scene, the sun shone as clear as ever.”	Not listed	Public/Private	California (Applegate Trail)	There are interpretive waysides at Lower Klamath River Crossing and Tub Springs, and markers at Sheepy Creek, Jenny Creek Wagon Slide, Round Prairie, Lincoln, Hyatt Lake, Keen Creek Wagon Slide, Cascade Summit, Tyler Creek, Emigrant Creek, Songer Gap, and Emigrant Lake.
20	Canyon Creek Pass	9	Douglas, OR	Canyonville	This segment stretches from Canyon Creek Pass to South Umpqua River. No place on the Applegate Trail caused greater suffering than the descent of Canyon Creek, which broke wagons and caused deaths as emigrants were forced down a narrow defile through icy waters.	Not listed	Public/Private	California (Applegate Trail)	None known.
21	Overland Canyon	10	White Pine, NV	Ruby Lake	This segment, used by the Pony Express and the Hastings Cutoff of the California Trail, begins at Fort Ruby Spring, at the eastern base of the Ruby Mountains. The trail climbs through Overland Canyon, crosses Overland Pass, and descends Big Wash. On August 10, 1850, Madison Berryman Moorman described the trail through Overland Pass: “The road made a right turn over the mountain, in a very nearly due West course. The pass is an excellent one—no rocks—not very steep and the road very firm. Right on the summit is a spring of only tolerable water.” The segment ends where Big Wash opens onto the Huntington Valley. This was the first pass south of the Humboldt River that wagons could cross. Although pack trains cut across the Ruby Mountains through Secret or Harrison passes, wagons were forced to swing far south, cross through Overland Canyon, and then head north to reach the Humboldt River.	Not listed	Public (USFS- Humboldt National Forest)	California (Hastings Cutoff), Pony Express	None known.
22	Overland Canyon to Simpson Park Station	84	White Pine, Eureka, Lander, NV	Ruby Lake, Newark Lake, Simpson Park Mountains, Summit Mountain	From the mouth of Overland Canyon, the Pony Express route crosses the same vast and lonely stretches of mountains and sagebrush flats that the pony riders covered in 1860. This is typical Basin and Range country, where few modern developments intrude upon the viewshed. The segment heads out across Huntington Valley, crosses Diamond Mountains, and descends Telegraph Canyon to Diamond Springs Station. It continues across Diamond Valley, traverses the Sulphur Springs Range south of Mount Hope, and crosses Kobeh and Monitor valleys to reach Dry Creek Station. Remnants of the old trail are barely visible as the segment leaves Dry Creek station heading west. The route goes around the north end of Simpson Park Mountains, crosses Rye Patch Canyon, descends Simpson Park Canyon, and ends at Simpson Park Station on Willow Creek.	Not listed	Public (BLM, USFS- Toiyabe National Forest)	Pony Express	None known.
23	South Fork Humboldt River Gorge	14	Elko, NV	Elko	This rugged canyon was a curiosity described by many emigrants. The Bidwell-Bartleson Party was the first to traverse it in 1841. The Hastings parties and the gold-seeking forty-niners followed. It was used through 1850, when the Hastings Cutoff was abandoned. Heinrich Lienhard told of his journey through the canyon in 1846: “We entered the deep gorge through which the river cut its way, and through which our road led. The mass of rock rose in several places nearly perpendicular, around which the stream twisted in several great bends, now to the right, now to the left, the gorge becoming more contracted. . . . Each moment we had to recross the stream, the water often coming nearly as high as the wagon bed.”	Not listed.	Public (BLM)/ Private	California (Hastings Cutoff)	None known.

NO	SEGMENT NAME	LENGTH (miles)	COUNTY/ STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	TRAIL	THREATS TO RESOURCES/ VISITOR SERVICES
24	Carlin to Gravelly Ford	15	Elko, Eureka, NV	Battle Mountain	This segment begins approximately three miles west of present-day Carlin, Nevada, where the trail leaves the Humboldt River and ascends a low gravelly hill to an elevated ridge. The route climbs to Emigrant Pass over a six-mile hiking, equestrian, and four-wheel-drive route, on or near the original trail, paralleling I-80. Just west of Twin Summit, the trail turns south, leaving I-80, and descends Emigrant Canyon along a pristine six-mile section of trail that can be easily followed all the way to Gravelly Ford.	Not listed	Public (BLM)/ Private	California	None known.
25	North Battle Mountain to Ellison	12	Lander, Humboldt, NV	Battle Mountain, Winnemucca	The trail along the north side of the Humboldt River from North Battle Mountain to Ellison retains its original historic viewshed and contains some exceptional trail remains. The segment begins one mile northwest of present-day North Battle Mountain and follows a seldom used four-wheel-drive road northwest along the north side of McIntyre Slough. It crosses Sheep Creek and ends near the Valmy power plant, southeast of present-day Ellison.	Not listed	Public (BLM, BOR)/ Private	California	None known.
26	Iron Point to Edna Mountain Pass	5	Humboldt, NV	Winemucca	A five-mile hiking segment on original trail starts at the beginning of the steep ascent up the sand hill at Iron Point, crosses over the sandy point, and ascends a narrow, pristine ravine to Edna Mountain Summit. The historical viewshed from the pass is still intact.	Not listed	Public (BLM)	California	Recent mining exploration and drilling threaten the area.
27	Golconda to Winnemucca	17	Humboldt, NV	Winnemucca, Osgood Mountains	This segment on the north side of the Humboldt River traces the eastern end of the river's "Big Bend." It starts two miles north of present-day Golconda, Nevada, and follows primitive ranch roads as the river swings northwest in a long loop along the south edge of the Osgood Mountains. After crossing the Little Humboldt River, the trail and Humboldt River swing south again, and the segment ends two miles north of present-day Winnemucca.	Not listed	Public (BLM)/ Private	California	None known.
28	Humboldt River – North Side Trail	22	Humboldt, Pershing, NV	Winnemucca, Eugene Mountains	Ranch roads trace the trail along the north and west sides of the Humboldt River, beginning two miles northwest of present-day Rose Creek, Nevada. The route stays close to the Humboldt River for the first eight miles and then heads southwest across sagebrush flats. In about 13 miles the trail rejoins the river, which has made a long loop south and then west. The segment ends at the Callahan Bridge at the north end of Rye Patch Reservoir. The road maintains its historic viewshed.	Not listed	Public (BLM)/ Private	California	None known.
29	Humboldt River – South Side Trail	20	Humboldt, Pershing, NV	Winnemucca Eugene Mountains	The trail can be followed on ranch roads along the south and east sides of the Humboldt River, beginning one mile northwest of present-day Rose Creek, Nevada. The segment stays near the Humboldt River as it heads southwest for approximately four miles and then swings south, ending at a sharp bend in the river, one mile north of today's Mill City. The road maintains its historic viewshed.	Not listed	Public (BLM)/ Private	California	None known.
30	Rye Patch Reservoir to Woolsey	22	Pershing, NV	Eugene Mountains, Lovelock	Heading south from Rye Patch Reservoir, ranch roads follow the west side of the Humboldt River. These roads cross pristine landscapes on, or very near, the original route of the trail. The segment ends at the north end of Upper Valley, two miles west of Woolsey.	Not listed	Public (BLM)/ Private	California	None known.

NO	SEGMENT NAME	LENGTH (miles)	COUNTY/ STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	TRAIL	THREATS TO RESOURCES/ VISITOR SERVICES
31	Humboldt Sink to Dayton	81	Churchill, Lyon, NV	Carson Sink, Fallon, Carson City	On the western edge of the Humboldt Sink, the Carson and Truckee routes divide. The Carson Route heads south across the infamous Forty-mile Desert. This desert was the most difficult part of the journey to California. Emigrants found abandoned wagons and dead animals strewn all along the route. Trail ruts survive at the crossing of Salt Creek, between the Mopung Hills and the Hot Springs Mountains. From here, the trail passes through sand hummocks, crosses alkali Parran Flat, and heads south across the desert on dirt roads to Soda Lake. Much of this segment still retains its historic viewshed. In Lahontan Valley, the trail meets the Carson River, the first water since the Humboldt Sink. The route then turns west and ascends the Carson River. It runs beneath present-day Lahontan Reservoir, crosses Churchill Valley, and arrives at Fort Churchill. The segment continues up the Carson River, past Table Mountain, and ends on the west side of the Carson Plains at the present-day town of Dayton.	Not listed	Public/Private	California (Carson Route)	None known.
32	Mickey Canyon	14	Lyon, NV	Smith Valley	The Walker River-Sonora Trail was forced away from the West Walker River when it passed through narrow Wilson Canyon. As a consequence, emigrants swung south through Mickey Canyon, a fourteen-mile diversion that brought them back to the river only a few miles from their starting point. Clear traces of the trail are visible today as it sweeps up the hillside and over the ridge top.	Not listed	Public (USFS)	California (Walker River-Sonora Route)	None known.
33	Summit Creek Canyon	3	Tuolumne, CA	Bridgeport	The trail descends one thousand feet down Summit Creek Canyon from Sheep Camp to Saucer Meadow, winding between boulders and plunging through steep ravines, where ropes were required to keep the wagons in check. Passing through dense forest along the bank of Summit Creek from Saucer Meadow to Relief Valley, this segment is one of the few pristine sections of emigrant trail remaining in the Sierra Nevada. While much of the Walker River-Sonora route is protected in the Hoover and Emigrant Wilderness areas, most of its course has been used as hiking and stock trails. This particular section, however, appears essentially as it was when abandoned in the early 1860s.	Not listed	Public (USFS-Stanislaus National Forest-Emigrant Wilderness Area)	California (Walker River-Sonora Route)	None known.
34	Genoa to Union House	72	Douglas, NV; Alpine, El Dorado, Amador, CA	Carson City, Smith Valley, Placerville	This segment includes the ascent of the arduous West Carson Canyon and the various crossings of West Fork of the Carson River. Midway up West Carson Canyon is a Trails West marker installed by the Nevada Historical Society. This marks the start of a stretch of original trail ruts that pass Snowshoe Thompson cave. Reportedly, Thompson stopped here overnight while delivering mail to Washoe miners in the 1850s before the Pony Express was established.	Not listed	Public	California (Carson Route)	In 1997, Cal Trans was widening Highway 88 at the eastern part of Carson Canyon by putting in a passing lane. Work on the uphill side does not impact the trail, but it is not clear what is happening on the downhill side, or how it might affect the trail.

NO	SEGMENT NAME	LENGTH (miles)	COUNTY/ STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	TRAIL	THREATS TO RESOURCES/ VISITOR SERVICES
35	Humboldt Sink to Fernley	37	Churchill, Lyon, NV	Carson Sink, Reno	The Carson and Truckee routes divide on the western edge of the Humboldt Sink. The Truckee Route crosses the Humboldt Bar and heads west across the infamous Forty-mile Desert, the most difficult part of the journey to California. Emigrants found abandoned wagons and dead animals strewn all along the route. Much of the trail can still be followed, both on foot along pristine remnants and by vehicle along dirt roads that maintain their historical viewshed. The route runs southwest along the I-80 corridor, passes Boiling Springs, and skirts the northern boundary of Fernley State Wildlife Management Area. Crossing Impressive sand swales and passing emigrant graves, the trail turns west, paralleling the 1868 Central Pacific Railroad bed, which is now used as an access road. After passing the Fernley Ruts, an excellent set of sandy swales, the segment ends one mile north of present-day Fernley and two miles east of the long-awaited Truckee River.	Not listed	Public (BLM, State of Nevada)/ Private	Calironia (Truckee Route)	None known. Negotiations are underway to create a conservation easement on a two-mile section of the trail that contains the Fernley Ruts.
36	Verdi to Steephollow Crossing	74	Washoe, NV Sierra, Placer,CA	Reno, Portola, Truckee	This segment includes some remarkable resources, many of which would make desirable hiking trails. It starts near the Truckee River, one mile northwest of Verdi, and proceeds northwest up the steep, narrow valley of the south branch of Dog Creek. Sections of pristine trail ascend the creek, but the Hennis Pass/Dog Valley Road has impacted the trail in some areas. The trail crests at First Summit and drops down a steep slide into beautiful Dog Valley. At the bottom of the slide, the trail turns southwest, where wagon swales can still be seen. The route climbs up a draw to Second Summit, where emigrants had their first view of the crest of the Sierra Nevada. Proceeding down the center of Hoke Valley, the route skirts the southeastern edge of Stampede Reservoir, crosses Little Truckee River and Russell Valley, and arrives at Woodchopper Spring. The eroded trail soon crosses a gravel road just below the spring and heads for Prosser Creek. Prosser Creek crossing is clearly defined, and a 0.75-mile section of pristine trail ascends Station Creek Valley. One mile east of present-day Truckee, California, an 800-foot section of ruts can be seen where the trail descends into the Truckee River Valley. West of Truckee, the segment passes Donner Memorial State Park and ascends Coldstream Valley and Emigrant Canyon, where the viewshed is still pristine and undisturbed trail ruts can be found. The trail climbs Roller Pass and descends to join the route from Donner Pass just east of Summit Valley. This valley was identified in many diaries as a welcome resting- place after the torturous summit crossing. After passing Lake Van Norden, Kidd Lake, and Cascade Lakes, the trail descends to the South Yuba River, which it follows to Cisco Butte. Here the trail turns up a rocky shelf; climbs to Crystal Lake; crosses Sixmile Valley and Carpenter Flat; and makes the hazardous descent through Emigrant Gap into Bear Valley. The steep river canyon below Bear Valley forced emigrants to ascend Lowell Hill Ridge to the north. Following this ridge, the trail crosses Deadmans Flat, passes Mule Spring, goes over the top of Camel's Hump, and makes the precipitous descent to Steephollow Crossing, where this segment ends. The last major obstacle on the Truckee Route, the descent to Steephollow Creek was the steepest encountered in the entire mountain crossing.	Not listed	Public (USFS - Toiyabe National Forest)/Private	California (Truckee Route)	Residential development, logging, and highway construction all threaten both the trail remains and the historic viewshed. The California State Park system plans to protect the segment from Donner Memorial State Park to Summit Meadow. The beginning of the ascent of Dog Valley is marked by a Nevada Emigrant Trail Marking Committee marker near the old Crystal Peak Cemetery on Dog Valley Road.

NO	SEGMENT NAME	LENGTH (miles)	COUNTY/ STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	TRAIL	THREATS TO RESOURCES/ VISITOR SERVICES
37	Grizzly Valley/Grizzly Ridge	15	Plumas, CA	Portola	This superb hiking route from Lake Davis to Spring Garden over a 7,000-foot ridge was a severe test for emigrants. The segment has a historically intact viewshed and ten trail markers at sites/ruts along the route.	Not listed	Public (USFS-Plumas National Forest)/Private	California (Beckwourth Trail)	None known.
38	Quincy to Spanish Ranch	7	Plumas, CA	Portola, Chico	The 1851-1855 route over Emigrant Hill has an essentially intact viewshed. Trail traces with six trail markers enhance a good hiking trail.	Not listed	Public (USFS-Plumas National Forest)/Private	California (Beckwourth Trail)	None known.
39	Bucks Summit to Lake Oroville	34	Plumas, Butte, CA	Chico	An ideal auto tour could be made of this Beckwourth Trail segment. There are numerous nearby ruts, swales, prehistoric and historic sites, and 18 related trail markers.	Not listed	Public (USFS-Plumas National Forest)/Private	California (Beckwourth Trail)	None known.
40	Lassen Meadows to Pothole Springs	206	Pershing, Humboldt, Washoe, NV; Modoc, CA	Eugene Mountains, Jackson Mountains, High Rock Canyon, Vya, Cedarville	This exceptional Applegate Trail segment includes some of the most dramatic landscapes and notable sites along the emigrant routes. Beginning at Lassen Meadows, where the Applegate Trail left the Humboldt River and the California Trail, the segment heads northwest to Willow Springs, veers southwest past Antelope Springs, and crosses Antelope Summit. Turning northwest, the route crosses Kamma Pass, descends Painted Canyon to Rabbithole Springs, and heads out across the punishing Black Rock Desert. At Black Rock Springs, the first good source of water and grass since Lassen Meadows, the segment turns north, passes Double Hot Springs and the Lassen and Clapper burial site, and parallels Mud Meadow Creek to reach Mud Meadows. The segment then turns west, passes through Fly Canyon, and negotiates the steep 200-foot descent of the Fly Canyon Wagon Slide near High Rock Lake. Again turning northwest, the trail enters High Rock Canyon with its petroglyphs, axle grease records, and exceptional ruts. Continuing west the route passes Bruff's Singular Rock, Massacre Creek, Emigrant Spring, Long Valley, and crosses Fortynine Pass northwest of Fortynine Mountain. Beyond Sand Creek, the route crosses Surprise Valley and passes Seyferth Hot Springs. Passing between Upper and Middle Alkali Lakes, the trail turns north along the western edge of Upper Alkali Lake. It crosses numerous small streams, including Plum Creek, and arrives at Nesham Creek. An excellent hiking segment begins where the trail leaves the Surprise Valley Road at the eastern base of the Fandango Pass ascent. In 1849, Alonzo Delano found, "The ascent was easy generally. . . . at the steepest part our company doubled teams; but many did not, and the summit was gained without difficulty." After climbing through Fandango Pass, the route descends to Fandango Valley, crosses Willow and Lassen creeks, and meets the eastern edge of Goose Lake. The original trail is now under Goose Lake, so the segment follows the 1853 road around the south end of the lake, where the Lassen Trail separated from the Applegate Trail at Davis Creek. The segment leaves Goose Lake at McGinty Creek, passes through Devils Garden Natural Area, and descends Fletcher Creek for almost 12 miles. It crosses the southern shoulder of Blue Mountain before ending at Pothole Spring, originally named for David Goff of the 1846 Southern Road Expedition.	The section of trail from Rabbithole Springs to Fly Canyon is listed	Public (BLM, USFS-Modoc National Forest)/ Private	California (Applegate Trail)	Overuse of trails and campsites may degrade the area. Large public events are a substantial threat. The trail needs to be marked, and some sections should be developed as hiking trails. Existing markers identify important sites, including the starting and ending points.

NO	SEGMENT NAME	LENGTH (miles)	COUNTY/ STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	TRAIL	THREATS TO RESOURCES/ VISITOR SERVICES
41	1856 Nobles Trail Junction to Granite Creek	30	Pershing, Washoe, NV	Eugene Mountains, Gerlach	Beginning one mile northwest of Rabbithole Springs, where the 1856 route of the Nobles Trail left the Applegate Trail, this segment closely approximates the bladed road between Gerlach and Winnemucca. The route heads west across the desert to Trego Springs, the water source that made the opening of this route possible. J.B. Brown described a miserable nights camp here in 1859: "Such a scene I never wish to see again as being enacted here. . . . Some of the loose cattle which have had no grass for two days nor water for 20 miles travel . . . and of course are nearly crazed are running about in all directions lowing and bellowing in search of water and grass." The trail continued west across the playa for another 12 miles before good water and grass was found at Granite Creek.	Not listed	Public (BLM)	California (Nobles Trail)	Mining, geothermal exploration, and recreational overuse of the area are all potential threats.
42	Deep Hole Springs to Smoke Creek Canyon	26	Washoe, NV	Gerlach	An improved gravel road provides access to a pristine segment of the Nobles Trail along the west edge of the Smoke Creek Desert. From Deep Hole Springs, "a good place to lie over a day or two," the segment runs southwest. The main route stayed on the desert playa, but a side trip could be made to Wall Spring, two miles northwest. In 1859, J.B. Brown found this playa "level as floor, not a spear of living shrub or plant." The route continues southwest, passes Buffalo Springs, and ends at the mouth of Smoke Creek Canyon.	Not listed	Public (BLM)/ Private	California (Nobles Trail)	Modern intrusions threaten the viewshed.
43	Rush Creek Valley to Viewland	18	Washoe, NV; Lassen, CA	Eagle Lake, Susanville	Pristine trail ruts run on alternating sides of a bladed road from Rush Creek Valley to present-day Viewland, California. The route ascends a drainage of Rush Creek for about three miles, crosses Bull Flat, and arrives at Mud Springs. Continuing west over a road that Mary C. Fish described as "an awful rough road it being perfectly macadamized with rocks only the rocks were about a foot high," the segment ends northwest of the town of Viewland.	Not listed	Public (BLM)/ Private	California (Nobles Trail)	Modern intrusions threaten the viewshed.
44	Bridge Creek to Feather Lake	9	Lassen, CA	Eagle Lake, Burney	This heavily forested segment leaves Bridge Creek and climbs to the Sierra Crest. Passing Summit Springs (exact location unknown), the segment ends at Feather Lake, where the Nobles and Lassen trails merge. Mary C. Fish painted a vivid picture of the region in 1850: "The timber here grows to an amazing size. . . . There is also plenty of game in the mountains consisting of Grizzly Bears, Mountain Sheep, Deer, Foxes, &c. I saw the track of a Grizzly bear which being measured . . . was found to be eight inches long and six inches in diameter."	Not listed	Public (USFS-Lassen National Forest)	California (Nobles Trail)	Logging threatens the area.
45	Butte Creek to Manzanita Chute	25	Lassen, Shasta, CA	Burney	The Nobles Trail through the spectacular scenery of Lassen Volcanic National Park would make a superb hiking route. The route ascends Butte Creek to Butte Lake and passes between Black Butte and Prospect Peak. In 1854, Lieutenant E.G. Beckwith recorded his impressions of the lava field the trail crosses: "After leaving the creek [Butte Creek] we passed two or three small ponds, and entered one of the most recently formed and strongly marked volcanic fields we have seen in these mountains. . . . The lava rocks are black, and about 100 feet high, occupying the valley in a confused mass, which would be difficult to cross on foot." The segment continues west past Pine Meadows, crosses Hat Creek and Lost Creek, climbs Nobles Pass, and ends at Manzanita Chute.	Listed	Public (USFS-Lassen National Forest; NPS-Lassen Volcanic National Park)/Private	California (Nobles Trail)	None known.

NO	SEGMENT NAME	LENGTH (miles)	COUNTY/ STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	TRAIL	THREATS TO RESOURCES/ VISITOR SERVICES
46	Trail to North Fork of Pit River	5	Modoc, CA	Cedarville	Six miles south of Davis Creek, a five-mile section of the original Lassen Trail can still be followed. The segment leaves U.S. Highway 395 heading south, passes over a low saddle in the hills and drops into Joseph Creek bottom, an emigrant camping area. On September 5, 1949, Elijah Preston Howell recorded, "By a very rough road, passed over a low divide from where the waters fall off south. On the first creek [Joseph Creek] coming down from the mountains on the left, which we came to we camped." The trail went south from Joseph Creek over two ridges, separated by Thomas Creek and turned abruptly west down a canyon for half a mile to the North Fork of Pit River. The segment ends where the trail rejoins U.S. Highway 395 north of Conical Rocks.	Not listed	Public (BLM)/ Private (XL Ranch Indian Resrvation)	California (Lassen Trail)	None known.
47	Pit River Canyon	5	Modoc, CA	McArthur	This section of trail through the deep Pit River Canyon maintains its original environment and can be followed by a hiker or horseback rider. The segment begins where the trail leaves Bushy Road, passes the often-mentioned landmark of Hanging Rock, and ends where the trail intersects Stone Coal Road. The trail crosses the circuitous Pit River five times in this five-mile stretch and passes through a narrow canyon with 400-500 foot high volcanic walls. On September 9, 1849, Elijah Preston Howe recorded, "In one mile we crossed the creek [Pit River] to the North West side. We crossed four times more in the Cañon. Heavy Pine timber and steep rocky ridges on each side. We turned out early for noon, our Cattle being quite weak and road bad."	Not listed	Public (USFS-Modoc National Forest)	California (Lassen Trail)	None known. The USFS plans to make the Pit River Canyon an interpretive hiking trail. A Trails West marker is located near the start of the segment.
48	Pit River to Feather Lake	46	Lassen, CA	McArthur, Burney	This extended segment of the Lassen Trail begins six miles south of the present-day town of Bieber, where the eastern (1849) and western (1848) branches of the Lassen Trail split. The segment follows the eastern branch south past Hunter Spring and makes an unbelievable descent to Horse Creek at the present-day town of Little Valley. On October 10, 1849, J. Goldsborough Bruff recorded this descent: "And then an awful descent:—a long and rather steep, winding road, deep dust, and volcanic stones, and rocks; Broken wheels, capsized wagons, tires, hubs, &c broken wagons profusely strewn all the way down,—At the bottom, . . . ran a clear, cold, and rapid mountain stream. . . . Some trouble fording, but greater at the ascent of the opposite bank—Mules very weak, and we had to double team each wagon successively, and bang and shout the mules up." Emigrants then headed southwest to Beaver Creek Pasture, where the two routes rejoin, passed the west and south flanks of Blacks Mountain, and headed east through Patterson Flat to Aspen Well. Now turning south, the segment skirts the west edge of Harvey Valley and the east edge of Grays Valley to reach present-day Bogard Ranger Station, where the Lassen and Nobles trails join. The two trails share the same corridor for the next four miles through Pine Creek Valley—Lassen travelers heading southeast and Nobles travelers heading northwest. The segment ends northwest of Feather Lake, where the two routes again separate. The segment contains impressive rock swales, and extensive ruts in the Pine Creek area. Forest Service roads closely parallel the original trail. Though the forest has been logged at least once, the second growth allows one to feel the original ambiance of the trail.	Not listed	Public (USFS-Lassen National Forest, BLM)/Private	California (Lassen Trail)	None known. Trails West markers are located all along this route.

NO	SEGMENT NAME	LENGTH (miles)	COUNTY/ STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	TRAIL	THREATS TO RESOURCES/ VISITOR SERVICES
49	Clover Valley Branch to Robbers Creek	6	Lassen, CA	Burney, Lake Almanor	The Norvell Flat and Clover Valley routes of the Lassen Trail divide just south of Long Lake, where the trail intersects the Susan River. This segment is on the western branch. The route turns west up the Susan River for a short distance, swings north of Bennett Knob, crosses the Susan River, and heads south through Clover Valley. As the route approaches Robbers Creek, it turns southeast and parallels that drainage to intersect the Norvell Flat route 0.75 mile north of Robbers Creek and about three miles northwest of the spur trail to Duck Lake. When J. Goldsborough Bruff arrived at the Susan River on October 14, 1849, he "reached a large pine tree, where the trails branched. —The tree was struck full of card and notices: —directing acquaintances, and travelers in general, to take the right-hand road, —which led to grass and water in two miles [in Clover Valley], and the left, or main road was very rocky and for some distance destitute of either. We, of course took the most desirable trail."	Not listed	Public (USFS-Lassen National Forest)/Private	California (Lassen Trail)	None known. Trails West markers are located all along this route.
50	Norvell Flat Branch to Robbers Creek	6	Lassen, CA	Burney, Lake Almanor	The Norvell Flat and Clover Valley routes of the Lassen Trail divide just south of Long Lake, where the trail intersects the Susan River. This segment is on the eastern branch. The route turns east down the Susan River for 1.5 miles, crosses that river in Norvell Flat, and follows Forest Service roads south to intersect the Clover Valley Route 0.75 mile north of Robbers Creek and about three miles northwest of the spur trail to Duck Lake. Despite the warnings posted on the tree at the junction, Amos Batchelder chose to take the original 1848 trail. He camped on Norvell Flat the night of October 4, 1849: "After traveling through the large timber, we reached a very large opening, and encamped. . . . Here, there was an abundance of grass, wood, and water."	Not listed	Public (USFS-Lassen National Forest)/Private	California (Lassen Trail)	None known. Trails West markers are located all along this route.
51	Deer Creek Meadows to Acorn Hollow	46	Tehama, CA	Lake Almanor	Much of the Lassen Trail between Deer Creek Meadows and Acorn Hollow can be followed on logging roads along the dividing ridge between Deer Creek and Mill Creek. Traces are available to hike or view. From Deer Creek, it was 50 long, dry miles to Lassen's Ranch in the Sacramento Valley. Emigrants knew they could not expect to find much grass or water along the route, and with worn out stock and a rough, rocky road ahead they had reason for concern. It was now a race against time. Climbing out of Deer Creek on October 10, 1849, Simon Doyle was worried: "Our road today was . . . mostly up hill and Rocky . . . Last night snow fell on the mountains. . . . Everybody is pushing forward as fast as possible, fearing that winter has set in and they may be caught in the snow. God help the hindermost." The segment begins at Deer Creek Meadows; crosses Swamp, Slate, Round Valley, and Forked creeks as it climbs onto the ridge between Deer and Mill creeks; traverses the Narrows; passes Cedar Spring and Bruff's Camp; and runs between Barkley Mountain and Flatiron Mountain. Now in the Ishi Wilderness Area, the segment passes Obie Fields Spring, makes a steep descent into and ascent out of Steep Hollow, and exits Lassen National Forest. Now crossing private land, the segment passes south of Cave Spring and Emigrant Spring, heads southwest above Twentymile Hollow, crosses Dry Creek, and ends at Acorn Hollow, five miles northeast of Lassen's Ranch at present-day Vina, California.	Not listed	Public (USFS-Lassen National Forest, Ishi Wilderness Area)/Private	California (Lassen Trail)	None known. Trails West markers are located all along this route.

Appendix F. California and Pony Express National Historic Trails: High-Potential Sites

APPENDIX F. CALIFORNIA AND PONY EXPRESS NATIONAL HISTORIC TRAILS—HIGH-POTENTIAL SITES

NO	SITE NAME	COUNTY	STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	TRAIL	THREATS TO RESOURCES/ VISITOR SERVICES
1	Upper Independence Landing (Wayne City)	Jackson	MO	Kansas City	Wayne City, a "paper city" on the south bank of the Missouri River about 3.5 miles north of Independence Courthouse Square, was the closest Missouri River landing to the town of Independence, but the climb up the bluffs was steep and tortuous. It rivaled the landing at Blue Mills during the 1830s and 1840s and that at Westport from the 1840s through the 1850s. It was very popular until the flood of 1844 washed away the landing.	Not listed	Private	Oregon, California (Independence Road)	Modern developments have altered the historic scene, and flooding has changed the landing dramatically. A small overlook at the north end of Cement City Road is fenced, but it needs additional interpretation.
2	Independence Courthouse Square Complex	Jackson	MO	Kansas City	The location of frenzied outfitting activity throughout the 1840s and early 1850s, Independence was the jumping-off point for the Santa Fe Trail and the Independence Road. The town includes several historic buildings, monuments, and Independence Spring. As the place of convergence of early routes from the Mississippi Valley, this square was the last significant point of supply until the mid-1840s, when Westport also became an outfitting town. When J. Quinn Thornton visited Independence in 1846, he found "a great Babel of African slaves, indolent dark-skinned Spaniards, profane and dust-laden bullwhackers going to and from Santa Fe with their immense wagons, and emigrant families bound for the Pacific, all cheerful and intent on their embarkation upon the great prairie wilderness."	Several structures are listed	Public (City of Independence)	Oregon, California (Independence Road)	Modern development may alter the historic scene.
3	Santa Fe Trail Park Ruts	Jackson	MO	Kansas City	The Independence Road is visible as a swale south of this Independence city park, near Santa Fe Road and 29th Street. There are intermittent swales and traces in an undeveloped field owned by the RLDS Church, up through a couple of backyards to the southwest, and ending on the east side of 3122 Santa Fe Road.	Listed	Public	Oregon, California (Independence Road)	Future development may impact the historic scene. The site needs additional interpretation.
4	Rice-Tremonti Home	Jackson	MO	Kansas City	Built by Archibald Rice in 1844, this farmhouse was mentioned as a camping site by many California Trail diarists, especially in 1849. Foodstuffs were often purchased here. On his way to Santa Fe in 1839, Mathew Field "got a Christian supper of Bacon, Corn bread and milk at Farmer Rice's." Owned by the Tremonti family until recently, the house was purchased by a non-profit group that is seeking funds for a complete restoration.	Listed	Private (Friends of Rice-Tremonti Home Association)	California (Independence Road)	The site could become a Missouri State Park when the mortgage is paid off. Santa Fe Trail historical markers have been erected by the DAR and the town of Raytown.
5	Eighty-fifth Street Ruts	Jackson	MO	Olathe	A preserved trail swale, rare in this urban setting, can be found in a grassed lot at Eighty-fifth and Manchester, heading southwest. This alignment is the only one of up to three alternates in the area that has traces remaining.	Not listed	Private	Oregon, California (Independence Road)	Some interpretation may be possible with the owners' consent.
6	Heart (Hart) Grove Campground	Jackson	MO	Olathe	Both Oregon and California-bound emigrants traveling the Independence Road used this campground on Heart Grove Creek, a tributary of the Big Blue River. Many 1846 emigrants camped here, including the families of George and Jacob Donner and James Frazier Reed. Hiram O. Miller, traveling with the Donner-Reed Party, made this brief journal entry in 1846: "May 14 15 Camped at 'Heart Grove' Jackson County near the Indian line twenty two miles from Independence on the Big Blue."	Not listed	Private	Oregon, California (Independence Road)	The area has been severely impacted and there are no extent remains of the campsite or trail. Some interpretation should be done on the site.

NO	SITE NAME	COUNTY	STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	TRAIL	THREATS TO RESOURCES/ VISITOR SERVICES
7	Minor Park/Red Bridge Crossing of the Big Blue River	Jackson	MO	Olathe	This 27-acre park in a beautiful setting and landscape has both recreational and historic overtones. Its prominent feature is a gentle swale that cuts across the park, obviously created by wet wagons and teams pulling up the hill after crossing the Big Blue River. Emigrants heading west from Independence encountered their first river crossing at this site, a preview of the many rivers and streams to be negotiated on their long journey. On May 8, 1846, Virgil Pringle "Went 12 miles to the Blue and encamped, it being too high to cross. Another wagon capsized at the encampment. . . . No injury to persons or property." The next day his party "Crossed the Blue soon in the morning." The crossing was initially a ford; Red Bridge was constructed in 1859.	Listed	Public (Kansas City Parks and Recreation)	Oregon, California (Independence Road)	The ruts and swales need to be interpreted.
8	New Santa Fe	Jackson	MO	Olathe	This village, also called Little Santa Fe, had its beginnings in the 1840s and was incorporated in 1852. It was the last place for emigrants from Independence to buy supplies before entering Indian territory. Although never an important outfitting town, it was mentioned by many diarists. New Santa Fe grew up at the western edge of Missouri. Trading stores were established here, especially to sell liquor, which was prohibited in the Indian lands west of Missouri. A cemetery, historical marker, two homes from the trail era, and a faint trail swale are all that remain of this site today.	Not listed	Private (New Santa Fe Church)	Oregon, California (Independence Road)	None known. There is a Santa Fe Trail DAR marker at 122nd and State Line Road, one block west of the church and cemetery. An interpretive wayside exhibit is planned for the site.
9	Lone Elm Campground	Johnson	KS	Olathe	Located at the head of Cedar Creek, the 40-acre Lone Elm Campground was the first campground in Indian country for parties following the Santa Fe Trail/Independence Road from Independence, Missouri. It was first known as Round Grove but was later called Lone Elm, named for its single surviving tree. The site was mentioned in many journals. In May 1849, James Pratt found the tree was "fast being hacked away by the travelers, for firewood," and by 1852, Gilbert Cole reported "no Lone Tree to be found." In use from 1820 through the 1850s, Lone Elm was one of the most important frontier trail campgrounds.	Not listed	Private	Oregon, California (Independence Road)	Encroaching subdivisions and commercial development by the city of Olathe may impact the area.
10	Parting of the Oregon-California and Santa Fe Trails	Johnson	KS	Olathe	So far, California-bound emigrant trains had been traveling in the wrong direction—southwest toward Santa Fe instead of west. They did this to stay on the divide between the Kansas and Osage river drainages and avoid numerous difficult stream crossings. Now it was necessary to move north; so the Oregon and California trails branched to the right (northwest) and the older Santa Fe Trail branched to the left (southwest). The site is relatively flat farmland. The actual junction probably moved around the surrounding area over the years. Historian William Ghent reported that the junction had been marked with a signpost: "Here, in the early days, some well-disposed person had set up a sign with the words, 'Road to Oregon'." The Westport and Independence roads came together just east of this junction.	Not listed	Private	Oregon, California (Westport and Independence Roads)	Farming impacts the whole area. A roadside park, 0.25 mile south on U.S. Highway 56, contains a Kansas State Historical Society marker describing the junction.
11	Lower Bluejacket Crossing of the Wakarusa River	Douglas	KS	Lawrence	The Wakarusa River was the first difficult stream crossing on the Independence Road. Micajah Littleton complained, "We shall break down all our wagons!" The Bluejacket Crossings were named for Charles Bluejacket, a mixed-blood Shawnee Indian who operated a roadhouse and a ferry here. The Lower Bluejacket Crossing was heavily used, especially in the 1850s, but it is only one of at least four Wakarusa River crossings on various branches of the Oregon-California Trail. It was a major crossing for emigrants on the Westport-Lawrence Road but also served the Independence Road.	Not listed	Private	California (Independence and Westport-Lawrence Roads)	With the landowner's consent, some interpretation could be done 0.25 mile south on the county road.

NO	SITE NAME	COUNTY	STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	TRAIL	THREATS TO RESOURCES/ VISITOR SERVICES
12	Upper Bluejacket Crossing of the Wakarusa River	Douglas	KS	Lawrence	Highly visible and well-preserved ruts survive on the southeast side of this Wakarusa River crossing. Evidence of the crossing on the northwest bank has been obliterated by flooding and excavation work. The river has a smooth rock bottom here with flat rock ledges on the east bank. This crossing may have been used as much as the Lower Bluejacket Crossing, and is the one with extant remains. In 1841, Rufus B. Sage reported, "The remainder of the day was occupied in crossing the creek—a task by no means easy,—its banks being so precipitous we were compelled to lower our wagons by means of ropes. In so doing it required the utmost caution to prevent them from oversetting or becoming broken in the abrupt descent." Along with the Lower Bluejacket and Upper Wakarusa (Blanton's) crossings, this was one of at least four places where Oregon-California Trail routes crossed the Wakarusa River.	Not listed	Private	California (Independence Road)	Some interpretation might be done on the nearby county road with the consent of the owners.
13	Blue Mound	Douglas	KS	Lawrence	Blue Mound was a major camp site and the first natural landmark encountered by emigrants, many of whom climbed to the top for the view. Its oval, tree-covered summit, approximately 150 feet high and 0.5 mile long, is one of a series of mounds in this area. In 1843, John C. Fremont placed signal fires atop the mound to summon his Indian hunters. The trail passed the south edge of the mound on its way to the Upper Wakarusa Crossing.	Not listed	Private	Oregon, California (Independence Road)	The mound has been used as a ski slope, but it is now a tree-covered pasture. Wayside exhibits should be installed on nearby county roads to interpret the trail and this landmark.
14	Upper Wakarusa Crossing/ Blanton's Bridge	Douglas	KS	Lawrence	This difficult crossing of the Wakarusa River rivaled the lower Bluejacket Crossings. In 1846, Virgil Pringle reported that about half the migration "missed the road [at the Bluejacket Crossings] and crossed about 4 miles above [at the Upper Wakarusa Crossing]." He described the Wakarusa as "a fine stream of clear water, between a creek and a river in size with fine timber on its banks." The bridge was built by James Abbott in 1854. Napoleon Blanton bought the farmland around it the next year, thus the name.	Not listed	Private	Oregon, California (Independence Road)	There are no extant remains. Interpretation is needed on nearby U.S. Highway 59.
15	Pellant Ruts	Shawnee	KS	Topeka	Named for the current owner of the property, these three dramatic swales run for about 100 yards.	Not listed	Private	Oregon, California (Independence Road)	The house is fairly new and the owner is very proud of the site.
16	Kansas River Crossing/Papin's Ferry	Shawnee	KS	Topeka	Upsets and drownings were frequent at the Kansas River crossings, for the river was 600 feet wide with, as John Charles Fremont described, a "swollen, angry, yellow turbid current." Papin's Ferry, the lower of the three crossings, was the most popular. It was established by Joseph and Louis Papin, two mixed-blood brothers, in 1843 and lasted into the mid-1850s. The ferry consisted of a platform floating on three dugout canoes. William Johnson described this operation in 1849: "By means of a rope, one end of which was coiled around a tree, the wagons were let down the steep banks of the river, and placed in the boat. Two wagons and twelve mules were taken over at a time, the boat being propelled by poles. . . . Double teams were required to haul the wagons up the northern bank, and through the deep sands extending _ mile back from the river." The river has moved very little in this area, and the site is now an industrial park at the river's edge.	Not listed	Private	Oregon, California (Independence Road)	None known.

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17	St. Marys Mission	Pottawatomie	KS	Manhattan	St. Marys was a Catholic mission and school established among the Potawatomi Indians by Belgian Jesuits from Florissant, Missouri, in 1848. An important emigrant campground, the site was often mentioned in emigrant diaries. Lorena L. Hays passed the mission on May 10, 1853: “Came by the Catholic mission today. There is a log church in the shape of a cross. Most of the best houses have been white washed and the place had a very neat appearance. The Indians dress very fine in broadcloth but wear their clothes in rather an odd and slovenly manner.” St. Marys is still operated as a Catholic school, named St. Mary’s College.	Not listed	Private	Oregon, California (Independence Road)	None known.
18	Vieux Cemetery/Red Vermillion Crossing	Pottawatomie	KS	Manhattan	In 1847 or 1848, Louis Vieux, a mixed-blood Potawatomi Indian, established a toll bridge at the crossing of the Red (or Little) Vermillion River. Vieux charged $1.00 to cross the bridge and also sold hay and grain to the emigrants. Plentiful water, grass, and wood made the east bank of the Red Vermillion River a favorite camping spot. On May 22, 1846, Edwin Bryant camped on the east bank and forded the stream the following morning: “The ford of the small creek on which we encamped last night was difficult, owing to its steep banks and muddy channel. We were obliged to fell small trees and a large quantity of brush, and fill up the bed of the stream, before the wagons could pass over.” In 1849, an epidemic of Asiatic cholera struck a large wagon train camped at the river and left 50 dead within a week. Survivors carefully buried the victims and marked each grave with a slab of limestone, upon which the name and date of burial was carved. One stone, protected by a fence, survives from the cholera victims’ cemetery.	Listed	Public	Oregon, California (Independence Road)	The modern bridge intrudes on the historic scene. The fence around the remaining grave is also intrusive but discourages vandalism. Both the cemetery and the crossing site need interpretation.
19	Scott Spring	Pottawatomie	KS	Manhattan	At a favorite emigrant campground on Rock Creek, Scott Spring was noted for its delicious cold water. The spring is at the base of a rocky ridge, and an emigrant grave can be found a few yards north. Edwin Bryant’s party stopped to refresh themselves on May 24, 1846: “We found here, gushing from a ledge of limestone rock, a spring of excellent water, from which we refreshed ourselves in draughts that would be astonishing to the most fanatical cold water advocate.” Adjacent Oregon Trail Park was a cooperative pride project to commemorate the 150th anniversary of the Oregon Trail that involved four historical societies. The site contains a covered-wagon and ox-team sculpture, historic signs, and Burr Oak trees (planted in all seven states that the Oregon Trail crossed).	Not listed	Public	Oregon, California (Independence Road)	None known.
20	Coon Creek/Marshall Grave	Pottawatomie	KS	Manhattan	The Oregon-California Trail crossed Coon Creek on a solid rock ford, passing a clear spring and campsite. S.M. Marshall’s grave is on the high promontory to the west. Two swales, fifteen feet deep, are north of the spring. Climbing the hill, the trail is seven swales wide. Marshall’s grave is marked with an iron fence erected by the Rock Creek Historical Society.	Not listed	Private	Oregon, California (Independence Road)	None known.
21	Black Vermillion Crossing	Marshall	KS	Blue Rapids	The Black (or Big) Vermillion River was a considerable obstacle for overland emigrants—its steep banks requiring heavy spading and rope work. On May 25, 1846, Edwin Bryant’s company spent several hours getting their wagons across the river: “The Vermilion is the largest water-course we have crossed since leaving the Kansas. Its current is more rapid than has been usually exhibited by the streams of these prairies, and would afford very good water-power. The timber at this point on its banks, is about a quarter of a mile in width, and consists chiefly of oak and elm."	Not listed	Private	Oregon, California (Independence Road)	None known. Although the site is now inundated by Tuttle Creek Lake and there are no extant resources, a marker commemorates the site on a nearby roadway. It has been there for 70 years, indicating the crossing was “70 rods north and 38 rods west” of the marker.

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22	Alcove Spring	Marshall	KS	Blue Rapids	This picturesque area was a favorite campsite near the Independence Crossing of the Big Blue River. The spring originates in an unusual rock formation and falls over a rock ledge into a pool below. Emigrants carved their names in the rocks surrounding the spring, and many of these carvings are still visible. Edwin Bryant, traveling with the ill-fated Donner-Reed Party, wrote a detailed description of the spring on May 27, 1846: "We found a large spring of water, as cold and pure as if it had just been melted from ice. It gushed from a ledge of rocks, which composes the bank of the stream, and falling some ten feet, its waters are received into a basin. . . . A shelving rock projects over this basin, from which falls a beautiful cascade of water, some ten or twelve feet. The whole is buried in a variety of shrubbery of the richest verdure. . . . Altogether it is one of the most romantic spots I ever saw. . . . We named this the '*Alcove Spring;'* and future travelers will find the name graven on the rocks, and on the trunks of the trees surrounding it." Sarah Keys, Margaret Reed's mother, died here while the party was waiting for the river to fall enough to cross. She was buried somewhere in the area.	Listed	Private (Alcove Spring Historical Trust)	Oregon, California (Independence Road)	Vandalism and vegetation overgrowth threaten the site. A monument to Sarah Keyes is next to the parking lot.
23	Pony Express Stable (Pike's Peak Stable)	Buchanan	MO	St. Joseph	The original building, known as the Pike's Peak Stable, was built in 1858 to accommodate horses used by the local freight and stagecoach company. In 1860, the Central Overland California and Pike's Peak Express Company purchased the building for the Pony Express, to serve the same purpose. On April 3, William (Billie) Richardson left this stable, rode the short distance to the Patee House, picked up the waiting mochilla, and headed west on the first Pony Express run to Sacramento, California, nearly 2,000 miles away. The original wooden structure was replaced by a brick building in 1888, but some of the original posts and beams were reused. In 1950, the Goetz Foundation restored the building to its 1888 brick appearance and established a museum dedicated to the Pony Express.	Listed	Private (Pony Express, Inc.)	Pony Express	None known. The stable now houses an excellent museum—the Pony Express National Memorial.
24	Patee House (Eastern Terminus)	Buchanan	MO	St. Joseph	The 140 room Patee House, built by John Patee in 1858, was recognized at that time as the most luxurious hotel west of the Mississippi River. In 1860, Russell, Majors, & Waddell established the St. Joseph offices of the Central Overland California and Pikes Peak Express Company on the first floor of the hotel. Here, on April 3, 1860, Mayor M. Jeff Thompson gave a rousing address to the excited crowd before the first pony-rider headed west: "This is a great day in the history of St. Joseph. For more than a decade she has been the portal through which passed the wagon trains for the great west . . . .Now she is to become the connecting link between the extremes of the continents. For the first time in the history of America, mail will go by an overland route from east to west. . . . Citizens of St. Joseph, I bid you three cheers for the Pony Express!" The original four-story brick structure, now 140 years old, still stands at the corner of 12th and Penn Streets.	National Historic Landmark	Private	Pony Express	None known. The Patee House is presently a museum of communications and transportation, which includes the restored Pony Express office.

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25	St. Joseph Riverfront Ferry Landing	Buchanan	MO	St. Joseph	Once emigrants reached St. Joseph, they had to cross the Missouri River. In 1852, the ferry cost $5.00 a person and 50 cents per head of livestock. On May 7, 1849, J. Goldsborough Bruff described the waterfront scene while waiting his own turn to cross: "As far as we could see . . . the country was speckled with the white tents and wagon-covers of the emmigrants. There were but two very indifferent scows at the ferry, and these were being plied from earliest day till midnight, every day; had been so for weeks, and from the mass here, would continue for several weeks more. From the principle street . . . to the river bank was one dense mass of wagons, oxen, and people, and as soon as a wagon entered the scow, the next moved down to the water's edge, and the mass in the rear closed up to the front, affording the opportunity to one or more lucky wagons to fall in the extreme rear." The historic landing itself has been obliterated by Missouri River flooding and the presence of a double-deck highway, but the city has created a small park at the foot of Francis Street, with a monument to the Oregon-California Trail and the Pony Express. The city has been restoring this block and would like to do some interpretation.	Not ed	Public (St. Joseph Parks and Recreation Department)	California (St. Joe Road), Pony Express	Urban development and a gambling casino moored on the left bank of the Missouri River intrude on the historic scene. Additional interpretation should be developed.
26	Swale Leading to Wolf River Crossing	Doniphan	KS	Atchison	At the Wolf River, emigrants often met Indians who requested payment as compensation for crossing Indian Lands. Some years Indians charged a toll for crossing a bridge or for their assistance in fording the river. James Hutching crossed the river on June 9, 1849: "We were soon met by 7 or 8 rather tall, well-built men, one of whom . . . understood enough English to ask for 50 cents toll, and since we were passing through their territory . . . we gave the sum asked. By signs, we requested these men to help us push our wagon to the opposite side of Wolf Creek. The chief consented and the whole number put their shoulders to the back of the wagon . . . but the load was too heavy . . . and we had to unload and carry the whole of the provisions on our backs up the steep bank." Today a wagon swale can be seen crossing the crest of the hill where the trail drops down into the Wolf River Valley.	Not listed	Private	California (St. Joe Road)	The site needs to be interpreted.
27	Iowa, Sac, and Fox Presbyterian Mission	Doniphan	KS	Atchison	The St. Joe Road came out of the Wolf River Valley and swung northwest following the ridges for about 1.5 miles, heading toward the Iowa, Sac, and Fox Presbyterian Mission. The mission was located near the Great Nemaha Sub-agent's Headquarters, at the junction of the main route of the St. Joe Road and the feeder trail from Iowa Point. The mission building, constructed in 1846, and the missionary site were almost universally described in emigrant diaries. In 1852, John Clark wrote, "Here we find a Smith to mend our broken waggon, also we see here a large farm under excellent cultivation with store & schoolhouse where they teach the young Indians & learn the old ones how to raise corn. This is a beautiful spot indeed; land rich & rolling, scattered trees, & small groves in the distance." A 30-yard trail swale east of the mission building is a remnant of the road to Iowa Point.	Listed	Public (Kansas State Historical Society)	California (St. Joe Road)	None known. The mission now houses the Native American Heritage Museum, operated by the Kansas State Historical Society.
28	Nemaha River Crossing	Nemaha	KS	Blue Rapids	The South Fork of the Big Nemaha River was one of three major river crossings on the St. Joe Road branch of the California Trail in present-day Kansas. (The first was the Wolf, the second the Nemaha, and the third the Big Blue). Fording the Nemaha was fairly easy because a limestone deposit extended across the river from bank to bank. This ledge is still visible today. On May 15, 1849, James Tate described the crossing: "Camped on the Nemahaw river about Fifty feet wide gravelly bottom and very high banks and a very beautiful ledge of lime stone rocks all along the east bank, skirted with a narrow strip of timber principally post oak, low and scrubby."	Not listed	Private	California (St. Joe Road)	None known.

NO	SITE NAME	COUNTY	STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	TRAIL	THREATS TO RESOURCES/ VISITOR SERVICES
29	Clear Creek Swale	Nemaha	KS	Blue Rapids	The swale is on the west side of the crest of the hill where the trail came down into Clear Creek Valley. Today, trees have grown in the swale. The fertile mid-western soil makes it possible for trees to grow in an area formerly crossed by a trail if that trail has not been used for many years. On May 12, 1853, Dr. R. J. Bradway found this "road very good but very crooked."	Not listed	Private	California (St. Joe Road)	None known.
30	Guittard's Station Swales	Marshall	KS	Blue Rapids	This site contains one of the few swales of the Pony Express left in Kansas. The Guittard family arrived in Kansas in 1857, establishing their ranch on Vermillion Creek as the earliest permanent settlement in that part of Marshall County, Kansas. George's son, Xavier Guittard, managed the station, which served as a home station for the Pony Express as well as a stage stop. On August 8, 1860, Richard Burton described Guittard's Station as "a clump of board houses on the far side of a shady, well-wooded creek. . . . The house and kitchen were clean, the fences neat; the ham and eggs, the hot rolls and coffee, were fresh and good, and, although drought had killed the salad, we had [an] abundance of peaches and cream."	Not listed	Private	Pony Express	None known. A stone marker was placed near the site in June 1931 by the Oregon Trail Memorial Association.
31	Marysville Pony Express Barn	Marshall	KS	Blue Rapids	In 1859, Joseph H. Cottrell and Hank Williams built a stone barn in Marysville, Kansas. In 1860, they contracted with Russell, Majors, & Waddell to lease the barn as a livery stable for the Pony Express. The north end of the structure served as a blacksmith shop and stalls were on the other side. This stable now serves as a museum. The Pony Express station was located in the Barrett Hotel, on the corner of Eighth Street and Broadway about one block north of the stable.	Listed	Private	Pony Express	None known. The barn is now operated as a museum and is open to the public.
32	Marshall Ferry on the Big Blue River	Marshall	KS	Blue Rapids	Francis Marshall established the first ferry on the west edge of Marysville, Kansas, in 1852. This was the third major river crossing on the St. Joe Road in Kansas. Richard Burton described the Big Blue River as "a pretty little stream, brisk and clear as crystal, about forty or fifty yards wide." On May 16, 1852, John Hawkins Clark described the business he encountered at this crossing, "On the east bank of this river is located a private postoffice, a dramshop, hotel and a ferry, the business all under one roof. If we mail a letter we pay $1; if we take a dram of good whisky, seventy-five cents; a square meal, $1.50; if it is a wagon we want carried over the river, $4, and no grumbling. The proprietor is doing a rushing business. During our stay of two and a half hours he crossed forty wagons."	Not listed	Private	California (St. Joe Road), Pony Express	None known. Interpretive panels and a reconstructed ferry can be found in a roadside park on U.S. Highway 36. A large, round, stone monument marks the ferry site next to the Shibley House. (Shibley was the second ferry operator.)
33	Junction of the St. Joe and Independence Roads	Washington	KS	Blue Rapids	The St. Joe and Independence roads joined on this prairie west of Marysville, Kansas. By traveling two days farther up the Missouri River from Independence and starting their overland journey from St. Joe, emigrants were able to save two weeks of travel time. Where these two main feeder routes met, emigrants commonly reported a maze of wagons, animals, and humanity that stretched to the horizon. In 1849, it seemed to William Johnson that there was "an unending stream of emigrant trains, while in the still farther distance . . . could be seen great clouds of dust, indicating that yet others of these immense caravans were on the move. It was a sight which once seen can never be forgotten; it seemed as if the whole family of man had set its face westward." Today, the junction is in an area of isolated farmland that has been plowed for decades. No traces of either trail remain.	Not listed	Private	Oregon, California (St. Joe and Independence Roads), Pony Express	None known. There are two commemorative Oregon Trail monuments in the vicinity.

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34	Hollenberg Station	Washington	KS	Blue Rapids	The Hollenberg ranch house was built on Cottonwood Creek about 1857 by Gerat H. Hollenberg to capitalize on the Oregon-California emigrant trade that passed his door. In addition to living quarters for the Hollenburg family, the building served as a neighborhood grocery store, a tavern, and an unofficial post-office. Emigrants were able to obtain provisions at the ranch. Three years later, it became a Pony Express home station and later a stage station. Dr. C.M. Clark reached Cottonwood Creek in 1860 and found "a small stream which is dry during the summer months. The approach to it is winding and steep, and as the bed of the stream contains several large stones at the ford, some care is necessary in driving. There are two good springs here, but no wood. The Stage Company have a station here, and there is also one or two other buildings." The original building still stands and houses a museum. It is a rare example of a Pony Express station that still stands unaltered in its original location.	National Historic Landmark	Public (Kansas State Historical Society)	Oregon, California, Pony Express	The site is well-protected and the restored station is a museum. Several historical markers and monuments stand on the grounds. There is a new visitor center with interpretive exhibits near the historic building.
35	Rock Creek Station	Jefferson	NE	Fairbury	This site on the Oregon-California Trail was a supply point for later emigrants, a stagecoach station, and a Pony Express station. About 1,600 feet of trail ruts are still visible.	Listed	Public (Nebraska Game and Parks Commission)	Oregon, California, Pony Express	None known. The site is well run as a Nebraska State Park. It has a new visitor center with excellent displays.
36	George Winslow Grave	Jefferson	NE	Fairbury	George Winslow, a 25-year-old machinist from Newton Upper Falls, Massachusetts, died June 8, 1849, from the complications of cholera while traveling to the California Gold Fields. Winslow's sons found the original gravestone and embedded it in a newer stone monument. A short stretch of Oregon-California Trail ruts can be seen nearby.	Listed	Private	California	None known. The site is marked with a stone monument and an Oregon-California Trails Association marker.
37	The Narrows	Nuckolls	NE	Fairbury	The trail was confined at the Narrows between the Little Blue River and the bluffs, making travelers vulnerable to Indian attacks. A small monument on the bluff above the Little Blue River and an Oregon-California Trails Association wayside exhibit on the county road near the entrance to the site interpret the story of the 1864 Indian attacks and their effects on the territory.	Listed	Private	Oregon, California, Pony Express	Nuckolls County officials and the Nebraska chapter of the Oregon-California Trails Association could negotiate an agreement with the owner to allow visitors to hike to the bluffs above the river.
38	Ayr Ruts	Adams	NE	Red Cloud	Approximately three miles northeast of the present-day town of Ayr, Nebraska, is a 300-yard stretch of clearly defined Oregon-California Trail ruts. The ruts are adjacent to the grave of eight members of the Simonton-Smith wagon train, en route from St. Joseph to Denver with a consignment of hardware, which was attacked by Cheyenne Indians in August 1864.	Not listed	Private	Oregon, California	None known.
39	Thirty-two Mile Station	Adams	NE	Grand Island	This way station served emigrants, stagecoaches, freight trains, and the Pony Express. It was named for its distance from Fort Kearny. The station, consisting of one long low building, was abandoned in August 1864, following several Indian attacks in that locality. Indians later burned it to the ground.	Listed	Private	Oregon, California, Pony Express	None known. The site needs improved interpretation.
40	Susan Hail Grave/Sand Hill Station	Adams	NE	Grand Island	This is the marked grave of a woman who died June 2, 1852—probably of cholera. The grave is protected by a pipe fence. The story is told that her grieving bridegroom walked back to St. Joseph, had a granite stone engraved, and brought it back to her grave in a wheelbarrow. The present stone is not the original. Pristine ruts near the grave run for a quarter mile through unbroken sod. Emigrants on the main Oregon-California Trail got their first view of the Platte River Valley from this site. The Sand Hill Pony Express Station was near the grave. The name refers to the difficult sandy road that sometimes called for double-teaming. Visible depressions can still be seen where the buildings once stood.	Listed	Private	Oregon, California, Pony Express	Interpretation and preservation of the site, surrounding swales, and viewshed are needed.

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41	Nebraska City Complex	Otoe	NE	Nebraska City	The Nebraska City Ferry landing and Old Freighters Museum are located at this site. Old Fort Kearny was established on Table Creek in 1846 at the future site of Nebraska City (which was established in 1854). When the new Fort Kearny was begun in 1848 on the main Platte River trail in central Nebraska, old Fort Kearny was abandoned. Later, the city grew and became a significant jumping-off place for emigrants and freighters. In 1849, Elijah Preston Howell "crossed the Missouri River in a common flat-boat . . . at Old Fort Kearney, and struck out into the Great plains."	Not listed	Public	California (Oxbow Trail, Nebraska City Cutoff)	None known.
42	Military Road Ruts	Douglas	NE	Omaha	This 100-foot section of ruts is one of the very few remaining in the Omaha area. The Mormon Pioneer Company passed this way in 1847 and the route was subsequently used by California gold seekers on the Council Bluffs Road.	Not listed	Public	California (Council Bluffs Road), Mormon Pioneer	Urban development is a threat to the site.
43	Crossing of the Elkhorn River	Douglas	NE	Fremont	This was the first major river crossing on the Council Bluffs Road west of the Missouri River. Described as a "wide and rambunctious stream" the river could not generally be forded in the spring, but wagons could be floated across or ferried on rafts. The crossing was located just south of where Nebraska Highway 36 crosses the Elkhorn River. This crossing was heavily used by those who traveled west along the north side of the Platte River.	Not listed	Private	California (Council Bluffs Road), Mormon Pioneer	None known. A wayside exhibit is planned.
44	Lower Loup River Ford	Nance	NE	David City	Emigrants traveling along the north side of the Loup River often crossed here and proceeded west along the south bank. There was another ford 17 miles farther up the river, where both routes turned south and headed back toward the Platte River. Creeks and marshy ground between the two rivers prevented emigrants from turning south before reaching the second ford.	Not listed	Private	California (Council Bluffs Road-Loup River Route), Mormon Pioneer	None known.
45	Lone Tree Site	Merrick	NE	St. Paul	A giant cottonwood tree once stood two miles south of present-day Central City, Nebraska. Being the only big tree on the level prairie, it could be seen for many miles and served as a landmark for travelers on the north side of the Platte River. The tree finally died, as hundreds of passing travelers stopped to carve their initials or names on its massive trunk. It was finally destroyed during a storm in 1865. A concrete replica, erected in 1911, marks the approximate site.	Not listed	Private	California (Council Bluffs Road-Platte River Route)	None known.
46	Murdock Site	Hall	NE	Grand Island	The trail crossed this 2.4-acre site on the south side of the Wood River in a northeast-to-southwesterly direction. During the 1860s, a sawmill and dwelling, referred to as the Murdock Homestead, were located here.	Not listed	Private (Hall County Historical Society)	California (Council Bluffs Road), Mormon Pioneer	None known. A wayside exhibit is being planned.
47	Fort Kearny	Kearney	NE	Kearney	Fort Kearny was established by the U.S. Army in 1848 to protect travelers going west from Indian attacks. This military post was strategically located at a junction where various eastern feeder trails merged, forming one broad trail. The Pony Express station, 0.5 mile northwest of the military post, was in use from April 1860 until November 1861. Fort Kearney was the telegraph terminus from the beginning of November 1860 until July 1861, when the line was built farther west toward Salt Lake City. This allowed riders to carry west the very latest news from the east coast. Although none of the original buildings have survived, the Nebraska Game and Parks Commission has reconstructed two of the fort buildings.	Listed	Public (Nebraska Game and Parks Commission)	Oregon, California, Pony Express	The Nebraska Game and Parks Commission needs to increase interpretation of historic trails at this site.
48	Plum Creek	Phelps	NE	Kearney	Although no plums grew here, Plum Creek was noted as a good campsite for overland emigrants. In later years, a Pony Express station and an Overland Stage station were located near the creek. On August 7, 1864, Cheyenne Indians attacked the station and a wagon train camped nearby, killing 11 men from the train and three occupants of the station. The victims are now commemorated in the Plum Creek cemetery.	Not listed	Public	Oregon, California, Pony Express	None known.

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49	Dan Smith's West Ranch	Dawson	NE	Gothenberg	This was one of a series of road ranches that sprang up along the Oregon-California Trail in the late 1850s to cater to the ever-increasing number of emigrant trains passing through Nebraska.	Not listed	Private	Oregon, California	None known.
50	Fort McPherson	Lincoln	NE	North Platte	Fort McPherson was established in September 1863, when the Army foresaw the need for an intermediate military post between Forts Kearny and Laramie. The fort protected emigrants, stagecoaches, freighters, and railroad workers who traveled the "Great Platte River Road" from the threat of attack by Plains Indians. The fort became a camping and refitting spot for emigrants and was an important military post during the Indian Wars.	Listed	Public (Veterans Administration)	California	None known.
51	O'Fallon's Bluff	Lincoln	NE	Ogallala	Oregon-California Trail ruts can be found near this natural landmark on I-80. Here a series of high, sandy bluffs crowded the south bank of the Platte River, forcing emigrants to make a wearisome three-mile detour up and over the rolling, sandy hills. A Pony Express station was also located near the bluffs.	Listed	Public (Nebraska Department of Roads)	Oregon, California, Pony Express	Signs are needed on I-80 to direct visitors to the area.
52	Sand Hill Ruts	Lincoln	NE	Ogallala	This is one of the few points where emigrants had to leave the north side of the North Platte River and go across the hills. There are excellent swales still visible in the sand hills.	Not listed	Private	California (Council Bluffs Road), Mormon Pioneer	None known.
53	California Hill/Upper Crossing of the South Platte River (later known as Old California Crossing or Lower California Crossing)	Keith	NE	Ogallala	Crossing the South Platte River allowed emigrants to reach the North Platte River and follow it toward South Pass. Several crossing sites were used, but the Upper Crossing was the most important because it led directly into Ash Hollow, the best approach to the North Platte. California Hill, encountered immediately after crossing the South Platte, was the first major grade faced by the emigrants. Imposing trail ruts are visible at this site.	Listed	Private (Oregon-California Trails Association)	Oregon, California	Improved access and interpretation are needed.
54	Ash Hollow Complex/Windlass Hill	Garden	NE	Chappell	Ash Hollow is a natural landmark that served as the gateway to the North Platte Valley. Windlass Hill was a difficult descent, which left five scars of trail ruts down its side. The source of the name is unknown. Emigrants never referred to it as Windlass Hill. The complex includes Ash Hollow Spring, Rachel Pattison's grave, Windlass Hill, an emigrant campsite, and good drinking water. An often-mentioned grave at the north end of Ash Hollow in a small cemetery contains the remains of other emigrants.	Listed	Public (Nebraska Game and Parks Commission)	Oregon, California, Mormon Pioneer	None known. A visitor center with interpretive exhibits is operated at Ash Hollow State Historical Park. There are also interpretive waysides at Windlass Hill.
55	Ancient Bluff Ruins	Morrill	NE	Crescent Lake	This frequently mentioned landmark is the most dramatic and extensive bluff formation along the north side of the North Platte River. These three erosional remnant buttes were named by English Mormons who thought they resembled castles in their homeland. Emigrants often explored and climbed on the bluffs. Trail ruts are found nearby.	Not listed	Private	California (Council Bluffs Road), Mormon Pioneer	The site needs interpretation and adequate access.
56	Amanda Lamin Grave	Morrill	NE	Crescent Lake	Amanda Lamin was a 28-year-old emigrant, born in Devonshire, England, who died of cholera in 1850. The gravesite stands on the top of a small knoll, in the middle of private pastureland, overlooking the North Platte River. One mile east is an excellent set of Oregon-California Trail ruts.	Listed	Private	Oregon, California	None known. The site needs additional interpretation. On nearby Nebraska Highway 92 there is a large Nebraska State Historical Society marker.
57	Courthouse Rock/Jail Rock	Morrill	NE	Scottsbluff	Courthouse Rock was first noted by Robert Stuart in 1812 and quickly became one of the guiding landmarks for fur traders and emigrants. It is a massive monolith of Brule clay and Gering sandstone south of the trail, which was variously likened to a courthouse or a castle. A smaller feature just to the east was called the Jail House or Jail Rock. Courthouse Rock was the first of several impressive natural landmarks along the trail in western Nebraska.	Listed (Courthouse Rock)	Public (City of Bridgeport, Nebraska State Historical Society)	Oregon, California, Mormon Pioneer, Pony Express	Dirt bikes, vandalism, and all-terrain vehicles pose threats to resources at this site. Interpretation is needed.

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58	Chimney Rock	Morrill	NE	Scottsbluff	This prominent column of clay and sandstone, resembling a tall factory chimney, was mentioned in more diaries than any other landmark on the Oregon-California Trail. Visible for miles, Chimney Rock was more than a wonder of nature. As a milepost on a journey noted so far for its monotony, the column was a significant landmark in measuring the emigrants' progress west.	Listed	Public (Nebraska State Historical Society)	Oregon, California, Mormon Pioneer, Pony Express	None known but ongoing erosion. A new visitor center contains excellent interpretive exhibits.
59	Scotts Bluff National Monument/Mitchell Pass	Scotts Bluff	NE	Scottsbluff	Scotts Bluff was the first of many imposing barriers that travelers encountered as they made their way west. It was also the last famous landmark along the Great Platte River Road in Nebraska. Early travelers were forced to swing south away from the river and go through Robidoux Pass, a natural gateway in the great bluffs. In 1850, a shorter route was opened through Mitchell Pass, which stayed closer to the river and eliminated the eight-mile swing through Robidoux Pass. A Pony Express relay station was located approximately three miles west of the gap and close to the river, near where Fort Mitchell once stood.	National Historic Landmark/ National Natural Landmark	Public (NPS)	Oregon, California, Mormon Pioneer, Pony Express	Visual intrusions and potential urban sprawl from Gering and Scottsbluff encroach on the site.
60	Robidoux Pass	Scotts Bluff	NE	Scottsbluff	The pass forms a broad U-shaped opening in the semicircular line of bluffs composing the Wildcat Hills. The climb to its summit was mitigated by fresh spring water and wood, two commodities that were quite scarce along the Platte River. The pass takes its name from Antoine Robidoux, an early trader whose family established a trading post and a blacksmith shop here in 1848. At that time, Robidoux's post was the first habitation encountered west of Fort Kearny on the Oregon-California Trail.	National Historic Landmark	Private	Oregon, California	Threats have been made by a landowner to turn under the ruts.
61	Horse Creek Treaty Grounds	Scotts Bluff	NE	Scottsbluff	This is the site of the signing of the first Fort Laramie Treaty in 1851. The assembly of some 10,000 Plains Indians was the largest in history. The Federal government made the treaty to protect the traffic along the Oregon-California Trail, as the Indians became increasingly resentful of the growing numbers of emigrants. The document established tribal grounds and the right of emigrant travel along the trails.	Not listed	Private	Oregon, California	None known.
62	Fort Laramie	Goshen	WY	Torrington	Fort Laramie traces its origin to Fort William, a fur-trading post constructed on the Laramie River in 1834. For the next 15 years, it served as an important outfitting and resupply point for fur trappers, emigrants, and military expeditions. Acquired by the U.S. Army in 1849, it became one of the most important military posts in the trans-Mississippi West. It continued to serve as a stop for overland emigrants and also as a station for the Pony Express. Important diplomatic negotiations with the tribes of the northern plains were held here. Fort Laramie was a key installation during the Indian conflicts of 1850-1890. The Bedlam Ruts (administered by BLM) are nearby.	National Historic Landmark	Public (NPS)	Oregon, California, Mormon Pioneer, Pony Express	None known. Fort Lamamie National Historic Site maintains a visitor center/museum with interpretive exhibits and several restored buildings from the military era.
63	Mexican Hill	Platte	WY	Torrington	At Mexican Hill the trail made a steep and dramatic cut through the river bluffs from the benchland to the floodplain of the North Platte River. Where the Bluff and River routes intersected, ruts lead up to the hill from 0.75 mile to the east. They are some of the most-memorable swales anywhere on the trails. The origin of the name is obscure.	Not listed	Private	Oregon, California, Mormon Pioneer	The site has been impacted by erosion and unauthorized vehicle use.
64	Register Cliff	Platte	WY	Torrington	Among the most famous of the surviving emigrant registers, thousands of names were inscribed on this mile-long prominent sandstone cliff on the south side of the North Platte River. Cliffs to the east and west also contain hundreds of well-preserved emigrant inscriptions.	Listed	Public (State of Wyoming)	Oregon, California, Mormon Pioneer	Natural deterioration, housing development, vandalism, and National Guard activities to the west all impact the site. The state of Wyoming needs to update the interpretive materials.

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65	Guernsey Ruts (Deep Rut Hill)	Platte	WY	Torrington	At this site, where the trail was forced away from the river and crossed a ridge of soft sandstone, the track is worn to a depth of five feet, creating some of the most-spectacular ruts remaining along the entire length of the Oregon-California Trail. The geography of the area dictated that practically every wagon that went west crossed the ridge in exactly the same place, with impressive results.	National Historic Landmark	Public (State of Wyoming)	Oregon, California, Mormon Pioneer, Pony Express	This site needs better marking and interpretation. Visitor use should be channeled to protect the ruts and surrounding terrain from the effects of indiscriminate wandering. National Guard activities in the area have caused major visual intrusions.
66	Warm Springs Canyon	Platte	WY	Torrington	These two free-flowing springs, one gushing from a ledge of rock and the other bubbling up in a large pool, were only slightly warm. Often called the "emigrants' wash tub," this was a particularly popular camping place, available to travelers on both the Black Hills Road and the River Route. Pursey Graves, who camped nearby on June 24, 1850, wrote, "After I finished my letter to send back to the Ft. I proceeded to the spring a distance of 1_ miles with my bucket of dirty clothes." The spring still flows strongly and the site is in nearly pristine condition.	Not listed	Private	Oregon, California, Mormon Pioneer	National Guard activities threaten the canyon. The site has been marked by the Oregon-California Trails Association.
67	Laramie Peak	Albany	WY	Laramie Peak	This famous 10,272 foot landmark in the Black Hills (named for the dark appearance of its tree-covered slopes) guided emigrants' travel for many days. First sighted when descending from Robidoux or Mitchell passes, this mountain was constantly in view for almost 100 miles. It must have seemed that the peak would never be passed.	Not listed	Public (USFS-Medicine Bow National Forest)	Oregon, California, Mormon Pioneer, Pony Express	None known.
68	Ayres Natural Bridge	Converse	WY	Douglas	This natural feature was often mentioned in emigrant diaries, and spring-fed La Prele Creek was used as a campsite. The natural bridge is in a beautiful red-rock canyon, which offered good water and plentiful forage for animals.	Not listed	Public (Wyoming State Parks and Historic Sites)	Oregon, California, Mormon Pioneer	The site shows signs of overuse. Improved interpretation is needed.
69	Unthank Grave	Converse	WY	Douglas	Nineteen-year-old Alvah Unthank was one of a group of young men who left Wayne County, Indiana, for the gold fields of California in 1850. On June 23, he cut his name in the soft sandstone of Register Cliff. That inscription can still be seen, along with the names of two of his relatives. Five days later, the party camped on the banks of the North Platte River (five miles southeast of present-day Glenrock, Wyoming) where Alva died of cholera on July 2, 1850.	Not listed	Private	California	Public access is not permitted.
70	Reshaw Bridge (Richard's Second Bridge)	Natrona	WY	Casper	Constructed in 1852-53 by mountain man and Indian trader John Richard, this bridge replaced Richard's First Bridge near Deer Creek. Located six to seven miles below Fort Caspar, the bridge cost about $15,000 to build and competed with the 1849 Mormon Ferry. Many 1853 diaries mentioned the ferry and the $5.00-per-wagon toll charged during high-water. Richard's name was pronounced "Reshaw" and he was identified as a "Canadian Frenchman," but J. R. Brown reported in 1856 that Richard and his brother were from Florisant, Missouri, and had gambled away the $400,000 he claimed they made at the bridge. It served as the primary crossing of the North Platte River until Guinard's Bridge was built near Fort Caspar in 1859.	Not listed	Public (City of Evansville, State of Wyoming)	California	The site could use more interpretation. In 1996, the replica bridge had begun to deteriorate, and its status is not clear at this time.
71	Mormon Ferry (1849)	Natrona	WY	Casper	Mormons operated a ferry at this North Platte River crossing in 1847 and 1848, but it is best-remembered for its service in the gold rush. Mormons ran three boats alongside an operation called the "Missouri Ferry." They told M. B. Moorman on June 19, 1849, that each day they crossed 300 wagons at $5.00 each using "decidedly the best boats I ever saw." Bill Hickman ran a similar operation here in 1850. At the Casper-area ferries, emigrants finally left the Platte River system, which they had followed from Fort Kearny, Nebraska, over 440 miles to the east.	Not listed	Public (City of Casper)	Oregon, California	None known. The ferry is located on the grounds of the North Casper ball fields. An interpretive sign is placed near the entrance and the concessions stand.

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72	Fort Caspar	Natrona	WY	Casper	Established in 1858 near the point where the Mormon Pioneer Company crossed the North Platte River in 1847, Mormon Ferry Post was renamed in honor of Lieutenant Caspar Collins after his death in battle at Red Buttes in 1865. The fort protected emigrant trails, the Overland Stage, the transcontinental telegraph line, and served as a Pony Express station. Abandoned in 1867, Indians quickly burned the post, but an excellent reconstruction marks the site.	Listed	Public (City of Casper)	California, Pony Express	None known. Fort Caspar has a museum/visitor center with interpretive exhibits.
73	Upper Platte Ferry and Ford (1847)	Natrona	WY	Casper	In 1847, the Mormon pioneers used timber from the nearby mountains to build a ferry across the North Platte River. Brigham Young left nine men behind to trade ferry services for money and provisions. Consisting of two 30-foot dugout canoes with a plank bed, this ferry was soon moved downstream to respond to competition. The Pony Express later crossed the river here on Guinard's Bridge, which was built in 1859.	Not listed	Public (City of Casper)	California, Mormon Pioneer, Pony Express	None known. Nearby Fort Caspar has a replica of the raft.
74	Bessemer Bend/Red Buttes Crossing	Natrona	WY	Casper	The last place to cross the North Platte River, Bessemer Bend was the preferred crossing prior to the establishment of the Mormon Ferry in 1847, after which its use declined. The Red Buttes, a physical feature to the north of the river, made the crossing a minor landmark. The Pony Express crossed the North Platte River on Guinard's Bridge at Fort Caspar, but the route stayed close to the north bank of the river until reaching Red Buttes Crossing, where a Pony Express station was located.	Not listed	Public (BLM)	California, Mormon Pioneer, Pony Express	The site is adequately protected and well interpreted by the BLM.
75	Emigrant Gap	Natrona	WY	Casper	Most emigrants who crossed the North Platte River on the ferries and bridges below Fort Caspar passed through Emigrant Gap, a shallow pass through a ridge west of present-day Casper, Wyoming. From this point, travelers were afforded a sweeping view to the west, the scene of their next week's travel. Here they began their ascent into the Rocky Mountains, which gradually led up and over the Continental Divide at South Pass.	Not listed	Public (BLM)	Oregon, California	None known. A BLM interpretive marker is located here.
76	Avenue of Rocks	Natrona	WY	Casper	These natural rock formations jut out of the Wyoming rangeland, and the Oregon-California Trail was forced to wind through the rocks as it vaulted the rocky spine. At the end of Rock Avenue is the Devil's Backbone, described by British traveler Richard Burton in 1860 as a "jagged, broken ridge of huge sandstone boulders, tilted edgeways, and running in a line over the crest of a long roll of land . . . like the vertebrae of some great sea-serpent."	Not listed	Public (State of Wyoming)	Oregon, California, Mormon Pioneer, Pony Express	Vandalism and increasing erosion on country roads are the main threats. This site needs interpretation of the natural formation and the emigrant trails.
77	Willow Springs	Natrona	WY	Casper	Willow Springs provided the first safe water west of Casper. These free-flowing springs offered cool refreshing water and nearby forage for animals. The area quickly became a popular campsite. To the southwest, visible ruts ascend Prospect Hill. A Pony Express relay station, a small, rough building with no corral, was built at the site.	Not listed	Private	Oregon, California, Mormon Pioneer, Pony Express	Low-key and unobtrusive interpretive panels should be selectively placed to point out trail-related geographical features.
78	Prospect (Ryan) Hill	Natrona	WY	Casper	Just west of Willow Springs is a low ridge called Prospect Hill, where emigrants gained their first sight of the Sweetwater Mountains to the west. The 400-foot climb was very hard on draft animals. It was reportedly named because emigrants could see the gentle valley of the Sweetwater River from the top of the hill, giving them a view—or prospect—of an easier road ahead. Prospect Hill has clearly visible ruts on its eastern slope. The view from the top has changed little from the one seen by emigrants 150 years ago.	Not listed	Public (BLM)	Oregon, California, Mormon Pioneer, Pony Express	Mineral development may impact the site. Two BLM interpretive markers are located at the top of Prospect Hill.

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79	Saleratus Lake	Natrona	WY	Rattlesnake Hills	This alkali deposit, or "pan," about a quarter-section in size, provided emigrants a soda compound used in baking. Sir Richard Burton passed the lake on August 17, 1860: "It [Saleratus Lake] lies to the west of the road, and is only one of a chain of alkaline waters and springs whose fetor, without exaggeration, taints the land. . . . The appearance of the Saleratus Lake startles the traveler. . . . On a near inspection, the icy surface turns out to be a dust of carbonate of soda, concealing beneath it masses of the same material, washed out of the adjacent soil, and solidified by evaporation. . . . It is still transported westward, and declared to be purer than the saleratus of the shops."	Not listed	Private	Oregon, California, Mormon Pioneer	An agreement to permit access should be negotiated with the private owner.
80	Independence Rock	Natrona	WY	Bairoil	Independence Rock was the most-noted landmark on the emigrant trails west of Fort Laramie. An oval outcrop of granite rock, it is 1,900 feet long, 700 feet wide, and rises 128 feet above the range. The rock derived its name from a party of fur trappers who camped there and celebrated Independence Day in their own style on July 4, 1830. Independence Rock was also widely used by emigrants as a place to inscribe their names and to leave messages for those coming behind.	National Historic Landmark	Public (State of Wyoming)	Oregon, California, Mormon Pioneer, Pony Express	The site shows signs of overuse. A complete inventory of inscriptions is needed. Lichen growth is encroaching on several panels. A highway rest area provides parking and interpretive wayside exhibits.
81	Devil's Gate	Natrona	WY	Bairoil	Devil's Gate is a narrow cleft carved by the Sweetwater River, 370 feet deep, 1,500 feet long, and only 50 feet wide in places. Devil's Gate is among the more interesting geographical landmarks along the emigrant trails. This natural feature became visible approximately 15 miles to the east. It was a rest stop and campground and is thought to have more than 20 graves in the immediate vicinity, although only one is marked. There are inscriptions on the rocks.	Listed	Public (BLM)	Oregon, California, Mormon Pioneer, Pony Express	The impacts of visitor use should be closely monitored. The BLM manages the Devil's Gate interpretive site.
82	Split Rock	Fremont	WY	Bairoil	This famous "gun sight" cleft in the mountains is another prominent geographical feature within the South Pass segment. It was noted in many diaries. The Split Rock Pony Express station site is on private land, two miles east of the existing ranch homesite, but no physical evidence of the station remains.	Not listed	Public (BLM)/ Private	Oregon, California, Mormon Pioneer, Pony Express	Access to the trail should be improved. Just east of Split Rock Station, the BLM has developed an attractive interpretive site that describes the area and its history.
83	Three Crossings/Deep Sand Route	Fremont	WY	Rattlesnake Hills	At this narrow canyon, emigrants had a choice. They could follow the Sweetwater River through the canyon, a trip that required three difficult river crossings within two miles, or they could travel via the "deep sand" route to the south of the Sweetwater River. Most emigrants followed the river route because pulling the wagon across the deep sand was exhausting. A Pony Express station and a military outpost station were located at the first (eastern most) of the three crossings.	Not listed	Public (BLM)/ Private	Oregon, California, Mormon Pioneer, Pony Express	A nearby uranium processing plant has been torn down, and a reclamation effort has been underway at the mill site for several years. The BLM would like to acquire the site but might not be able to do so if the area is contaminated.
84	Ice Slough	Fremont	WY	Lander	At this cold spring, emigrants occasionally found ice underneath the soil until late summer. The ice was insulated by four to six inches of water above the ice and by rich grassy sod that grew thick enough to bear a man's weight. Ice Slough became a major camping site for travelers, who enjoyed the cold refreshment after several days of dry and dusty terrain.	Not listed	Public (BLM)	Oregon, California, Mormon Pioneer	Hydric soils are susceptible to trampling damage by wild horses and the season-long livestock grazing that has occurred for over a century. This has caused a loss of the humus that provided the insulation that preserved the ice. Access to the site is across private land. There is a state historical marker nearby.

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85	Rocky Ridge Station	Fremont	WY	South Pass	A Pony Express station and later military outpost were located here. The site was sometimes referred to as St. Marys Station. In 1860, Richard Burton described the site: "The station rather added to than took from our discomfort: it was a terrible unclean hole; milk was not procurable within thirty-five miles . . . there was no sugar, and the cooking was atrocious . . . not sorry when night came, but then the floor was knobby, the mosquitos seemed rather to enjoy the cold, and the bunks swarmed with 'chinches'."	Not listed	Private	Pony Express	A cooperative agreement for access is needed with the private landowner.
86	Rocky Ridge	Fremont	WY	South Pass	Here the emigrants were forced up and away from the Sweetwater River to cross a high, barren, and rocky ridgeline. The crossing required much jarring travel over a rock-strewn landscape. There is no specific spot that can be labeled Rocky Ridge. The name refers to a geographic area spread over two square miles, where wind and erosion have kept soil from collecting and have laid bare a washboard of bedrock. Well-defined ruts still wander over the top of the ridge.	Not listed	Public (BLM)	Oregon, California, Mormon Pioneer, Pony Express	The site needs a cultural landscape report. The area has great visual integrity. Overuse may be a problem with increased visitation.
87	Burnt Ranch (Ninth Crossing of the Sweetwater River)	Fremont	WY	South Pass	Burnt Ranch, at the ninth and final crossing of the Sweetwater River, was one of the great hubs of emigrant trail activity. By 1862, this popular campsite had grown into such a key communications and transportation center that a detachment of the 11th Ohio Volunteers was sent out to protect the mail and stage station and overland travelers from Indian attack. When the soldiers departed in 1868, Indians promptly burned the station to the ground; hence the name—Burnt Ranch.	Nominated	Private	Oregon, California, Pony Express	None known. An Oregon-California trail marker from 1913 still stands.
88	South Pass	Fremont	WY	South Pass	South Pass was perhaps the most important landmark along the emigrant trails. It marked the end of the long ascent to the Continental Divide and the emigrants' arrival at the frontier of the Oregon country. It was also thought to be the halfway point along the trail. South Pass dictated the location of the emigrant trail, for only via its gradual ascent was wagon travel over the Continental Divide practical for large-scale emigration. South Pass is the wide, flat summit of a long and gradually ascending plateau, with low ridges and hills on both sides and a wide sage and grass covered saddle between. Many emigrants commented that they scarcely noticed the ascent or the crossing.	National Historic Landmark	Public (BLM)	Oregon, California, Mormon Pioneer, Pony Express	In spite of an abandoned railroad grade, a diversion ditch, and an AT&T buried cable, this site should be protected from additional visual intrusions. Any pipeline crossing of this area might intrude on the extraordinary historic character of the site. Historic monuments are at the pass and a wayside exhibit is nearby.
89	Pacific Springs	Fremont	WY	South Pass	Pacific Springs was the first good water source after emigrants crossed South Pass and entered the Pacific watershed. The springs created an extensive marsh, which appeared as a green oasis in the dry landscape. Emigrants often camped at the site and many commented on the destination of its waters. In the 1860s, a Pony Express and stage station stood near the springs.	Not listed	Private	Oregon, California, Mormon Pioneer, Pony Express	Vandalism is a continuing problem. An impressive overlook/rest area on Wyoming Highway 28 contains several interpretive waysides about the South Pass/Pacific Springs area.
90	Dry Sandy Crossing	Sublette	WY	Farson	The Dry Sandy was the first water reached west of Pacific Springs. It was crossed below a broad basin that collected subsurface water. In dry seasons, water could be found here by digging in the streambed, but it was tainted with alkali. Many emigrants reported the loss of livestock. The river flowed more below the surface than above ground. Emigrants only stopped here when absolutely necessary. This site was later the location of a Pony Express and stage station. Evidence of "tanks" dug by emigrants to water their oxen can still be found in the area.	Not listed	Private	Oregon, California, Mormon Pioneer, Pony Express	None known.

NO	SITE NAME	COUNTY	STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	TRAIL	THREATS TO RESOURCES/ VISITOR SERVICES
91	Parting of the Ways	Sweetwater	WY	Farson	The Oregon Trail and the Sublette Cutoff separated at Parting of the Ways. In the midst of a wide-open expanse of land, both trails are plainly visible, and the eye can follow them for miles toward the horizon. At this point, emigrants had to make a hard decision. Should they save 46 miles by taking the Sublette Cutoff, which bypassed the southern loop to Fort Bridger but also demanded 50 miles of travel with no water? Decisions were based on the condition of the grass, animals, people, and supplies. In 1849, about one-third of the emigrants took the cutoff.	Listed	Public (BLM)	Oregon, California, Mormon Pioneer, Pony Express	Encroaching mineral exploration and development threaten the viewshed.
92	Little Sandy Crossing	Sweetwater	WY	Farson	Little Sandy Crossing, a popular campsite on the road to Fort Bridger, was the first good water west of Pacific Springs. Numerous emigrant graves are located in the area. A Pony Express relay station and stage station was established on the west bank of the stream about 1,500 feet from the crossing.	Not listed	Public (BLM)	Oregon, California, Mormon Pioneer, Pony Express	Visitors need to travel through a half mile of private property to access the site. There is a BLM marker east of the creek.
93	Big Sandy Crossing	Sweetwater	WY	Farson	Emigrants on the trail to Fort Bridger made the difficult crossing of the Big Sandy River here and followed its north bank to the Green River. There are excellent examples of pristine ruts nearby. A Pony Express and stage station was established near the crossing.	Not listed	Public (BLM)/ Private	Oregon, California, Mormon Pioneer, Pony Express	Currently there are few threats to the site because of limited access, but vehicle overuse could threaten nearby ruts, as well as damage the river crossing.
94	Lombard Ferry (Green River Mormon Ferry)	Sweetwater	WY	Rock Springs	Lombard Ferry, named after the trail era for its proximity to Lombard Buttes, was the main crossing of the Green River. During periods of low water, wagons could ford the river, but the shallow sand bar they used was only 10 feet wide. When the Mormon pioneers arrived on June 30, 1847, they built rafts and floated their wagons across the river. Later that year, they built ferryboats and provided a commercial ferry service, both to assist subsequent Mormon companies and as a commercial venture. The crossing is mentioned in many travelers' journals. George Shepard was held up here for two days on June 14-15, 1850. He found Green River "uncommon high at this time having risen 2 ft in two days it is about 9 ft deep in the deepest past there is a ferry here they only charge 5$ a wagon and 1$ a horse . . . not much prospect of crossing tomorrow there is so many before us [60 to 80 wagons]." On June 15, Shepard continued, "we continue here at green river lying over waiting for our turn to be ferried over we thought of trying it ourselves with our wagon boxes but the current [in] the river is so swift and stream so high that we did not hardly dare to do it."	Listed	Public (USFWS-Seedskadee National Wildlife Refuge)	Oregon, California, Mormon Pioneer	Gas development and fossil collectors are threats. The site is interpreted.
95	Church Butte	Uinta	WY	Kemmerer	This large butte, with its temple-like shape, deeply eroded walls, and flattop mesa, is about 1,000 feet in diameter and rises 75 to 100 feet above the plain of the Blacks Fork Valley. Believed to have been first named by fur traders, it became one of the landmarks along the trail and excited the comment of many emigrants.	Not listed	Private	Oregon, California, Mormon Pioneer, Pony Express	Gas wells and mineral development negatively impact the historic viewshed. Vandalism and litter are also problems.
96	Name Rock	Uinta	WY	Evanston	Name Rock itself is unimposing, being but a short section of cliff about 400 feet long and 20 feet high. On the face of the cliff, which is protected from the weather by a natural overhang, several dozen emigrants wrote dates, their names, and places of origin, mostly with wagon tar. Most of the names and dates are still clearly visible.	Not listed	Private	Oregon, California	Vandalism is a big problem. The inscriptions need to be stabilized, protected, and interpreted.

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97	Fort Bridger	Uinta	WY	Evanston	Jim Bridger established Fort Bridger in 1843 as a fur-trading post. It was composed of two double-log houses about 40 feet long that were joined by a pen for horses. To the emigrants, Fort Bridger offered the chance to obtain supplies, have essential blacksmith work done, and trade worn-out livestock for fresher animals. Here the main Oregon-California Trail turned north toward Fort Hall, and the Mormon Trail/Hastings Cutoff continued west to the Valley of the Great Salt Lake. The fort served as a Pony Express, Overland Stage, and transcontinental telegraph station in the 1860s and was garrisoned by the U.S. Army between 1857 and 1890.	Listed	Public (State of Wyoming)	Oregon, California, Mormon Pioneer, Pony Express	None known. The fort has a museum/visitor center and a reconstruction of Bridger's log trading post.
98	West End of the Sublette Cutoff	Lincoln	WY	Fontenelle Reservoir	Three miles south of present-day Cokeville, Wyoming, the main route of the Sublette Cutoff, which left the Oregon-California Trail at Parting of the Ways, rejoined the primary emigrant route. There is nothing on the ground to indicate the junction, for both trails have been erased by subsequent development.	Not listed	Private	Oregon, California (Sublette Cutoff)	None known.
99	Bear River Crossing	Uinta	WY	Evanston	This was the last major river crossing in Wyoming on the Hastings Cutoff/Mormon Pioneer/Pony Express route. William Clayton of the Mormon Pioneer Company found "a very rapid stream about six rods wide and two feet deep, bottom full of large cobbles, water clear, banks lined with willows and a little timber, good grass, many strawberry vines and the soil looks pretty good." It was also the location of the last Pony Express Station in Wyoming.	Not listed	Private	California (Hastings Cutoff), Mormon Pioneer, Pony Express	None known. There is a marker east of the river.
100	The Needles	Uinta	WY	Ogden	This prominent landmark rising abruptly near the Wyoming-Utah border is a formation of conglomerate rock that looks like cobblestones in hardened mud. A Mormon emigrant described it as "a mountain of pudding stone composed of gravel and rock so its spires were reaching up like the pyramids of Egypt." From here, emigrants got their first look at present-day Utah.	Not listed	Private	California (Hastings Cutoff), Mormon Pioneer, Pony Express	None known.
101	Big Mountain Pass	Morgan	UT	Salt Lake City	Following the route blazed in 1846 by the Donner-Reed Party, the trail climbed Little Emigration Canyon to Big Mountain Pass, the third-highest point on the entire trail thus far and an important and difficult crossing. From this vantage point, thousands of emigrants caught their first glimpse of the Valley of the Great Salt Lake. When Orson Pratt first saw this view on July 21, 1847, he recorded, "beholding in a moment such extensive scenery open before us, we could not refrain from a shout of joy which almost involuntarily escaped from our lips the moment this grand and lovely scenery was within our view."	Not listed	Public (Utah Department of Transportation highway right-of-way)	California (Hastings Cutoff), Mormon Pioneer, Pony Express	None known. There is an interpretive marker at the pass.
102	Little Mountain Summit	Salt Lake	UT	Salt Lake City	This was the last summit the emigrants crossed before entering the Valley of the Great Salt Lake. They hitched multiple teams together to pull the wagons straight up the slope. On the summit, they locked their wheels for brakes and slid down the other side into Emigration Canyon, which led directly, and finally, into the Valley of the Great Salt Lake.	Not listed	Public (Utah Department of Transportation highway right-of-way)	California (Hastings Cutoff), Mormon Pioneer, Pony Express	None known. There is an interpretive marker by the side of the road.
103	Indian Ford on the Jordan River	Utah	UT	Provo	This site on a bend in the Jordan River was originally a fishing location for American Indians. Later, this historic crossing was used by settlers, emigrants, and the Pony Express—even after a bridge was built farther south on the Lehi road.	Not listed	Private	Pony Express	This once-pristine site has been impacted by development at Thanksgiving Point and is threatened by further development. Permission is required to visit the site.

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104	Camp Floyd/Stagecoach Inn	Utah	UT	Rush Valley	Camp Floyd, established in 1858, was named for the secretary of war and commanded by Albert S. Johnston. It was the first military installation built in present-day Utah and formed the state's third largest community. Camp Floyd was located southwest of Salt Lake City near the present-day town of Fairfield, Utah. At the time of the Pony Express, Camp Floyd provided troops for protection against Indian attacks and served to keep the trail open for the Pony Express, stage lines, and other travelers.	Listed	Public (State of Utah)	Pony Express	None known. The restored inn is open for visitation, the commissary building serves as a visitor center, and there is an interpretive wayside exhibit in the picnic area.
105	Faust's Station	Tooele	UT	Rush Valley	Mail contractor George Chorpenning originally established this station in late 1858 for the Jackass Express. Henry J. "Doc" Faust later purchased the land as a ranch and raised horses for the Pony Express and military expeditions. Faust served as the stationkeeper during the Pony Express era and lived on the land until 1870. The first home station west of Salt Lake City, its house was a log structure with a low-pitched roof and perhaps as many as seven rooms. Pony Riders were changed at this station and the mail stage stopped for rest breaks. The remains of a stone building west of the site are not the ruins of the Pony Express station but a home built by Seth Fletcher after the demise of the Pony Express.	Not listed	Private	Pony Express	Vandalism is a concern, planes fly over regularly, and nerve gas sensors are nearby. In 1939, a marker was constructed three miles northeast of the station by the Civilian Conservation Corps, as part of a project to mark the Pony Express Trail.
106	Simpson Springs	Tooele	UT	Rush Valley	This station bears the name of explorer Captain James H. Simpson, a Camp Floyd topographical engineer, who stopped here in 1858 while laying out an overland mail route between Salt Lake City and California. The availability of excellent water made Simpson Springs one of the most prominent stations in the West Desert. George Chorpenning established his second mail station at this site in 1858, which was later used by the Pony Express and the Overland Stage. A number of structures have been built and destroyed in the vicinity of Simpson Springs over the years. It is not known for sure which served as the station for the Pony Express. The current building is a replica, built in 1975 by the Future Farmers of America under the direction of the BLM.	Not listed	Public (BLM)	Pony Express	None known. The BLM maintains interpretive wayside exhibits and a nearby campground. A monument was erected in 1965 to mark the station site.
107	Boyd Station	Juab	UT	Fish Springs	This station is one of the best-preserved Pony Express stations in Utah. The relay station derived its name from Bid Boyd, a stationkeeper who continued to live here until the turn of the century. The structure was small and contained gun ports. The living quarters consisted of bunks built into the walls, with boxes and benches used as furniture. Only portions of the rock walls now remain.	Not listed	Public (BLM)	Pony Express	None known. The BLM has placed interpretive waysides at the site.
108	Willow Springs Station	Juab	UT	Fish Springs	The old Willow Springs Pony Express Station still stands on the Bagley Ranch in present-day Callao, Utah. The Bagley family has owned the ranch for well over 100 years, and the building has been used for various aspects of ranch life during most of that time. The structure has been modified and a concrete floor added. Artifacts dating to the Pony Express/Telegraph era have been found on the site.	Not listed	Private	Pony Express	The site is not threatened as long as the present family maintains ownership. They are very proud of the structure and welcome visitors. A monument stands at the entrance to the Bagley Ranch.
109	Benson's Mill	Tooele	UT	Tooele	Benson's Mill is the oldest building in Tooele County. E.T. Benson supervised its construction for the LDS Church in 1850. Wooden pegs and rawhide strips hold the timbers together. The mill produced flour until 1938, and much of the original machinery is still inside. Several California-bound emigrants mentioned the mill in their diaries. Madison Berryman Moorman noted on July 26, 1850, "We nooned upon a creek near to a lone house where some men were engaged in fitting some timbers for a sawmill."	National Historic Landmark	Public (Utah Division of Parks and Recreation)	California (Hastings Cutoff)	None known.

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110	Timpie Point	Tooele	UT	Tooele	Timpie Point is the northern tip of the Stansbury Mountains. From this location, the Hastings Cutoff can be seen as it hugs the point and passes Big Springs, often mentioned in emigrant journals. On August 10, 1846, James Mathers recorded, “encamped by a point of the mountain at a very large spring of brackish water and but little grass, and that so salt that the cattle would not eat it.” The Hastings Cutoff, Lincoln Highway, Union Pacific Railroad, and I-80 all cross the same narrow strip of land between the Stansbury Mountains and the Great Salt Lake.	Listed	Public (BLM)/ Private	California (Hastings Cutoff)	None known.
111	Spring at Dell Ranch	Tooele	UT	Tooele	This site functioned as a campsite and source of fresh water for gold seekers. In 1850, John Wood mentioned that 50 wagons were camped at these springs.	Not listed	Private	California (Hastings Cutoff)	None known.
112	Rock Ledge Overlook	Tooele	UT	Tooele	This rock ledge overlooks the junction of the Forty-niner Trail and the Hastings Cutoff. The Forty-niner Trail left the Hastings Cutoff just north of Horseshoe Springs and climbed the foothills to the spring at Dell Ranch. The trail then rejoined the main Hastings Cutoff just below the overlook. There is a good view of Skull Valley from the overlook, and interesting Indian drawings can be found on rocks in the area.	Not listed	Public (BLM)	California (Hastings Cutoff)	None known.
113	Hope Wells	Tooele	UT	Tooele	Hope Wells, at the southern end of Skull Valley, was the last good water source before the “fearsome long drive” across the Great Salt Lake Desert. It was 83 miles from Hope Wells to the oasis of Donner Spring at the base of Pilot Peak. Heinrich Lienhard recorded his preparations for the journey on August 16, 1846: “With our pocket knives we cut as much grass as we could, binding it in bundles to carry with us. Every receptacle that would hold water was placed in readiness for our departure by being filled with this indispensable fluid.”	Not listed	Private	California (Hastings Cutoff)	None known.
114	Redlum Spring	Tooele	UT	Tooele	Redlum Spring was a camping site and brackish spring in the Cedar Mountains. Recent research indicates it was originally named after Return Jackson Redden of the 1847 Mormon Pioneer Company. It was the last possible place to get water before the long desert crossing. However, the spring was not much use to emigrant parties, because the cattle were not yet thirsty enough to drink this salty water.	Not listed	Public (BLM)	California (Hastings Cutoff)	None known.
115	Big Hill at Hastings Pass	Tooele	UT	Tooele	The difficult 0.3-mile ascent of Big Hill was a difficult climb for emigrants and their stock. From Hastings Pass at the top of the Cedar Mountains, the emigrants saw their first view of the Great Salt Lake Desert and the difficult country they would have to cross. Heinrich Lienhard “came finally to the place the road climbed over very steep hills. . . . By the time we had attained this high summit and bent our steps toward the wide, desolate valley below, the great, dark-red disk of the sun had reached the northwestern edge of a boundless flat plain lying before us, an oppressive solitude as silent as the grave.”	Not listed	Public (BLM)	California (Hastings Cutoff)	None known.
116	Grayback Hills	Tooele	UT	Bonneville Salt Flats	Grayback Hills, a rocky ridge of volcanic origin 8.5 miles northwest of Aragonite, rises 70 feet above the desert plain and is thickly strewn with sharp fragments of basalt and vitreous gravel. The Hastings Cutoff went over a low spot in these hills. Just west of the summit, wheel marks are visible for 0.25 mile in the basaltic rocks.	Not listed	Public (BLM, State of Utah)	California (Hastings Cutoff)	None known.
117	Floating Island	Tooele	UT	Bonneville Salt Flats	This small isolated mountain was an important emigrant landmark on one of the most difficult sections of the Hastings Cutoff. Edwin Bryant “reached and passed, leaving it on our left, a small butte rising solitary from the plain. Around this the ground is uneven, and a few scattering shrubs, leafless and without verdue, raised themselves above the white sand and saline matter, which seemed recently to have drifted so as nearly to conceal them.”	Not listed	Public (BLM)	California (Hastings Cutoff)	None known.

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118	Playa Wagon Tracks	Tooele	UT	Newfoundland Mountains	Wagon tracks can still be seen on the mud flats a mile east of Donner Spring. This site is only accessible during dry weather and at the end of summer.	Not listed	Public (BLM)	California (Hastings Cutoff)	None known.
119	Donner Spring	Tooele	UT	Newfoundland Mountains	Originally named Pilot Spring by John C. Fremont in 1845, this is the famous spring at the base of Pilot Peak where emigrants finally quenched their thirst after crossing many miles of barren desert. Edwin Bryant reported searching "among the reeds, willows, and luxuriant grass" for some time before locating the actual spring. His party sounded the spring to a depth of 35 feet but could not find the bottom.	Not listed	Private	California (Hastings Cutoff, Bidwell-Bartleson Route)	None known. In 1994, an interpretive kiosk was dedicated by the Oregon-California Trails Association.
120	Halls Spring	Tooele	UT	Wendover	The Bidwell-Bartleson Party was the first emigrant company to stop at Halls Spring. They ate dinner here on September 14, 1841. John James wrote, "We started early this morning and passed a number of good springs, took dinner at one of them [Halls Spring]. We travelled on the border of the salt plains till night." The main route of the Hastings Cutoff passed right by the spring. The Harlan-Young, Lienhard, and Donner-Reed parties all traveled past this spring on their way to California.	Not listed	Public (BLM)	California (Hastings Cutoff, Bidwell-Bartleson Route)	None known.
121	Haight Creek (Kaysville)	Davis	UT	Salt Lake City	The first camping place on the Salt Lake Cutoff after leaving Salt Lake City was at the residence of Hector Haight, a Mormon settler. In the spring of 1853, on her way to California, Cornelia Ferris met Mr. Haight "of whom we had engaged some choice butter for our own use and where we spent the night. This man is a large farmer, living in a fair sized adobe house within a mile of the lake. A very pretty stream coursed rapidly a few rods in the rear; and . . . the whole scene looked more like eastern life than we usually see. On the other side of the way was a large and convenient barn, and in the yard adjacent contained some fine Durham and Devon cows."	Not listed	Private	California (Salt Lake Cutoff)	None known. The Utah Crossroads Chapter of the Oregon-California Trails Association has built an interpretive kiosk on this site.
122	Hampton Ford on the Bear River	Box Elder	UT	Tremonton	Hampton Ford was the primary crossing of the Bear River. The river was bounded by very steep bluffs about 50 feet high that had to be descended to reach the narrow, flat valley. The river itself was about 200 feet wide, deep, and swift. John Charles Fremont was at Hampton Ford in 1843, and the first emigrant party crossed there in 1849. By 1853, the Mormons had established a ferry, which made the crossing easier but cost $1.00 per wagon. A toll bridge was finally constructed in 1859. Mormon entrepreneurs maintained a presence at the site until 1869.	Not listed	Private	California (Salt Lake Cutoff)	The proposed Honeyville Dam and reservoir threaten this entire area.
123	Rocky Ford on the Malad River	Box Elder	UT	Tremonton	This crossing of the Malad River had been used for years by Indians and fur trappers when the Bidwell-Bartleson Party found it in 1841. Though narrow, this river was a big obstacle for early travelers because of its steep high banks and muddy bottom. After 1848, emigrants on the Salt Lake Cutoff also used this crossing.	Not listed	Private	California (Salt Lake Cutoff, Bidwell-Bartleson Route)	None known.
124	Pilot Springs	Box Elder	UT	Grouse Creek	These springs in Curlew Valley were used by American Indian tribes, the returning Mormon Battalion, and after 1848, by California-bound emigrants. In 1849, travelers could expect to find "2 lone springs in a desert place, with little or no grass." The springs were directly on the line of travel between the crossing of Deep Creek and Emigrant Spring and served as a landmark to "pilot" emigrants between these two points.	Not listed	Private	California (Salt Lake Cutoff)	None known.
125	Goose Creek	Box Elder; Elko	UT NV	Jackpot	Goose Creek was an area of good water and grass in very scenic volcanic country, but it was noted for Indian-emigrant conflicts. There are many emigrant names and figures of unknown origin carved into soft rock formations along the creek. Franklin Langworthy reported in 1850, "We find a greatly increased number of the carcasses of dead animals. Crow, hawks, and buzzards, fare sumptuously, and collect along the road in great numbers."	Not listed	Public (BLM)/ Private	California	None known.

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126	Thomas Fork Crossing	Bear Lake	ID	Preston	This crossing of swift-flowing Thomas Fork was particularly difficult because of steep, muddy inclines into and out of the stream. A toll bridge solved the problem in the early 1850s for those emigrants who could afford its $1.00 charge. Emigrants found traders and large numbers of Indians camping here and good grass and water along the fork and in the Bear River bottoms. Excellent trail traces are present in the Sheep Creek Hills west of the fork.	Not listed	Private	Oregon, California	None known. There is an Idaho state historical marker on U.S. Highway 30.
127	Big Hill	Bear Lake	ID	Preston	Big Hill was one of the greatest impediments on the whole Oregon Trail route. To avoid the marshy bottoms of the Bear River, it was necessary to make a very steep, difficult ascent and descent of the Sheep Creek Hills. Ruts caused by the locking of wheels for the descent are visible from the west.	Not listed	Public (BLM)	Oregon, California	This site can only be reached by crossing private land. BLM has no easement for access. An Idaho state historical marker is located on U.S. Highway 30.
128	Smith's Trading Post	Bear Lake	ID	Preston	Fur trapper and mountain man Thomas L. "Pegleg" Smith—so-called for his cork leg, the result of an accident and self-amputation—established a trading post on the east bank of the Bear River about 1845. Smith was often mentioned in 1849 emigrant accounts, a year in which he did a thriving business. The post, which consisted of four log buildings, was abandoned by 1850.	Not listed	Private	California	None known. The actual site of the post is not determined. An Idaho state historical marker is located on U.S. Highway 30.
129	Soda Springs Complex	Caribou	ID	Soda Springs	The natural fountains at "Beer Springs" were rightfully considered to be one of the marvels of the overland trails. Almost every emigrant account noted the picturesque scenery and the natural curiosities of the area. The development of the town and the building of Alexander Reservoir have destroyed or covered many of these historic springs. Steamboat Spring, Wagonbox Grave, Hooper Spring, Octagon Spring, and two short traces of ruts can still be seen in the area.	Not listed	Public (City of Soda Springs)/ Private	Oregon, California	None known. The City of Soda Springs has completed a historical resource study of Oregon Trail sites in the area, is preparing a visitor brochure, and hopes to develop wayside exhibits. There is a historic monument at the west end of town.
130	Sheep Rock (Soda Point)	Caribou	ID	Soda Springs	Rising 1200 feet above the trail, this tree-covered point was a prominent landmark for emigrants. The Bear River flows through this gap between the Bear River Range and the Soda Springs Hills and turns south toward the Great Salt Lake. At this important junction, the Oregon-California Trail headed northwest and the Bidwell-Bartleson Route turned south along the west bank of the Bear River. After 1849, the Hudspeth Cutoff went directly west from this site. This point and the volcanic craters to the west were often noted in emigrant journals.	Not listed	Public (BLM)/ Private	Oregon, California (Main Trail, Bidwell-Bartleson Route)	None known.
131	Fort Hall	Bingham	ID	Blackfoot	Fort Hall was built by American Nathaniel Wyeth in 1834 but became the property of the Hudson's Bay Company in 1838. The fort was an important camping spot and trading center on the Oregon-California Trail until the middle of 1849, when the Hudspeth Cutoff was opened west of Soda Springs. From that time on, almost all travel to California took the Hudspeth Cutoff. Those traveling to Oregon continued to pass the fort until it was abandoned in 1856. An excellent replica now stands south of the site in present-day Pocatello, Idaho.	National Historic Landmark	Private (Fort Hall Indian Reservation)	Oregon, California	Erosion caused by the flooding of the Snake River seriously threatens the future existence of the site.
132	American Falls	Power	ID	Pocatello	American Falls was one of the great natural wonders of the overland trails. These impressive falls were enthusiastically noted in the accounts of all who passed by. The roar of the falls, as the Snake River dropped 50 feet, could be heard several miles away. The area below the falls became a favorite camping and resting spot for emigrants. Below modern American Falls Dam, the still-impressive river enters a rugged volcanic canyon.	Not listed	Public	Oregon, California	None known.

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133	Massacre Rocks	Power	ID	Pocatello	Massacre Rocks are two rock masses south of the trail, with just enough gap between them to allow the passage of a wagon. Three to five miles northeast of these rocks, on August 9-10, 1862, a skirmish took place between several emigrant wagon trains and Indians. The fight, one of the last hostile encounters between emigrants and Indians in this part of Idaho, ended with the death of ten whites and an unknown number of Indians.	The ruts between Massacre Rock and Coldwater Hill are listed	Public (Idaho Department of Parks and Recreation)	Oregon, California	Massacre Rocks State Park maintains a museum with interpretive exhibits. Pristine ruts and interpretive waysides can be accessed from the Massacre Rocks Rest Area off I-86, two miles east of Massacre Rocks State Park. The ruts near the wayside exhibits show the impact of heavy visitation.
134	Register Rock	Power	ID	Lake Walcott	Register Rock is a half-buried boulder, 25 feet in diameter, with many clearly visible names and dates inscribed upon it by emigrants, some dating from 1849. The small stream that provided water at this campsite was known to the emigrants as both Fall Creek and Rock Creek. Today the area has been developed as a day-use picnic area. Register Rock is enclosed by a chain link fence and protected from weathering by an octagonal pavilion.	Listed	Public (Idaho Department of Parks and Recreation)	Oregon, California	None known. Massacre Rocks State Park maintains the site and an interpretive sign.
135	Coldwater Hill	Power	ID	Lake Walcott	Cold Water was a camping area along the Snake River. At the western end of the valley, the trail climbed Coldwater Hill and turned southwest, away from the Snake River and toward the crossing of the Raft River. Intact trail remnants are clearly visible as the trail ascends this hill. They are easily accessibly from an eastbound rest stop off I-84.	Listed	Private	Oregon, California	None known.
136	California Trail Junction/Raft River Crossing	Cassia	ID	Lake Walcott	Immediately after fording Raft River, the California Trail branched south and traveled up the Raft River Valley to Cassia Creek and City of Rocks. The Oregon Trail continued west over rolling rangelands to rejoin the Snake River. Joseph R. Walker opened the California Trail through the Raft River Valley in 1843, and it was the main route to California until the opening of Hudspeth Cutoff in 1849. There are trail markers at the parting of the two trails, and nearby emigrant graves have been fenced and marked. There are traces of the trail on public lands both west (the Oregon Trail) and south (the California Trail) of the junction.	Not listed	Public (BLM)	Oregon, California	None known. Access to the site from the east is over private land.
137	Summit Springs	Oneida	ID	Malad City	When emigrants reached Summit Springs at the crest of the Sublett Mountain Range, they knew the most difficult part of the Hudspeth Cutoff was behind them. It was mostly downhill from here to the Raft River. Elisha Perkins described the view from Summit Springs Pass in 1849: “We finally emerged upon a hill overlooking a valley with fine grass and a creek of pure water [from Summit Springs] and bounded by high bluffs and mountains.”	Not listed	Public (USFS-Sawtooth National Forest)	California (Hudspeth Cutoff)	None known. The site has been marked but needs additional interpretation.
138	Sublett Creek Canyon	Oneida	ID	Malad City	The descent of Sublett Creek Canyon was often mentioned in emigrant accounts. In 1849, William Swaine wrote, “The height of the hills was left behind and the road began to descend a defile winding gradually among the hills.” Today the route through this canyon can be driven in a high clearance vehicle, but the area still retains its natural setting and beautiful scenery.	Not listed	Public (USFS-Sawtooth National Forest)	California (Hudspeth Cutoff)	None known. The canyon should be interpreted and made accessible to the public.
139	Raft River Narrows	Cassia	ID	Oakley	The Raft River Narrows, a canyon about two miles in length, posed great difficulty for emigrants on the Salt Lake Cutoff. It was necessary to cross the Raft River three times: once on the southeast side of the narrows, once on the west side, and another crossing six miles farther west. Although the original trail has been obliterated in the canyon bottom, excellent trail remnants can be found both east and west of the actual canyon, and a pristine dugway can be clearly seen cut into the talus slope on the south side of the river. Descriptions of this dugway by later emigrants tell us they tied ropes to their wagons to prevent them from falling into the river.	Not listed	Public (BLM)	California (Salt Lake Cutoff)	None known.

NO	SITE NAME	COUNTY	STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	TRAIL	THREATS TO RESOURCES/ VISITOR SERVICES
140	City of Rocks Complex	Cassia	ID	Oakley	One of the great scenic and historic landmarks along the California Trail, the City of Rocks was mentioned in almost every emigrant account. It is an area of fantastically weathered granite formations, which the emigrants fancied as steeples, hotels, houses, temples, and palaces in a “Silent City of Rocks.” It includes a series of sites: Twin Sisters, a natural historic landmark; Pinnacle Pass, wide enough for one wagon; Emigrant Canyon Spring, where remnants of the Kelton to Boise stage station and excellent trail ruts can be seen; and Salt Lake Cutoff Junction, where this alternate route comes up Emigrant Canyon to join the California Trail in an open valley approximately one mile south of the Twin Sisters.	National Historic Landmark	Public (Idaho Department of Parks and Recreation-NPS)/Private	California (Main Trail, Salt Lake Cutoff)	The area needs to be protected from development and from rock-climbing within the designated historic trail corridor. City of Rocks National Reserve maintains a small museum and plans to place interpretive wayside exhibits throughout the park.
141	Granite Pass	Cassia	ID	Grouse Creek	As the only route into Nevada north of the Hastings Cutoff that was passable for emigrant wagons, Granite Pass (elevation 6,960 feet) played a key role in determining the path of the California Trail. An easy ascent from the east terminated with a very steep and treacherous descent westward into Goose Creek. The pass was never referred to in emigrant accounts as Granite Pass, but there are several emigrant graves at the summit and along the ascent. Alonzo Delano described the view from the top of the pass in 1849: “From the summit of the hill, a fine and peculiarly interesting view afforded. . . . Far as the eye could reach, cones, tables, and nebulae, peculiar to the country, extended in a confused mass.”	Listed	Private	California	None known. The pass should be acquired in conjunction with the City of Rocks National Reserve.
142	Natural Bridge on Lost River	Klamath	OR	Klamath Falls	The 1846 Applegate party learned of the “Stone Bridge on Lost river” from an Indian who took them to “two natural bridges of conglomerate sandstone” from 10 to 15 feet wide. This phenomenon consisted of two parallel formations under the surface of the Lost River. The bridge was a key Applegate Trail site, since as Lt. H. L. Abbot noted in 1855, “There is no ford for a considerable distance above, and none below,” although in 1846 Fremont crossed at a ford some 4.5 miles above the bridge. Located just north of the Oregon-California border, one bridge has washed away, but the surviving formation is now the foundation of an irrigation-diversion dam.	Not listed	Private	California (Applegate Trail)	None known. There is an Applegate Trail Coalition interpretive wayside exhibit at the site.
143	Upper Klamath River Crossing	Klamath	OR	Klamath Falls	Tolbert Carter, an 1846 emigrant, thought the Applegate Trail’s encounter with the Klamath River “one of the worst crossings that wagons ever made.”	Not listed	Private	California (Applegate Trail)	The site is under water. There are interpretive waysides on the Lower Klamath River Crossing at Sportsman’s Park.
144	Lower Klamath River Crossing	Klamath	OR	Medford	In 1847 Levi Scott opened a shortcut through Bear Valley to this Klamath River ford as an alternative to the 1846 Applegate Trail upper crossing. George Riddle recalled that in 1851 the Klamath ford “was rocky and deep, with a swift current,” so he rode Bill, “my big near ox” across the river to keep his light wagon from capsizing.	Not listed	Public	California (Applegate Trail)	The site is under water.
145	Jenny Creek Wagon Slide	Klamath	OR	Medford	Here Virgil Pringle noted “the steep hill to go down” on October 7, 1847, as he made the sharp descent to Jenny Creek ford north of today’s Pinehurst.	Not listed	Private	California (Applegate Trail)	None known. Two trail markers are located .75 mile apart.
146	Tub Springs State Wayside	Jackson	OR	Medford	Located on a “good but very rough and broken” section of trail, J. Quinn Thornton abandoned a wagon here in 1846. This Oregon State Park contains a short trail along wagon ruts of the Cascade Wagon Road.	Not listed	Public (Oregon Parks and Recreation Department)	California (Applegate Trail)	None known. There are Applegate Trail Coalition interpretive waysides at Tub Springs.
147	Cascade Mountain Summit	Jackson	OR	Medford	Here emigrants crested the Cascade Mountains at Green Springs Summit to cross the divide between the Klamath River and Rouge River drainages. Lindsay Applegate recalled the eastbound “route was good, not rocky, and the ascent was very gradual,” but “the descent was, in Places, very rapid.” Today this is the junction with the Pacific Crest National Scenic Trail.	Not listed	Public	California (Applegate Trail)	None known. There is an Applegate Trail Coalition interpretive wayside at Tub Springs.

NO	SITE NAME	COUNTY	STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	TRAIL	THREATS TO RESOURCES/ VISITOR SERVICES
148	Junction of the Trappers Trail to California and the Applegate Trail	Jackson	OR	Medford	At today's Emigrant Lake, about five miles west of the confluence of Emigrant and Tyler creeks, the trail's two routes passed Songer Butte and joined the Hudson's Bay Company trappers trail to California. Here the east bound 1846 South Road exploring party left the trappers trail and turned east to seek a pass over the Cascade Mountains.	Not listed	Private	California (Applegate Trail)	None known.
149	Valley of the Rogue State Park	Jackson	OR	Grants Pass	This Oregon State Park is located on the trail corridor that follows the Rogue River. Exhausted after crossing the Cascades, here emigrants rested their cattle. A. S. Crews recalled that in 1846 the emigrants "thought they could get through to [the] settlements be fore winter and they strougled on."	Not listed	Public (Oregon Parks and Recreation Department)	California (Applegate Trail)	None known.
150	Grave Creek	Josephine	OR	Canyonville	This is the site of Martha Leland Crowley's 1846 grave and a historic covered bridge. "I was a carpenter and made coffins for the members of our party who died," recalled David M. Guthrie. "We had no boards left when Martha died, but I knocked some boxes to pieces and made her a coffin. There were 26 pieces of board in her coffin. We buried her by the stream and then corralled the cattle over her grave so the Indians would not find her body."	Listed	Public (Josephine County)	California (Applegate Trail)	None known.
151	Wolf Creek Tavern State Heritage Site	Josephine	OR	Canyonville	This Oregon State Park is located on the Applegate Trail. The tavern opened in the 1880s to serve the Oregon-to-California stagecoach route.	Listed	Public (Oregon Parks and Recreation Department, Oregon Department of Transportation)	California (Applegate Trail)	None known.
152	Canyonville Pioneer Park	Douglas	OR	Canyonville	The descent of Canyon Creek was one of the most arduous portions of the entire Applegate Trail. Tabitha Brown recalled that in 1846, "Out of hundreds of wagons, only one came through without breaking. The canyon was strewn with dead cattle, broken wagons, clothing, and everything but provisions, of which latter we were nearly all destitute." Levi Scott and David Goff remained behind to help the exhausted emigrants, who "presented the appearance of a defeated and retreating army." Refusing to abandon his library, Rev. J. A. Cornwall spent the winter of 1846–47 here in a log cabin. The first land claims were made at Canyonville in 1851.	Not listed	Public (City of Canyonville)	California (Applegate Trail)	None known.
153	Pleasant Valley/Yoncalla Complex	Douglas	OR	Cottage Grove	In the northern Umpqua Valley, the Applegate Trail split into two branches. The eastern fork, opened in 1846–47, crossed the Calapooya Mountains to the Coast Fork of the Willamette River, where it followed the Willamette Valley north along the line of today's Highway 99. The western branch closely followed the Hudson's Bay Company trappers trail to California. It became the western branch of the Applegate Trail after the Scott and Applegate families settled the area in 1849 and developed the route as a shorter way to the west side of the Willamette Valley.	Charles Applegate House is listed.	Public/Private	California (Applegate Trail)	None known. In Yoncalla, an Applegate monument is located at the corner of Front and Applegate Avenue, near the historic Charles Applegate house. North of Yoncalla, a marker commemorates the Jesse Applegate homestead
154	Long Tom River Crossing	Benton	OR	Eugene	This Oregon State Park is located on the eastern branch of the Applegate Trail near the crossing of the Long Tom River. In 1846, Tolbert Carter ferried a mother and her newborn child across the Long Tom. "A woman and child had died the night before under the same circumstances," he recalled. "She was another member of the unfortunate Crowley family. But the woman and child I speak of both lived." The eastern and western branches of the trail rejoined at today's Monroe.	Not listed	Public (Oregon Parks and Recreation Department)	California (Applegate Trail)	None known.
155	Mary's River Crossing	Benton	OR	Corvallis	In 1846, Mary's River was the last place emigrants had to disassemble their wagons and cross a river on a canoe ferry.	Not listed	Public (City of Corvallis)	California (Applegate Trail)	None known.

NO	SITE NAME	COUNTY	STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	TRAIL	THREATS TO RESOURCES/ VISITOR SERVICES
156	Dallas/La Creole Creek Complex	Polk	OR	Corvallis	La Creole Creek, in present-day Dallas, Oregon, was the official start and end of the Applegate Trail. The South Road Company assembled here in 1846 under Jesse Applegate to seek a southern route from Soda Springs to the Willamette Valley. Applegate relied on a map and excellent advice from Peter Skene Ogden, who had explored the Great Basin for the Hudson's Bay Company. Members of an earlier exploring party, including Moses Harris, Levi Scott, and David Goff, joined Applegate, his brother Lindsay, and others on the expedition. The original Applegate land claims are four miles to the northwest. Today, La Creole Creek is known as Rickreall Creek.	Not listed	Public/Private	California (Applegate Trail)	None known. There are interpretive waysides, but local directional signing is needed. There is an OCTA sign at Dallas City Park.
157	Edwards Creek Station	Churchill	NV	Smith Creek Valley	Edwards Creek Station was on the north side of the Desatoya Mountains, midway between Smith Creek and Cold Springs stations. The station was built in July 1861 to serve both the Pony Express and the Overland Stage, which operated daily, except Sunday. One of the best-preserved Pony Express stations, its ruined stone walls still stand today.	Not listed	Private	Pony Express	The ruins need to be stabilized.
158	Cold Springs Station	Churchill	NV	Smith Creek Valley	Cold Springs Station was hurriedly constructed by Bolivar Roberts, J. G. Kelly, and their crew in March 1860 as they prepared for the first run of the Pony Express. The station was repeatedly attacked by Indians. When Richard Burton reached the station in October 1860, he found "a wretched place, half built and wholly unroofed; the four boys, an exceedingly rough set, ate standing, and neither paper nor pencil was known among them." Today, remnants of thick stone walls, complete with windows, gun ports, and a fireplace, identify the station. The ruins of a corral can be found nearby. As in Burton's day, the structure has no roof. The station has been structurally stabilized for preservation and safety reasons.	Listed	Public (BLM)	Pony Express	None known. The BLM maintains interpretive wayside exhibits nearby on U.S. Highway 50.
159	Sand Springs Station	Churchill	NV	Fallon	Boliver Roberts and crew also built Sand Springs Station in March 1860. Travelers found a reliable source of water at Sand Springs, but its poor quality often poisoned animals and probably made people ill. Richard Burton recorded his negative reaction to the place: it was "roofless and chairless, filthy and squalid, with a smoky fire in one corner, and a table in the center of an impure floor, the walls open to every wind, and the interior full of dust." In addition to the Pony Express, the site served as a telegraph, freight, milling, and ranching center. Structural ruins from many of these activities still exist and the station remains have been stabilized.	Listed	Public (BLM)	Pony Express	None known. The BLM excavated and stabilized the ruins in 1977 and maintains interpretive signs at the site.
160	Fort Churchill	Lyon	NV	Carson City	Indian raids and the interruption of Pony Express mail service spurred the construction of Fort Churchill on the banks of the Carson River. Captain Joseph Stewart and his men began building the fort on July 20, 1860, as a permanent installation, consisting of adobe buildings erected on stone foundations. This fort housed the Pony Express station in its headquarters building, which is still standing. When Richard Burton arrived on October 19, 1860, he gave it a positive review and named Captain F. F. Flint as the commander.	National Historic Landmark	Public (Nevada Division of State Parks)	Pony Express	None known. Fort Churchill Historical State Monument preserves the ruins of the adobe fort and maintains a visitor center with interpretive exhibits in the headquarters building.
161	Pilot Peak	Elko	NV	Wells	This 10,700-foot peak, named by John C. Fremont, served as a landmark to all emigrant parties moving west in this part of the country. From the top of the peak, it is possible to get an overview of the Hastings Cutoff from the Utah border to Silver Zone Pass. It also offers a good view of the salt flats. This was the route taken by Bidwell-Bartleson (1841), Fremont (1845), Bryant-Russell and the Donner-Reed Party (1846), and others.	Not listed	Public	California (Hastings Cutoff)	None known.

NO	SITE NAME	COUNTY	STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	TRAIL	THREATS TO RESOURCES/ VISITOR SERVICES
162	Bidwell Pass	Elko	NV	Wendover	The pass has not officially been named, but should be. The 1841 Bidwell-Bartleson Party was the first emigrant company to pass through Bidwell Pass. John James recorded, "In the evening we left the salt plain, turned our course to the west, crossed the mountain through a gap [Bidwell Pass] and could find no water." In 1846, Edwin Bryant discovered the Bidwell-Bartleson wagon tracks here and followed them for two or three miles. Bryant recorded, "We struck a wagon-trail, which evidently had been made several years. From the indentations of the wheels, where the earth was soft, five or six wagons had passed here. The appearance of this trail in this desolate region was at first inexplicable; but I soon recollected that some five or six years ago a emigrating expedition to California was pilotted out by Colonel Bartlettson, Mr. J. Chiles, and others, of Missouri." A nice section of trail remnants can still be found near the Wendover-to-Lucin Road, about one mile east of Bidwell Pass, heading west.	Not listed	Public (BLM)	California (Hastings Cutoff, Bidwell-Bartleson Route)	None known. The Crossroads Chapter of the Oregon-California Trails Association has erected a wayside exhibit at the eastern base of the pass and two carsonite posts (one brown and one white) have been placed in the pass.
163	Silver Zone Pass Spring	Elko	NV	Wendover	The spring in Silver Zone Pass was mentioned and used by the early emigrants. It was the only water between Halls Spring and Big Springs. Heinrich Lienhard recorded, "With our breakfast we were soon enough finished, after which we yoked up and again proceeded slowly on down the gorge. We had gone scarcely 100 yards before we actually found near the road a spring hole perhaps 12 feet deep. We stopped, naturally, and equipping myself with a bucket and a small receptacle I forced my way the few steps down to the water. The water was clear, cool, and pleasant to the taste." Sarah Davis described Silver Zone Pass as "a large canion barely enuf of rume for the wagons to pass each other and vary ruff roads."	Not listed	Private	California (Hastings Cutoff)	None known.
164	Big Springs (In Goshute Valley)	Elko	NV	Wendover	Big Springs is at the eastern base of the Pequop Mountains. In 1841, the Bidwell-Bartleson Party abandoned their remaining seven wagons here and packed their necessities on horses, mules, and oxen. Edward M. Kern, topographer with Fremont's 1845 expedition, recorded seeing the Bidwell trail, as did Edwin Bryant in 1846. The Hastings wagon trains followed the Bidwell-Bartleson trail from Donner Spring to Big Springs, as did the gold rushers through 1850. In 1850, Madison Berryman Moorman "came to a fertile little valley—two or three hundred yards wide—where we had plenty of fine grass and water," and Sarah Davis' party "lay buy all day . . .and washed and grased our cattle."	Not listed	Private	California (Hastings Cutoff)	None known.
165	Flowery Lake Springs	Elko	NV	Wendover	About two miles east of Flowery Lake Pass, these springs were used by emigrant parties from 1846 through 1850, including the Fremont, Clyman, Bryant-Russell, and Donner-Reed parties. James Reed called them Mad Woman Springs because all the women in their company were angry while camped at these springs. Edwin Bryant described "an oasis of about fifty acres of green grass, reeds, and other herbage, surrounding a number of springs, some of cool fresh water, others of warm sulphur water. There waters rise and immediately sink in the sands. . . . The grass immediately around the springs, although not of the best quality, is very luxuriant, and on the whole, it being a favorable place for grazing our mules . . .we determined to encamp for the day."	Not listed	Public	California (Hastings Cutoff)	None known.

NO	SITE NAME	COUNTY	STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	TRAIL	THREATS TO RESOURCES/ VISITOR SERVICES
166	Mound Springs	Elko	NV	Wendover	These springs were a curiosity to all the emigrants because they flowed out of low mounds of earth. Edward M. Kern called them Whitten's Springs. Edwin Bryant described his days travel across Independence Valley to Mound Springs on August 7, 1846: "Crossing this valley, the sun pouring its scorching rays down upon us with such fervor as nearly to parch our bridle reins into a crisp, we found on the slope of the western side, near the foot of the mountains [Spruce Mountains], another small oasis, of an acre or two of green vegetation, near the center of which were one or two small springs or wells of cool fresh water. The waters of these springs [Mound Springs] rise to the surface and sink immediately, moistening only the small patch of fertile ground." Here Fremont split his 1845 pack party, sending Lieutenant T.H. Talbot with the majority of the party west to the Humboldt, while he and the rest of the men went south and west.	Not listed	Private	California (Hastings Cutoff)	None known.
167	Warm Springs	Elko	NV	Elko	These springs at the foot of the Humboldt Mountains were noted for the large volume of water flowing from them. In 1846, Edwin Bryant "found a bold spring gushing forth a volume of water sufficient to turn the most powerful millwheel." On September 5, 1850, Sarah Davis described "water cold as ice a butifull creek comin right from the mountain it roars like a cataract and springs all round in every direction and cattle are giten fat on this grass." From here, pack parties could turn northwest and cross Secret Pass, a gap between the East Humboldt and Ruby mountain ranges, to rejoin the primary California Trail on the Humboldt River. Wagons could not get through this way, so the wagon road headed southwest and crossed the Rubys through Overland Canyon.	Not listed	Private	California (Hastings Cutoff)	None known.
168	Sulphur Hot Springs	Elko	NV	Elko	These springs at the foot of the Ruby Mountains were a curiosity to the early emigrants. Some used the hot springs to cook their food. Madison Berryman Moorman described the springs in 1850: "We came to a group of boiling springs. I did not count them, but there can not be less than twenty . . . . One of the springs I supposed to be twenty feet in diameter, of unfathomable depth and boiling like a pot. From the appearance of the ground around which is perfectly bare of vegetation, they sometimes overflow. They attract the attention of every passer-by, and this strange phenomenon of nature is only beheld with wonder and surprise."	Not listed	Private	California (Hastings Cutoff)	None known.
169	Cave Creek	Elko	NV	Ruby Lake	A large spring or creek flows out of a cave at the foot of the Ruby Mountains about 12 miles north of Overland Pass. T.H. Jefferson and James Reed noted the existence of Cave Spring in 1846. On September 19, Reed recorded, "Encamped at a large Spring breaking out of from the and part of large Rock Stream la[r]ge enough to turn one pr [pair] Stone." Curiously, no mention of it is made in any of the journals of 1850. This spring is located 19.5 miles south of the old Ruby Valley post office and lies at the base of Pearl Peak, which is 11,000 feet high.	Not listed	Public	California (Hastings Cutoff)	None known.

NO	SITE NAME	COUNTY	STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	TRAIL	THREATS TO RESOURCES/ VISITOR SERVICES
170	Overlook of the South Fork of the Humboldt River Gorge	Elko	NV	Elko	This rugged canyon was often mentioned in emigrant journals, some giving extensive descriptions of travel through the gorge. The 1841 Bidwell-Bartleson Party was the first emigrant company to travel down this gorge to the Humboldt River. John Bidwell wrote: “The creek became perfectly dry and its banks rose to high perpendicular precipices, so that there was no other road that the dry bed of the stream. Having come about 15 miles, we encamped in a place affording a little grass and water, where we could see nothing but sky. But the men who ascended the precipice to see what was the prospect ahead said that in about a mile we would come to a valley—this was delightful news.” The view from the overlook down into the canyon is very impressive. One can see what the emigrants went through, winding back and forth across the river. A hiking tour through the gorge is well worth the effort.	Not listed	Public/Private	California (Hastings Cutoff, Bidwell Bartleson Route)	None known.
171	Record Bluff	Elko	NV	Jackpot	Emigrants marked their names on this cliff near Goose Creek. It is generally considered to be the finest display of emigrant names and dates in Nevada and California. David DeWolf reported in 1849, “We passed a singular rock composed of sandstone the outside being hard and the inside quite soft, so soft one can cut it with a knife. It was singularly shaped with large cavities in it and in the different cavities were a large number of names.”	Not listed	Private	California	Natural erosion and boring insect damage are destroying the inscriptions.
172	Rock Spring	Elko	NV	Jackpot	Water still wells from the rocks at this emigrant campground at the head of Rock Spring Creek. In 1849, Alonzo Delano recorded in his journal, “From the appearance of many wagons standing together on the plain below, I knew water was near. A mile brought me to them, where I found a small stream of lukewarm water, flowing in a trifling brook under the point of a rock.”	Not listed	Public (BLM)	California	Rock Spring would be a good location for an interpretive wayside exhibit. There is a Trails West marker at the site.
173	Thousand Springs Valley	Elko	NV	Jackpot	Thousand Springs Valley is another key site in determining the path of the California Trail from Fort Hall to the headwaters of the Humboldt River. The valley contains both hot and cold springs at today’s Winecup Ranch. Numerous diaries recount the emigrants passage through this valley. In 1849, E. D. Perkins wrote, “The valley where we are Encamped is a remarkable fine one abounding in rich grass, and presents quite a live appearance just now, there being wagons and camps up and down as far as we can see. . . . About noon we came to a hot spring. . . . Certainly there is something very mysterious in the appearance of nearly boiling water at the surface of the ground. . . . What is a little singular is that a spring of clear cold water issues from the ground not _ of a mile from the other.”	Not listed	Public (BLM)/ Private	California	None known. BLM has established an interpretive kiosk at Winecup Ranch. There is also a Trails West marker located here.
174	Humboldt Wells	Elko	NV	Wells	These unique natural wells and camping area are located at the headwaters of the Humboldt River. The springs were described as marshy spots and small ponds of water. In 1850, Lorenzo Sawyer wrote, “Five miles brought us to several deep holes in a wet marshy valley to the left of the road filled with water.” Emigrants frequently rested here before beginning the grueling 300-mile journey down the Humboldt River.	Not listed	Public/Private	California	Humboldt Wells would be an excellent site for an interpretive wayside exhibit.
175	Carlin Canyon	Elko	NV	Battle Mountain	This three-mile loop along the Humboldt River through beautiful, steep-walled Carlin Canyon was the route of the main California Trail (including the Bidwell-Bartleson in 1841), the Central Pacific Railroad (remnants still visible), and State Route 1 (later known as the Victory Highway, then U.S. Highway 40). Some emigrants took the Greenhorn Cutoff to the north to avoid high water and the canyon’s four river crossings.	Not listed	Public (BLM)	California	The last two fords are accessible along the old highway and would be excellent locations for interpretive wayside exhibits. A Trails West marker is located in the canyon.

NO	SITE NAME	COUNTY	STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	TRAIL	THREATS TO RESOURCES/ VISITOR SERVICES
176	Gravelly Ford	Eureka	NV	Battle Mountain	This Humboldt River crossing was named Gravelly Ford because of the gravel in the riverbed that made it a good crossing for wagons. Here the trail returned to the river after the long, dry trip across Emigrant Pass and down rocky Emigrant Canyon. Travelers were glad to get back to water. In 1849, J. A. Pritchard "found a luxury here such as we had not seen, in the shape of wild curren[t]s. . . . The flavor of them was very fine indeed." The site of many Indian conflicts, there are several signed and fenced graves near the ford.	Not listed	Private	California	Erosion and dust occasionally make the ford unsafe for vehicles. A Trails West marker is located at the site.
177	Iron Point	Humboldt	NV	Winnemucca	One of the most historic sites along the Humboldt River Route, Iron Point is located west of the steep ascent of the sand hill where James Reed probably killed John Snyder on October 5, 1846. This fight led to Reed's banishment from the Donner-Reed Party, which had such an important impact on the fate of the emigrants.	Not listed	Public (BLM)	California	A Trails West marker is located at the base of the ascent to Iron Point.
178	Humboldt Sink	Pershing, Churchill	NV	Lovelock, Carson Sink	The Humboldt Sink, or Great Meadows, was a place of celebration. Here emigrants completed the exhausting 300-mile trip down the length of the Humboldt River and arrived at a place to rest themselves and their animals. Here the river ended, spread its waters to create a vast marsh, and, in wet years, formed Humboldt Lake. G.W. Thissell described the area in 1849: "We arrived at the sink of the river. It empties out on the desert, forming a great marsh or meadow of coarse grass, that covers more than a thousand acres. In many places the grass was higher than a man's head." This celebration was tempered by anxiety, because the grueling Forty-mile Desert lay dead ahead.	Not listed	Public (BOR)/ Private	California	None known.
179	Parting of the Truckee and Carson Routes	Churchill	NV	Carson Sink	At this spot, emigrants had to decide which route to take across the Forty-mile Desert. They could head west to the Truckee River and go over Donner or Roller passes on the Truckee Route. Or they could head southwest to the Carson River and cross West Pass on the Carson Route or Sonora Pass on the Walker River-Sonora Route. The preferred route changed from year to year. The original trail over Donner Pass was used through 1846. For the next two years, Roller Pass was preferred, until West Pass was opened in 1848. The Dutch Flat Wagon Road was cut over Donner Pass in 1852, and emigrants began to favor this route. Sonora Pass was also opened in 1852 for those going farther south.	Not listed	Public (BOR)/ Private	California	None known.
180	Humboldt Bar	Churchill	NV	Carson Sink	Humboldt Dike was created by wave action on prehistoric Lake Lahonton. Before Rye Patch Dam was built, this natural earthen dam impounded the waters of the Humboldt River into Humboldt Lake. In wet years, excess water escaped through a gap in this dike and flowed out into the Humboldt Slough at the western base of the dike. The Carson and Truckee routes split at the eastern base of Humboldt Bar and both routes travel over this dike as they enter the Forty-mile Desert. In 1849, John Edwin Banks described the dike as, "An embankment some twenty feet high extends across the bed of the river, extending from mountain to mountain, perhaps one and a half miles wide." The view from the top of the bar looking out over the Forty-mile Desert is impressive, and this unique site must be protected and preserved.	Not listed	Public (BLM, BOR)/Private	California (Carson and Truckee Routes)	There are Trails West markers on both of these trails on top of the Bar.
181	Little Lost Canyon	Mono	CA	Bridgeport	The trail leaves the desert in Little Antelope Valley and climbs abruptly up Little Lost Canyon to the ridge overlooking Lost Cannon Creek.	Not listed	Public (USFS-Toiyabe National Forest)	California (Walker River-Sonora Route)	None known.

NO	SITE NAME	COUNTY	STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	TRAIL	THREATS TO RESOURCES/ VISITOR SERVICES
182	Upper Levitt Meadow	Mono	CA	Bridgeport	Unable to follow the West Walker River through its narrow gorge out of Levitt Meadow, emigrants created a trail up a narrow cleft in the granite. The route is clogged with boulders, making it appear impossible that wagons could have actually passed through such a rugged canyon, but physical evidence confirms that they did. Once they had struggled to the top of the ridge, emigrants were forced to lower their wagons down the other side with ropes anchored around juniper trees.	Not listed	Public (USFS-Toiyabe National Forest, Hoover Wilderness Area)	California (Walker River-Sonora Route)	None known.
183	Browder Flat	Mono	CA	Bridgeport	Here, the emigrants faced the most difficult and precarious climb of the entire route, a half-mile haul up to Fremont Lake. Many wagons were abandoned and equipment jettisoned as emigrants lightened their loads to prepare for the arduous ascent. Later travelers, such as James “Grizzly” Adams, noted the number of abandoned wagons at the site. It may also have been the location of a trading post set up on the eastern side of the summit in 1853 to provide aid to travelers.	Not listed	Public (USFS-Toiyabe National Forest)	California (Walker River-Sonora Route)	None known.
184	Approach to Fremont Lake	Mono	CA	Bridgeport	This short section of trail is one of the steepest and most challenging portions of any emigrant route, traversing granite and winding circuitously among boulders. In one place, the emigrants paved a steep ramp with granite slabs to take their wagons up the side of a rock wall. Diary accounts describe the wreckage of numerous wagons along this section. At the northern end of Fremont Lake the first party to use the trail (1852) dug a ditch to lower the level of the lake so that their wagons could ford the shallows along one bank.	Not listed	Public (USFS-Toiyabe National Forest, Hoover Wilderness Area)	California (Walker River-Sonora Route)	None known.
185	Upper Little Emigrant Valley	Mono	CA	Bridgeport	The actual summit of the Walker River-Sonora Trail is mislabeled on most maps. The original Sonora Pass of 1853 was one mile north of the Emigrant Pass shown on government maps and almost eight miles south of today’s Sonora Pass on U.S. Highway 395. The emigrants climbed along the side of a deep, winding chasm as they worked their way toward the summit. They described crossing over snowfields as they neared the crest of the Sierra Nevada, the highest emigrant wagon pass in the United States at 9,780 feet.	Not listed	Public (USFS-Toiyabe National Forest, Hoover Wilderness Area; and Stanislaus National Forest, Emigrant Wilderness Area)	California (Walker River-Sonora Route)	None known.
186	Hubbs Grave Site	Tuolumne	CA	Bridgeport	The Hubbs grave near Saucer Meadow is marked by a carving set deep into a tree, indicating the name Hubbs and the year 1853. The stones that once covered the grave have since been used to build a fire ring. Nothing is known of Hubbs or of the circumstances of his or her death.	Not listed	Public (USFS-Stanislaus National Forest)	California (Walker River-Sonora Route)	None known.
187	Relief Camp	Tuolumne	CA	Bridgeport	Relief Camp was the meeting place of a relief party and the emigrants of the first wagon company to use this route in 1852. The following year, Sonora citizens set up a trading post to help emigrants along the trail. Parties stopped here to rest their stock and allow sick members to recuperate. On one occasion, a dance was held upon bare earth to celebrate the successful arrival in California.	Not listed	Public (USFS-Stanislaus National Forest)	California (Walker River-Sonora Route)	None known.
188	Commemorative Iron Tire	Tuolumne	CA	Bridgeport	An iron wagon tire has been affixed to a rock along the trail between Relief Meadow and Upper Relief Meadow. A plaque there commemorates the emigrants of 1852-1854.	Not listed	Public (USFS-Stanislaus National Forest)	California (Walker River-Sonora Route)	None known.

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189	Burst Rock (Birth Rock)	Tuolumne	CA	Bridgeport	Birth Rock stands prominently overlooking the canyon of the South Fork of the Stanislaus River, near today's Pinecrest. In 1853, the Fischer family was caught in a snow storm while descending the Walker River-Sonora Trail. Under the overhang of the rock, Martin Fischer built a bark shelter for his family and then went to help other emigrants bring their wagons down the mountains. When his wife Katherina went into labor, four-year-old Martin George struggled through the snow to get help from an Indian guide. Little Marika Fischer was born in the lee of Birth Rock.	Not listed	Public (USFS-Stanislaus National Forest)	California (Walker River-Sonora Route)	None known.
190	Mormon Station	Douglas	NV	Carson City	In the spring of 1850, the DeMont-Beatie-Blackburn party, a group of about 80 Mormons from Salt Lake City, headed for the gold fields of California. When they reached the Carson Valley, they "concluded to start a station for trade" and built a large log blockhouse at the north end of present-day Genoa, Nevada. This station conducted a lively trade, supplying food, supplies, and fresh livestock, at a steep price, to emigrant parties bound for California on the Carson Route. A later station has been reconstructed and is run by Nevada State Parks. The old post office in Genoa was used as the Pony Express station. The building was razed years ago, and the site is now a vacant lot, just south of the courthouse. The livery stable across the street supplied riders with fresh horses. That site is now the picnic area for Mormon Station State Park	Non-contributing element within the National Historic District	Public (Nevada State Parks)	California (Carson Route), Pony Express	None known. Mormon Station State Park has a museum with exhibits, picnic area, and a replica of the old trading post.
191	Woodfords Station	Alpine	CA	Smith Valley	From April 3 to April 29, 1860, a remount station for the Pony Express was located at the site. When the route was changed to go up the new Kingsbury Grade, the pony riders no longer went past Woodfords. The modern Old Emigrant Road to the east is on top of the Carson branch of the California Trail and the Pony Express route. A nice swale on the edge of the highway can be found at the junction of Old Emigrant Road and Highway 88.	Not listed	Public/Private	California (Carson Route), Pony Express	The site needs interpretation and listing on California Department of Transportation records to protect the swale from future destruction. There are markers near the site.
192	Snowshoe Thompson Cave and Ruts	Alpine	CA	Smith Valley	This cave was said to be Snowshoe Thompson's shelter; there is a pristine trail segment near the 3rd Crossing.	Not listed	Public	California (Carson Route)	An electric power line follows the trail.
193	Hope Valley	Alpine	CA	Smith Valley	Hope Valley was an important camping place for emigrants after reaching the top of West Carson Canyon. An excellent description appears in the 1859 diary of Charles True. Here, at junction of California Highways 88 and 89, the original route of the Pony Express cut north across the mountains and on to Placerville. Farther up the valley, the Big Trees Road left the main Carson Route to cross the mountains into the gold mines at Angels Camp and Murphys.	Not listed	Public (USFS)/ Private	California (Carson Route and Big Trees Road), Pony Express	Vandalism is a problem. A Pony Express marker near the junction of California Highways 88 and 89 was found and replaced in June 1997 by the California Division of the National Pony Express Association. The area needs California Trail interpretation.
194	Devil's Ladder/Carson Pass	Alpine	CA	Smith Valley	Vividly described in most emigrant diaries, this was the covered wagon route up the first summit of the Sierra Nevada on the Carson Route. Emigrants had to wait their turn, haul the wagon contents up first, then double or triple team their empty wagon to get it over "slippery rock" (a major obstacle) to reach Carson Pass. The trail crosses the Pacific Crest Trail behind the Forest Service log cabin at the highway summit. The 1849 grave of an unknown member of the Independent Order of Odd Fellows, pioneer names on rocks with the date Aug. 24, 1849 (the names have been retouched over the years yet many have disappeared), and a metal plaque can be found on the upper part of the trail.	Not listed	Public (USFS-Toiyabe and El Dorado National Forests)	California (Carson Route)	The trail needs additional marking and trailhead interpretation. There is a Trails West marker nearby.

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195	East Shore Caples Lake	Alpine	CA	Placerville	There are beautiful swales between Carson Pass and the east shore of Caples Lake. The trail leads through meadows and forests, but California Highway 88 crosses it in four places before the trail descends a steep slope to the lakeshore. In pioneer days, Caples Lake was a large meadow crossed by streams flowing into two small lakes. Many emigrant diaries describe resting here before starting the second and final ascent of the Sierra Nevada. One can see where the trail begins its climb up the mountain and over the Perpetual Snow Bank to West Pass and Covered Wagon Summit.	Not listed	Public (USFS- El Dorado National Forest)	California (Carson Route)	Highway widening and off-highway parking were planned a few years ago but the project was stopped because it would have destroyed swales and the vista from Covered Wagon Summit The site needs interpretation.
196	West Shore Caples Lake	Alpine	CA	Placerville	Wagon trains came up from the meadows now covered by Caples Lake and began their final ascent of the Sierra Nevada from here. Emigrant Summit National Recreation Trail goes west from this point up to Covered Wagon Summit, West Pass, and Melissa Coray Peak. The trail continues to follow the Carson Route on Squaw Ridge, goes west to the old Plasse Trading Post, and on to Tragedy Spring (past the Maiden's grave), Leek Springs Road (Mormon Emigrant Trail Road), and Placerville.	Not listed	Public (USFS- El Dorado National Forest)	California (Carson Route)	Evidence of use by mountain bikers has recently been found.
197	Emigrant Valley	Alpine	CA	Placerville	This valley was the halfway resting point, where livestock could be refreshed before the final climb up Covered Wagon Summit to West Pass and "California." Some pioneer diaries refer to this area and speak of stopping for lunch here while waiting their turn to ascend the summit. In 1853, there was literally a "traffic jam" here with wagons waiting in line. In his 1849 diary, Jasper Hixson comments on looking up and seeing large crows silhouetted against the snow banks near the summit. He later realized that these were wagons.	Not listed	Public (USFS- El Dorado National Forest)	California (Carson Route)	This multiple use area serves hikers, horseback riders, and skiers. The site needs interpretation of the California Trail. Possible development of another ski run across the face of the mountain may impact the site. Oregon-California Trails Association volunteers work with the ski resort to call attention to trail preservation and to inform skiers of this historic area.
198	Covered Wagon Summit/West Pass	Alpine	CA	Placerville	At 9,600 feet elevation, this is the summit of the Sierra Nevada on the Carson Route of the California Trail. When the pioneers reached this point, most felt they had arrived in California. They could look across the west slope of the Sierra Nevada and on a clear day see Mount Diablo in the San Francisco Bay area. The viewscape to the west remains essentially as it was in pioneer times. The trail west of Covered Wagon Summit is located primarily under a dirt road, opened after World War II for use by campers and hunters.	Not listed	Public (USFS- El Dorado National Forest)	California (Carson Route)	Mountain bikers and four-wheel-drive vehicles use the road west of the summit. Others access the relatively pristine east slope of the California Trail. An interpretive wayside is needed at the top of the pass. Trails West has placed a marker at the site.
199	Plasse Trading Post	Amador	CA	Placerville	The trail leads from West Pass along Squaw Ridge to the site of a trading post on the edge of the Mokelumme Wilderness. Remains of this post and two marked, but unidentified, emigrant graves can be located at the site.	Not listed	Public (USFS- El Dorado National Forest)	California (Carson Route)	None known.
200	Melissa Coray Peak	Amador	CA	Placerville	In 1848, veterans of the Mormon Battalion left California for Salt Lake City. In crossing the Sierra Nevada from west to east, they opened the Carson branch of the California Trail. The new route was described to west-bound pioneers they encountered during their journey up the Humboldt River. Melissa Coray accompanied her husband, a member of the Mormon Battalion, on their trip west to California in 1846. She was the only woman in the company that blazed the Carson Pass Trail in 1848. In 1993, this peak was named in her honor and also for all pioneer women on the California Trail.	Not listed	Public (USFS- El Dorado National Forest)	California (Carson Route)	There is a remote weather station located on top of the peak. There was talk about moving it elsewhere, but nothing has been done. Motor bike tracks have been seen on this peak.

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201	Tragedy Springs	El Dorado	CA	Placerville	Tragedy Spring was named by Henry Bigler. Mormons, who had been at Sutter's Mill when gold was discovered, opened the Carson Trail while blazing a new route over the Sierra. They sent three scouts ahead to find a pass, but the men never returned. Upon reaching this hillside, a grave was discovered that contained their bodies. The names of the three men (Daniel Browett, Ezrah H. Allen, and Henderson Cox) were cut into a red fir tree. This section is on display at the Marshall Gold Discovery Museum in Coloma. Along the trail west of the spring (which is covered by a wooden enclosure) is the stump of a dead tree with a blaze and the inscription "P. R. Wright, Aug. XIX, Second Company." Sgt. Phineas R. Wright was a member of another Mormon party that followed the first group during the summer of 1848, and the date matches current research.	Not listed	Public/ Private	California (Carson Route)	Nothing is being done to preserve the Wright stump. Due to vandalism, the spring outlet in the parking area has been capped. Some years ago, a section of trail leading from Tragedy Springs Meadow to the spring itself was destroyed when a water line was installed for nearby summer cabins. A few rocks still show marks from wagon tires.
202	Leek Spring Valley	El Dorado	CA	Placerville	Leek Spring Valley was an important emigrant camping area on the Carson Route of the California Trail.	Not listed	Private	California (Carson Route)	None known.
203	Brockliss Bridge Crossing	El Dorado	CA	Placerville	The Brockliss Bridge was built in the late 1850s and used by emigrants, freighters, stagecoaches, and the Pony Express.	Eligible	Public (USFS- El Dorado National Forest)	California (Johnson Cutoff), Pony Express	A new bridge needs to be constructed to provide a continuous route for the Pony Express. Wildfires and logging may damage the viewshed. The site has significant potential as an interpretive site.
204	Union House	El Dorado	CA	Placerville	This was the site of a way station (not related to the Pony Express) and the junction of the Johnson Cutoff/Pony Express route and the Mormon-Carson Trail.	Not listed	Private	California (Carson Route and Johnson Cutoff)	None known.
205	Sutter's Fort	Sacramento	CA	Sacramento	Sutter's Fort has been reconstructed at its original location. It commemorates John Sutter's creation of the "kingdom of New Helvetica" near the confluence of the American and Sacramento rivers. Following the discovery of gold on the south fork of the American River in 1848, Sutter's empire collapsed in the chaos of the rush for wealth, but Sacramento grew up between the fort and the river. For many, Sutter's Fort represented the end of the California Trail. The fort is of adobe-stucco construction and takes up the better portion of a large city block.	California State Historical Landmark.	Public (California Department of Parks and Recreation)	California (Carson Route)	Sacramento Area State Parks maintains the replica fort and provides exhibits and living history interpretive services. Most of the interpretation is from John Sutter's point of view and does not emphasize the oppression of native California tribes who operated the fort.
206	B.F. Hastings Building	Sacramento	CA	Sacramento	The Pony Express route follows J Street, passing through the city of Sacramento, heading directly to the B. F. Hastings Building, which served the Pony Express. Old Sacramento includes two Pony Express historic sites—the B.F. Hastings Building and a Pony Express statue. Other points of interest are found along the urban corridor, which is well marked.	Listed (Old Sacramento Historic Area)	Public (California Department of Parks and Recreation)	Pony Express	The B.F. Hastings Building has sustained considerable water damage. It is closed to visitation and needs major structural stabilization.
207	Fernley Ruts	Washoe, Lyon	NV	Reno	An extensive sand flat north of Fernley contains a two-mile long segment of ruts. Many artifacts have been located in this area, because when the exhausted emigrants reached the edge of the Forty-mile Desert, they abandoned as many of their possessions as possible.	Not listed	Public/Private	California (Truckee Route)	Currently private developers are negotiating with BLM to acquire these sand swales for an industrial park.
208	Dog Valley Overlook and Slide	Sierra	CA	Portola	The trail crested at First Summit and dropped down a steep slide into beautiful Dog Valley. Today, a shallow eroded slide covered by thick underbrush marks the descent. There are many diary descriptions of Dog Valley. In 1849, Wakeman Bryarly wrote, "We opened upon a beautiful little valley with a very steep hill to descend to it. . . . This valley is oval in shape and had plenty of good grass and water in it." Another emigrant said they had, "slid down the mountain like otters."	Not listed	Public (USFS- Toiyabe National Forest)	California (Truckee Route)	None known.

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209	Donner Camp Site	Nevada	CA	Truckee	The George and Jacob Donner families and their teamsters (about 20 people) spent the winter of 1846-47 at a campsite near Alder Creek. Due to injuries and a broken wagon, they could not reach the Donner Lake site, where the rest of the Donner-Reed Party wintered, six miles west. They were unable to build cabins and spent the winter under makeshift tents and quilts. Most of the people at this camp perished. The historic environmental setting is almost pristine.	National Historic Landmark	Public (USFS-Tahoe National Forest)	California (Truckee Route)	None known. The USFS has developed interpretive signs along a handicapped-accessible trail and there is a picnic area nearby, but there is some question about the camp's actual location.
210	Donner Memorial State Park	Nevada	CA	Truckee	About 60 members of the Donner-Reed Party spent the winter of 1846-47 near Donner Lake in three hastily constructed cabins. The Murphy cabin site is protected by the state park. The Breen and Graves cabin sites can be approximately located by diary descriptions but appear to be under state highway or private developments. The park contains a monument, museum, and a walking trail to the Murphy cabin site. The viewshed is not pristine, but this is an important place in trail history.	Not listed	Public	California (Truckee Route)	None known.
211	Donner Pass	Nevada	CA	Truckee	The Elisha Stevens Party, accompanied by mountain men Caleb Greenwood and Isaac Hitchcock, first took wagons into California over Donner Pass in November 1844, thus earning credit for the first successful wagon crossing of the Sierra Nevada. In 1846, Edwin Bryant wrote, "Standing at the bottom and looking upwards at the perpendicular . . . granite cliffs, the observer . . . would doubt that man or beast ever made good a passage over them." The Donner Party and their rescuers used Donner Pass in 1846. It was also used by foot and horseback traffic, even after the Roller Pass route opened in 1846. After veterans of the Mormon Batallion discovered a route over West Pass in 1848, the Carson Route became the preferred course for wagon travel. The Central Pacific built the first transcontinental railroad over Donner Pass, and today, I-80 runs nearby. Despite the impact of modern transportation, the pass still has a great viewshed.	Not listed	Public	California (Truckee Route)	None known.
212	Roller Pass	Placer	CA	Truckee	In late September of 1846, Caleb Greenwood found an easier route over the Sierra Nevada. He led his party south of Donner Pass, up Coldstream Valley and Emigrant Canyon, and over the pass between Mt. Judah and Mt. Lincoln. Roller Pass, at 7,860 feet, was the highest pass on the Truckee Route. There are many rich diary descriptions that describe the difficulty of reaching the pass and the joy of arrival. The view from the top, which caused many emigrants to gaze in awe, has not been impacted by modern development. The original 1846 route went straight up the slope, using logs as "rollers" to help pull the wagons up the last 400 feet of the steep, 30-degree slope. The logs acted as a bearing for chains connecting multiple yokes of oxen at the crest with a wagon below. In 1847, the Charles Hopper Party cut a switchback into the hillside near the top of the pass to make the ascent easier and eliminate the need for the "roller." Sections of pristine trail survive on both routes. This trail continued to see use until the Dutch Flat Road was cut over Donnner Pass in 1852.	Not listed	Public (USFS)	California (Truckee Route)	None known. The top of the pass is marked by a USFS sign.
213	Bear Valley	Nevada, Placer	CA	Truckee	The Truckee Route descended into Bear Valley through Emigrant Gap and down a 30-degree slide, using whatever braking devises emigrants could invent. Halfway down, an old cedar stump bears deep scars from snubbing ropes. John Steel described his descent in 1850: "The wagons were then shoved off, when one after another thundered down over the rocks through a cloud of dust, into the valley below." The valley was characterized by wet, swampy areas on both sides of the river. The site was mentioned in emigrant diaries as a resting place for people and animals.	Not listed	Public/Private	California (Truckee Route)	None known.

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214	Mule Spring	Nevada	CA	Truckee	Lying at the head of a small meadow, Mule Spring was an emigrant campsite and the staging area for the Donner Party rescue. Heavy snow caused one of the relief parties to leave their mules here and continue eastward on foot.	Not listed	Public/Private	California (Truckee Route)	None known. The site is marked with a USFS sign.
215	Johnson's Ranch	Yuba	CA	Yuba City	Johnson's Ranch was the first settlement reached on the Truckee-Donner Trail prior to the gold rush. This site played an important role in the rescue of the Donner Party.	Not listed	Private	California (Truckee Route)	The site is so threatened with unauthorized use that all visitors have been barred.
216	Beckwourth Pass	Plumas	CA	Portola	The discovery of this pass by Jim Beckwourth led to the opening of the Beckwourth Trail in 1851. There is a good hiking route along eroded wagon ruts from a stone marker at the summit to a trail marker 0.25 miles west.	Not listed	Public (BLM)/ Private	California (Beckwourth Trail)	None known.
217	Willow Springs (West of Lassen's Meadows)	Pershing	NV	Eugene Mountains	Located some 10 miles from where the southern route to Oregon left the California Trail near the head of today's Rye Patch Reservoir, Willow Springs offered welcome relief to travelers. Alonzo Delano noted on August 15, 1849, that these small springs provided "the first draught of pure, cold water which we had drunk for many days." By September 15, Simon Doyle found "about 175 wagons there encamped waiting their turn to water their stock. The springs were so small that water could only be dipped up with a tin cup into the buckets and did not come in half as fast as it could be dipped out with one cup." From this spring the Applegate Trail headed southwest to cross Antelope Summit, and a later stage route veered northwest over Imlay summit.	Listed	Private	California (Applegate Trail)	None known.
218	Antelope Springs	Pershing	NV	Eugene Mountains	About a mile south of the trail, these three small springs were "mere drippings," but in 1849 "hollow reservoirs below each spring" let emigrants water their animals. The view of "ragged, barren mountains" with "not a blade of grass to be seen" gave travelers a hint of the ordeal they were to experience while crossing to Black Rock Springs. The marked grave of Susan Coons, who died here in childbirth in 1860, is nearby.	Listed	Private	California (Applegate Trail)	Efforts should be continued to protect and interpret trail resources. The spring should be fenced to protect it from stock. Water could be piped out to a stock tank.
219	Antelope Pass	Pershing	NV	Eugene Mountains	This is the first pass through which the emigrants traveled after leaving the Humboldt River. It was an easy passage. On August 16, 1849, Alonzo Delano wrote, "We pursued our way in a north-west direction up the gorge to the ridge [Antelope Range]. . . . We were upon the north-eastern rim of another barren sand-basin, in view of a broken country far below." The road from Antelope Pass to Rabbithole Springs is a primitive two-track with an evocative viewshed.	Not listed	Public (BLM)	California (Applegate Trail)	Mining operations intrude on the viewshed.
220	Kamma Pass	Pershing	NV	Eugene Mountains	Through this pass, emigrants approached Rabbithole Springs and the awesome Black Rock Desert. The exhausted, starved, and dehydrated oxen could hardly continue pulling the wagons. On September 22, 1849, Joseph Middleton described their plight: "People are driving their poor exhausted cattle behind or sometimes before their wagons—and when they lie down from exhaustion, they will sometimes wait a while for them to rest, at others they will beat them. . . . This is all an appalling desert of desolation . . . vestiges of the intensity of its power and heat being equalled only by its incomprehensible extent and magnitude." An impressive section of trail runs northwest from Kamma Pass, passing up and down the drainage draws of Painted Canyon. The multi-hued rock formation described by Alonzo Delano as "the most beautiful hills of colored earth I ever saw, with the shades of pink, white, yellow and green brightly blended" can still be seen on the western slope of the canyon.	Not listed.	Public (BLM)	California (Applegate Trail)	Mining operations intrude on the viewshed.

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221	Rabbithole Springs	Pershing	NV	Eugene Mountains	Rabbit trails led to this waterhole, where Lindsay Applegate found a “little puddle of water” in 1846. Emigrants later sank wells here and at nearby Barrel Springs that provided “cool, clear water but a little saline.” Animals suffered from a lack of both water and grass all along this stretch of trail, and during 1849 J. G. Bruff noted there “was scarcely space for wagons to reach the holes, for the ox-carcasses.” Alonzo Delano realized that instead of avoiding the desert, the Applegate Trail crossed “a more dreary and wider waste, without either grass or water, and with a harder road before us.”	Listed	Public (BLM)	California (Applegate Trail)	High recreational use of Black Rock Desert is a threat. Non-historic uses and mineral development threaten the integrity of this site. Efforts should be continued to protect and interpret trail resources.
222	Black Rock/Black Rock Springs	Humboldt	NV	Eugene Mountains	Volcanic Black Rock “looked like a mass of black cinders” and resembled “a blacksmith’s forge.” This “oasis in the desert” with its complex of impressive boiling springs was the first adequate source of water and grass on the 50-mile trek from the Humboldt River and the first water after the Black Rock Desert. The water irrigated about 20 acres of meadow and was “too hot for the hand,” but Joseph Middleton noted in 1849 that “the water when cold is good for drinking” and “tasted good to the thirsty traveller.” The 1852 route of the Nobles Trail left the Applegate Trail at Black Rock Springs and headed southwest to meet the 1856 Nobles route on Granite Creek.	Listed	Public	California (Applegate Trail, Nobles Trail)	Motorcycle use is probably damaging the desert near the site. Efforts should be continued to protect and interpret trail resources.
223	Deep Hole Springs	Washoe	NV	Gerlach	In 1853, J. B. Dreibelbis found “grass and water in abundance, of the very best quality,” at Deep Hole Springs. The springs were noted for their depth. Mary C. Fish noted in 1860 that “some of them have been sounded 75 feet and no bottom found.” Emigrants often stayed here for several days to prepare their stock to cross the Smoke Creek playa. Ladue Vary built a trading post here in 1856, and the original stone structure remains intact.	Not listed	Private	California (Nobles Trail)	Mining, geothermal exploration, and recreational overuse of the area are all potential threats.
224	Bridge Creek/Nancy Allen Grave (1857)	Lassen	CA	Eagle Lake	Known to emigrants as Summit Creek, this heavily timbered campsite is the location of Nancy Allen’s 1857 grave. This is one of the few extant emigrant graves and gravestones on trails in the Far West. Traveling near Bridge Creek in 1854, Lieutenant E.G. Beckwith commented “The nights are cold in the mountains, but during the day the sun is hot, making the shade agreeable. Our path continued to-day through the same dense forest.”	Not listed	Public	California (Nobles Trail)	Logging threatens the site.
225	Pine Creek Valley	Lassen	CA	Burney	The three miles between the northern and southern junctions of the Nobles and Lassen trails include a unique section of emigrant trail. Traffic here ran north on the Nobles and south on the Lassen. Pristine ruts are associated with this important camping area. Camped on Pine Creek in 1850, Mary C. Fish reported, “There is plenty of water and grass in places and timber in inexhaustable quantities consisting of pines, spruce, cedar &c.”	Not listed	Public	California (Nobles Trail, Lassen Trail)	Logging threatens the site.
226	Manzanita Chute	Shasta	CA	Burney	This important section of trail passed north of Manzanita Lake through an “extensive plain of Manzanita” that was “full of wild bees.” It is a rough, two-track jeep trail that has been kept open since emigrant days and is well worth preserving.	Not listed	Public/Private	California (Nobles Trail)	Logging is an immediate threat.

NO	SITE NAME	COUNTY	STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	TRAIL	THREATS TO RESOURCES/ VISITOR SERVICES
227	Double Hot Springs	Humboldt	NV	High Rock Canyon	These two azure “large round sinks” marked the end of a series of springs that extended over five miles from Black Rock. Alonzo Delano stopped here on August 18, 1849: “On looking around us we saw a beautiful plat of green grass, covering about an hundred acres, which was irrigated by the water of several hot springs. Two of these were very large, and from them ran a rivulet of sufficient capacity to turn a mill; but fifty rods below the brook was too hot to bear the hand in. The water in the springs was clear and deep, and hot enough to boil bacon. We boiled our coffee by setting the coffee-pot in the water.” The scalding waters of Double Hot Springs resulted in occasional tragedies for unwary overlanders and are still dangerous. Emigrants dug ditches 0.25 mile long to let the water run off and cool down. The water was still very hot at the far end of those ditches.	Listed	Private	California (Applegate Trail)	Efforts should be continued to protect and interpret trail resources.
228	Lassen and Clapper Burial Site	Humboldt	NV	High Rock Canyon	*The Mountain Messenger* reported on April 30, 1859 that Paiutes had killed Peter Lassen and a companion, later identified as Edward Clapper, at Black Rock Springs while the Danish emigrant and trail-promoter was on a prospecting trip. Later, H. H. Bancroft thought “possibly white men disguised as Indians” committed the murders. Both bodies were reportedly buried in Clapper Canyon. Lassen’s body was later exhumed and buried in a more elegant grave. In the early 1990s, what is believed to be Clapper’s remains were found and reburied near Susanville, next to Lassen’s grave.	Listed	Public (BLM)	California (Applegate Trail)	Nonhistorical uses and mineral and other development threaten the integrity of this site. An interpretive monument has been installed by the Oregon California Trails Association and the BLM.
229	Mud Meadows	Humboldt	NV	High Rock Canyon	At Mud Meadows in 1849, P. F. Castleman noted “several Springs some two or three of them cold and all the others warm,” some “blood warm” and others “almost scalding hot.” The springs feed several hundred acres of level plain covered “with grass of several species mostly co[a]rse swamp grass.” William Swain reported, “Our teams are growing weak very fast.” Here emigrants began to have frequent encounters with Indians. In 1847, Lester Hulin wrote, “These prowling indians are as hard to find as the deer.”	Listed	Public/Private	California (Applegate Trail)	Efforts should be continued to protect and interpret trail resources.
230	Fly Canyon Wagon Slide	Humboldt	NV	High Rock Canyon	J. G. Bruff thought he had reached “the jumping-off place” when he came to this rocky, 45-degree descent of about 200 feet into Fly Creek near High Rock Lake. Emigrants lowered their wagons with ropes, locked the wheels with chains or poles, or added an extra team of oxen to keep from pitching down this “very precipitous rocky descent.” Although most efforts were successful, occasionally they lost control and wagons crashed to the bottom of the canyon. “It was truly frightful,” wrote A. E. Garrison.	Listed	Public	California (Applegate Trail)	Emigrant writings in Fly Canyon are subject to defacement. Efforts should be continued to protect and interpret trail resources.
231	High Rock Canyon	Washoe	NV	High Rock Canyon	This marvelous 21-mile canyon provides an exceptional trail experience. In 1843, John C. Fremont noted High Rock Canyon’s “stupendous and curious rocks, which at several places so narrowed the valley, that scarcely a place was left for the camp.” Indian Cave, Register Rock, Stevens Camp, and Stevens Springs are important sites associated with the canyon. At its upper end, an excellent mile-long hike winds through this unique, narrow, high-walled canyon — “a singular place to travel through.”	Listed	Public (BLM)	California (Applegate Trail)	None known. There is a Trails West marker at the entrance to Upper High Rock Canyon.
232	Bruff’s Singular Rock	Washoe	NV	Vya	J.G. Bruff sketched this “Singular Rock on left of road” by today’s Massacre Ranch on September 19, 1849. Near this large volcanic rock formation, he noted an “old codger” who “was in the habit of catching loose animals; and appropriating them to his own use, without further enquiry.” Trail ruts pass in front of the rock.	Not listed	Public (BLM)	California (Applegate Trail)	None known.

NO	SITE NAME	COUNTY	STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	TRAIL	THREATS TO RESOURCES/ VISITOR SERVICES
233	Seyfeyth's Hot Springs/ Surprise Valley	Modoc	CA	Cedarville	Upon entering Surprise Valley, emigrants encountered hot springs between Upper and Middle Alkali lakes. After the long drive from the Humboldt River, this lush valley provided an excellent area to recruit their stock. Alonzo Delano found "good grass and plenty of sage for firewood." Some trains spent a week or more resting and letting their starved, exhausted animals feed on the lush grass. In 1849, Simon Doyle described the "Hot Springs in Last [Surprise] Valley. . . . We camp tonight in a valley or sage plain laying between the two main ridges of mountains, from 20 to 25 miles wide extending N. & S. as far as the eye can reach. The steam from Boiling Springs is visible in many places."	Not listed	Public (BLM)/ Private	California (Applegate Trail)	None known. A Trails West marker is located here.
234	Fandango Pass (Lassen's Pass)	Modoc	CA	Cedarville	The east base of Fandango Pass was an important staging area for the "toilsome ascent" that often required double-teaming. From this Sierra Nevada crossing, Alonzo Delano described, "The view of mountain scenery is grand and beautiful. Below, on the west, is a broad, green, and grassy valley [Fandango Valley], abounding in springs. . . . At the extremity of the valley, is seen the broad, beautiful water of Goose Lake, adding a charming variety to the scene." P. F. Castleman looked west in 1849 to see "a great many trains encamped near the margin of this valley," making "the grandest scene." Blazes and deep swales survive from the earliest trail days.	Not listed	Public (BLM, USFS-Modoc National Forest)/ Private	California (Applegate Trail)	None known. There is an Applegate Trail Coalition interpretive wayside and a Trails West marker at Fandango Pass.
235	Conical Rocks	Modoc	CA	Cedarville	These very visible, numerous, and unique conical rock formations are located where the Lassen Trail entered the valley of the North Fork of Pit River. These formations were often mentioned in emigrant diary accounts. On September 26, 1849, Andrew Loop Murphy wrote, "Striking the river this morning I noticed a cluster of singular shaped rocks sticking up in spires of a conical shape 20 to 30 feet high."	Not listed	Private (XL Ranch Indian Reservation)	California (Lassen Trail)	None known. A Trails West marker is located at the base of these rocks.
236	Hanging Rock	Modoc	CA	Modoc	This towering cliff on a bend in the rugged Pit River Canyon was often noted by passing emigrants. On October 8, 1849, Israel Lord recorded in his journal, "On the east is a smooth overhanging basalt bluff, which is 40 or 50 rods long and some (I know not how many) hundreds of feet high. I . . . ascended to the summit. It was a rich scene . . . trees, trees, trees, in all directions—everywhere, except on the beautiful valley bottom, which winds and turns and twists among the mountains, garnished with the river's silver stripe."	Not listed	Public (USFS-Modoc National Forest)	California (Lassen Trail)	None known. The USFS plans to make the Pit River Canyon an interpretive hiking trail.
237	Feather Lake	Lassen	CA	Burney	Feather Lake, so named for the great quantities of waterfowl feathers around the lake, was a major camping area near the south crossroads of the Lassen and Nobles trails. Often described in emigrant diaries, this grassy, mile-long pond can still be found about five miles south of the Bogard Ranger Station off California Highway 44. Alonzo Delano found the water unappetizing in 1849: "Came to a broad valley, near a lake of water, so filled with insects and animalculae, that a cupfull could not be dipped up without having multitudes in it. It seemed as if every insect that lives in water was there. The only way it could be used was by digging wells near the margin, and letting the water filter through the ground, and then it proved to be sweet and good."	Not listed	Public (USFS-Lassen National Forest)	California (Lassen and Nobles Trails)	None known.

NO	SITE NAME	COUNTY	STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	TRAIL	THREATS TO RESOURCES/ VISITOR SERVICES
238	Duck Lake	Lassen	CA	Susanville	This major camping area was often described in emigrant diaries. It is located about 4.5 miles north of Westwood, just off County Road A21. Charles Glass Grey camped at Duck Lake on September 20-21, 1849. He wrote, “We came to a small lake, being the head waters of the north fork of ‘Feather River,’ around which the grass was excellent & the water very good. A great number of teams were encamp’d nearby. . . . Washed clothes, mended, roasted coffee, clean’d my gun, read Shakespeare & took a nap! Last night there were a tremendous number of fires kindled in every direction by the numerous camps & such shooting of guns & pistols & yelling & laughing I never heard.”	Not listed	Private (but surrounded by USFS land)	California (Lassen Trail)	None known.
239	Deer Creek Meadows	Tehama	CA	Lake Almanor	Emigrants often lay over in this valley to recruit their stock and store grass before starting the 50-mile “mountain desert” route to Lassen’s Ranch in the Sacramento Valley. Henry St. Clair described the general condition of the migration on September 17, 1849: “This being the general recruiting place, there is a great many wagons and cattle here. Men are getting so near worn out that we, with an ox team, travel as far in a week as foot-men, mule packers, horses or mule teams. The teams are nearly worn out as well as the men. Many are suffering for provisions here now.” The meadow was also the site of major government relief efforts for straggling, destitute emigrants in late September 1849.	Not listed	Private	California (Lassen Trail)	Owners are receptive to the placement of interpretive signs.
240	The Narrows	Tehama	CA	Lake Almanor	Emigrants looked down from this narrow dividing ridge into the deep canyons of Deer and Mill creeks. To the southwest, the ridge drops off precipitously 1,300 feet to Deer Creek, and to the northwest, the drop is 1,700 feet to Mill Creek. Alonzo Delano described the area in 1849: “The road ascends to a high ridge, with gulfs on each side more than a thousand feet deep, and in some places only wide enough for the road, and seldom over fifty rods. The country around is a confused broken mass of mountains, to the utmost limit of vision . . . with stupendous out-crops of slate & white quartz.”	Not listed	Public (USFS-Lassen National Forest)	California (Lassen Trail)	A Trails West marker is located at the Narrows.
241	Bruff’s Camp	Tehama	CA	Lake Almanor	This area was a camp for J. Goldborough Bruff and a few fellow emigrants from October 1849 to April 1850. It contains the graves of the Alford family—Ormond Alford, 54; William M. Alford, 19; Lorenzo D. Alford, 15; and John W. Cameron, 22. They were killed in their sleep by a falling tree while camped here. Bruff described the incident on October 21, 1849: “We were awakened by a man, crying at the top of his voice,—‘Hallow, here! Turn out and assist, a tree has fallen on a couple of tents, and killed and wounded several persons!’ We raised the bloodstained tent, cut it off from the chords, and extricated the broken tent-poles, etc. And there lay a shocking site!—An aged, grey headed man, and his grown son, with their hips buried in the ground, and their ghastly eyes turned up in death! Next another son, and beside him, a young man, his comrade, slowly dying in agony, with broken legs and mutillated bodies.”	Not listed	Private	California (Lassen Trail)	The site is now protected by the private landowner and is marked by three historical markers.

NO	SITE NAME	COUNTY	STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	TRAIL	THREATS TO RESOURCES/ VISITOR SERVICES
242	Steep Hollow	Tehama	CA	Lake Almanor	Steep Hollow was the last major obstacle for emigrants on the Lassen Trail before reaching Lassen's Ranch, about 12 miles ahead. The ridge they had been following narrowed down to such a sharp edge that wagons had to detour south down a very steep, V-shaped ravine and drop almost 400 feet in elevation. They climbed almost as steep a slope to regain the ridge. Archeological site surveys have located numerous emigrant artifacts at the bottom of the hollow, where wagons had to be abandoned. Elijah Preston Howe described his journey through the hollow on September 24, 1849: "We descended a very steep long hill, with deep dust and some rock into 'Deep Hollow' [Steep Hollow]. This place is very rocky and uneven at the foot of the hill, so that it is difficult to find room for the waggons to stand which were crowded into this place, and stopped for water. The road ascends the opposite very bad hill immediately from the foot of the one we came down. . . . In the evening we doubled teams and got up the hill, having very hard pulling."	Not listed	Public (USFS-Lassen National Forest)	California (Lassen Trail)	Trails West markers locate the descent and ascent at Steep Hollow.
243	Fiddlers Green	Modoc	CA	Tule Lake	The spring at Fiddlers Green on the edge of today's Clear Lake Reservoir provided a camping spot for emigrants and later for volunteers sent to help wagon trains through Modoc country. It served as army headquarters and was site of the Indian surrender during the Modoc War. Later, it was Jesse Carr's ranch where Jesse Applegate had a home. Some of the old emigrant road is under the waters of Clear Lake.	Not listed	Public	California (Applegate Trail)	None known.
244	Bloody Point	Modoc	CA	Tule Lake	The history of Bloody Point at Tule Lake is complex and controversial. Peter Bernett's Oregonians left the southern road here on their way to California in 1849. Modoc Indians attacked several wagon trains in 1852 and killed a number of emigrants; witnesses claimed they entirely destroyed an earlier party. Militia companies retaliated and killed many Modocs; casualties on both sides may have reached 150. The historic Indian camp and petroglyphs between Bloody Point and the nearby Natural Bridge are under jurisdiction of Lava Beds National Monument.	Not listed	Private	California (Applegate Trail)	None known.

Appendix G. Oregon National Historic Trail: High-Potential Segments

APPENDIX G. OREGON NATIONAL HISTORIC TRAIL—HIGH-POTENTIAL SEGMENTS

NO	SEGMENT NAME	LENGTH (miles)	COUNTY/ STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	THREATS TO RESOURCES/ VISITOR SERVICES
1	St. Marys-Red Vermillion Crossing	16	Shawnee, Pottawatomie KS	Manhattan	This segment begins three miles northwest of present-day Rossville and follows U.S. Highway 24 along the north side of the Kansas River to St. Marys Mission. From St. Marys, Oregon Trail Road follows the actual route of the Oregon-California Trail along the foot of the Kansas River Bluffs, past Oregon Trail Park, to Red Vermillion Crossing. This 11 miles of twisting gravel road has been graded, but its alignment has not been significantly changed. The Kansas River flood plain was swampy, forcing the emigrants to follow a path along a bench at the edge of the bluffs. Edwin Bryant eloquently described his day's travel on May 22, 1846: "The trail along which we have traveled today . . . runs over a high undulating country, exhibiting a great variety of rich scenery. As the traveler rises the elevated swells of the prairie, his eye can frequently take in at a glance, a diameter of 60 or 80 miles of country, all clothed at this season with the deepest verdure and the most luxuriant vegetation."	Vermillion Creek Crossing is listed	Private	None known. Oregon Trail Park has a shelter house and restroom.
2	Fort Laramie to Warm Springs	14	Goshen, Platte, WY	Torrington	The trail remains virtually intact and continuous, except when crossed by pipelines and county roads, from the climb out of the Laramie River Valley to Mexican Hill. Huge swales are visible in places; the junction of various branches is clearly visible where the Bluff and River routes join east of Mexican Hill.	Not listed	Public (Wyoming National Guard)/Private	National Guard activities near Guernsey impact the area.
3	Prospect Hill	3	Natrona, WY	Casper	Just west of Willow Springs is a low ridge called Prospect Hill. Here emigrants climbed 400 feet to gain their first sight of the Sweetwater Mountains to the west. The view, or prospect, of the gentle valley gave travelers hope for better water and an easier road ahead.	Determined eligible	Public (BLM)/ Private	Mineral development threatens the historic viewshed. There is a BLM interpretive panel at the top of the hill.

NO	SEGMENT NAME	LENGTH (miles)	COUNTY/ STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	THREATS TO RESOURCES/ VISITOR SERVICES
4	South Pass (Horse Creek to Little Sandy Crossing)	145	Natrona, Carbon, Fremont, Sublette, Sweetwater, WY	Casper, Bairoil, Rattlesnake Hills, Lander, South Pass, Farson	The quality of the resources and the visual experience make South Pass one of the most impressive segments on the entire trail. It starts where the trail fords Horse Creek and heads southwest to cross Wyoming Highway 220 a half mile northeast of Steamboat Rock. The segment continues southwest past present-day Pathfinder Reservoir to strike the Sweetwater River south of Saleratus Lake. Following the banks of the Sweetwater, the route heads generally west—past Independence Rock; around Devil's Gate; past Soda Lake, Split Rock, and Castle Rock—to Three Crossings. The segment follows the main trail along the Sweetwater, fords the river three times within two miles at Three Crossings, passes Names Rock, and fords again at Fifth Crossing. Some emigrants chose to take the Deep Sand Route to the south to avoid these river crossings. The segment next passes Ice Slough; crosses Warm Springs Creek; fords the Sweetwater three more times at Sixth, Seventh, and Eighth crossings; and arrives at the foot of Rocky Ridge. The trail climbs away from the Sweetwater River to cross the high, barren, and rocky ridgeline of Rocky Ridge. Passing north of Lewiston Lakes and crossing Strawberry, Rock, and Willow creeks, the trail leaves the Sweetwater River at the Ninth Crossing—a site known as Burnt Ranch. The route then climbs past Twin Mounds and crosses the Wind River Range and the Continental Divide at South Pass. On his way to Oregon in 1854, Winfield Scott Ebby waxed poetic at his July 10th campsite on the Sweetwater River: "This is the last night I shall sleep on the waters that flow to the rising sun I shall soon place this great barrier [South Pass] between me & the home of My Youth Well Good Bye 'Westward the Star of Empire takes it[s] way' While I have been Traveling on Streams that mingle their waters with those that flow from the Hills & valleys of 'Home' I have not felt as if I was in reality leaving that home, placing so great a distance between us Now I say 'Adieu adieu my native land' 'Yon Sun that sets behind the Sea, We follow in his flight,' Farewell, awhile to him and thee My nat[iv]e land Good Night' ." Descending into the Pacific drainage, the segment passes Pacific Springs and Plume Rock, crosses Dry Sandy Creek, and follows the north side of Dry Sandy Creek past Parting of the Ways to end at Little Sandy Crossing.	South Pass is a National Historic Landmark	Public (BLM)/ Private	Mineral exploration around Lewiston and Dickie Springs has been a low-level threat to the trail and its viewshed for many years. If large-scale development is proposed, the threat would increase greatly. Ranchette development on the upper Sweetwater River near Split Rock is a concern.
5	Big Sandy to Green River	50	Sweetwater, WY	Farson, Rock Springs	This segment begins at the Big Sandy Crossing near present-day Farson, Wyoming. It follows unimproved roads southwest along the north side of the Big Sandy River. The segment ends at the Lombard Ferry crossing of the Green River, three miles north of the confluence of the Big Sandy and Green rivers.	Not listed	Public (BLM, BOR)/ Private	Access to the eastern end of the segment is possible from Wyoming Highway 28 at a state historical marker. The segment crosses public and private lands. Visitors should acquire written permission from private landowners before entering private land. Access is not continuous along the trail by automobile. Travelers may park their vehicles and hike portions of the trail.
6	Bear River Divide	31	Uinta, Lincoln, WY	Kemmerer	The Oregon-California Trail follows two-track and ranch roads for 31 miles as it crosses the rugged Bear River Divide. The segment begins where the trail crosses U. S. Highway 189 near Cumberland Gap, crosses Cumberland Flats, ascends Little Muddy Creek and Chicken Creek, crosses the Bear River Divide, descends Bridger Creek, and ends at Wyoming Highway 89.	Not listed	Public (BLM)/ Private	None known.

NO	SEGMENT NAME	LENGTH (miles)	COUNTY/ STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	THREATS TO RESOURCES/ VISITOR SERVICES
7	Hagerman Fossil Beds	4	Twin Falls, ID	Twin Falls	This short segment within the boundaries of Hagerman Fossil Beds National Monument begins one mile west of Upper Salmon Falls at the mouth of Yahoo Gulch, where emigrants camped and grazed their stock. It climbs a ridge adjacent to the Snake River, which features a narrow spot that Jesse Applegate called the Devil's Backbone. On parts of the ridge, two parallel ruts are visible. The steep section near the top of the ridge has three rut segments. Artifacts from trail segments are in the museum collection at the park.	Not listed	Public (NPS)	Natural erosion continues to impact trail remnants. There is a wheelchair-accessible interpretive trail to the overlook at the top of the ridge. Hagerman Fossil Beds National Monument maintains a visitor center and museum in the town of Hagerman.
8	North Trail	83	Elmore, Ada, ID	Glenns Ferry, Mountain Home, Murphy, Boise	The North Trail segment extends from the Twin Falls-Elmore County line to the outskirts of present-day Boise, Idaho, and contains the best overall stretch of Oregon Trail left in Idaho. The segment features scenery varying from the Snake River Valley in the south to the broken foothills southeast of Boise. The trail winds through rangelands and the foothills, at times passing through beautiful canyons and along the edges of mountain streams. Over two-thirds of the segment has relatively pristine trail ruts. About one-third of the segment follows dirt roads that have been laid directly on top of the Oregon Trail. The segment heads northwest across rangeland, following trail remnants and passing near Pilgrim Stage Station and the camping area at Little Pilgrim Gulch. The route crosses Black Mesa and fords the Snake River at Three Island Crossing. Leaving the Snake River Valley, the segment crosses Alkali, Cold Springs, Ryegrass, and Bennett creeks. It enters the foothills and passes Teapot Dome Hot Springs, Rattlesnake Station, Canyon Creek Station, Inscription Rock, and Ditto Station, where a branch of the Goodale Cutoff comes in from Fort Hall. The segment continues past Indian Creek Station and Blacks Creek Station before reaching its highest elevation at Bonneville Point and descending to the Boise River. It ends at an electrical substation on the southeast edge of Boise.	Not listed	Public (BLM, Idaho Department of Parks and Recreation, Idaho State Lands)/ Private	None known. Land on the southern approach to Three Island Crossing was recently purchased by the Nature Conservancy. It will be managed as a part of Three Island Crossing State Park.
9	Sinker Creek	18	Owyee, ID	Murphy	This segment crosses one of the driest, hottest, and dustiest stretches of the entire Oregon Trail. Emigrants who were forced to travel the South Alternate Route compared their appearance at the end of each day to a man who had been dipped into a flour barrel. The segment begins two miles northwest of Castle Butte and ends about four miles north of present-day Murphy, Idaho. The trail crosses the broken and arid mesas that stretch along the south bank of the Snake River, passing Wild Horse Butte, crossing Sinker Creek, and climbing Sinker Creek Butte. On August 27, 1853, Rebecca Ketchum described the steep climb out of Sinker Creek: "It was all the horses could do to draw the empty carriage. The other wagon they were obliged to unload before they could get up. We were an hour and a half getting up." Pristine ruts are still evident for most of the segment.	Not listed	Public (BLM)/ Private	None known.
10	Alkali Springs	13	Malheur, OR	Brogan	Starting at a point about six miles north of present-day Vale, Oregon, and continuing to Willow Springs Camp, the Oregon Trail survives as a dirt ranch road. Emigrants often stopped at midday at Alkali Springs, whose name indicates the quality of the only water in the 22-mile crossing from the Malheur River to Birch Creek.	Not listed	Public (BLM)/ Private	The segment needs adequate road signage and public access. There is a BLM interpretive wayside at Alkali Springs.

NO	SEGMENT NAME	LENGTH (miles)	COUNTY/ STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	THREATS TO RESOURCES/ VISITOR SERVICES
11	Ladd Canyon	2	Union, OR	Enterprise, La Grande	The Ladd Canyon Ruts extend for two miles as they climb up and over a high ridge that overlooks the Grande Ronde Valley to the northwest. As the emigrants crested this ridge, they were greeted with an excellent view of the fertile valley and the Blue Mountains beyond. After enjoying the view, they were forced to negotiate a difficult descent down into the valley along several switchbacks, for the hill was too steep for a direct descent. The best portion of the ruts are cut into this hill.	Not listed	Private	Preservation of resources on private land is a concern.
12	Blue Mountains	17	Union, Umatilla, OR	La Grande	This segment, stretching from the western edge of present-day La Grande, Oregon, northwest to the Mount Emily Interchange of I-84, includes many miles of ruts through the picturesque and heavily forested Blue Mountains. This was the first forested terrain the emigrants had encountered since leaving the rolling hills of Kansas. The trail became rougher as it wound up the mountains and through the forests, but the shade was welcome in the summer's heat, and wood and water were now plentiful.	Not listed	Public (Wallowa-Whitman National Forest, Hilgard Junction State Park)/ Private	Preservation of resources on private land is a concern. There are interpretive waysides at Hilgard Junction State Park and Blue Mountain Crossing Interpretive Park and a monument at Summit Road.
13	Emigrant Hill	4	Umatilla, OR	Pendleton	This segment includes the long descent from Deadman Pass to the Umatilla River Valley. In spite of the visual intrusion of the pipeline and the powerlines, this segment provides an excellent feeling for the landscape.	Not listed	Public (U.S. Forest Service)/ Private	Leasing land for grazing has impaired and continues to threaten trail resources.
14	Boardman	12	Morrow, OR	Hemiston	This segment stretches from the eastern boundary of the Boardman Bombing Range to Immigrant Road and includes traces of the Oregon Trail. This appealing landscape of rough sagebrush-covered desert is much as it must have been during the emigrant years.	Not listed	Public/Private	Military use restricts access to the trail.
15	Barlow Road	32	Wasco, Hood River, Clackamas, OR	Mount Hood	The segment begins at Barlow Gate, swings south around Mount Hood, and ends at the West Barlow Tollgate. Ruts remain along most of the distance, and the scenic qualities are exceptional. On September 7, 1853, Amelia Stewart Knight wrote a graphic description of her day's journey over the Barlow Road: "Traveled 14 miles over the worse road that was ever made up and down very steep rough and rocky hills, through mud holes, twisting and winding round stumps, logs, and fallen trees. now we are on the end of a log, now bounce down in a mud hole, now over a big root of a tree, or rock, then bang goes the other side of the wagon and woe to be whatever is inside. . . .These mountains are a dense forest of pine, fir, white cedar, or redwood, the handsomest timber in the world must be here in these Cascade Mountains."	Barlow Road Historic District	Public (US Forest Service)/ Private	None known.

Appendix H. Oregon National Historic Trail: High-Potential Sites

APPENDIX H. OREGON NATIONAL HISTORIC TRAIL—HIGH-POTENTIAL SITES

NO	SITE NAME	COUNTY	STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	THREATS TO RESOURCES/ VISITOR SERVICES
1	Upper Independence Landing (Wayne City)	Jackson	MO	Kansas City	Wayne City, a "paper city" on the south bank of the Missouri River about 3.5 miles north of Independence Courthouse Square, was the closest Missouri River landing to the town of Independence, but the climb up the bluffs was steep and tortuous. It rivaled the landing at Blue Mills during the 1830s and 1840s and that at Westport from the 1840s through the 1850s. It was very popular until the flood of 1844 washed away the landing.	Not listed	Private	Modern developments have altered the historic scene, and flooding has changed the landing dramatically. A small overlook at the north end of Cement City Road is fenced, but it needs additional interpretation.
2	Independence Courthouse Square Complex	Jackson	MO	Kansas City	The location of frenzied outfitting activity throughout the 1840s and early 1850s, Independence was the jumping-off point for the Santa Fe and Oregon trails. The town includes several historic buildings, monuments, and Independence Spring. As the place of convergence of early routes from the Mississippi Valley, this square was the last significant point of supply until the mid-1840s, when Westport also became an outfitting town. When J. Quinn Thornton visited Independence in 1846, he found "a great Babel of African slaves, indolent dark-skinned Spaniards, profane and dust-laden bullwhackers going to and from Santa Fe with their immense wagons, and emigrant families bound for the Pacific, all cheerful and intent on their embarkation upon the great prairie wilderness."	Several structures are listed	Public (City of Independence)	Modern development may alter the historic scene.
3	Santa Fe Trail Park Ruts	Jackson	MO	Kansas City	The Oregon Trail/Independence Road is visible as a swale south of this Independence city park, near Santa Fe Road and 29th Street. There are intermittent swales and traces in an undeveloped field owned by the RLDS Church, up through a couple of backyards to the southwest, and ending on the east side of 3122 Santa Fe Road.	Listed	Public	Future development may impact the historic scene. The site needs additional interpretation.
4	Eighty-fifth Street Ruts	Jackson	MO	Olathe	A preserved trail swale, rare in this urban setting, can be found in a grassed lot at Eighty-fifth and Manchester, heading southwest. This alignment is the only one of up to three alternates in the area that has traces remaining.	Not listed	Private	Some interpretation may be possible with the owners' consent.
5	Heart (Hart) Grove Campground	Jackson	MO	Olathe	Both Oregon and California-bound emigrants traveling the Independence Road used this campground on Heart Grove Creek, a tributary of the Big Blue River. Many 1846 emigrants camped here, including the families of George and Jacob Donner and James Frazier Reed. Hiram O. Miller, traveling with the Donner-Reed Party, made this brief journal entry in 1846: "May 14 15 Camped at 'Heart Grove' Jackson County near the Indian line twenty two miles from Independence on the Big Blue."	Not listed	Private	The area has been severely impacted and there are no extent remains of the campsite or trail. Some interpretation should be done on the site.
6	Minor Park/Red Bridge Crossing of the Big Blue River	Jackson	MO	Olathe	This 27-acre park in a beautiful setting and landscape has both recreational and historic overtones. Its prominent feature is a gentle swale that cuts across the park, obviously created by wet wagons and teams pulling up the hill after crossing the Big Blue River. Emigrants heading west from Independence encountered their first river crossing at this site, a preview of the many rivers and streams to be negotiated on their long journey. On May 8, 1846, Virgil Pringle "Went 12 miles to the Blue and encamped, it being too high to cross. Another wagon capsized at the encampment. . . . No injury to persons or property." The next day his party "Crossed the Blue soon in the morning." The crossing was initially a ford; Red Bridge was constructed in 1859.	Listed	Public (Kansas City Parks and Recreation)	The ruts and swales need to be interpreted.

NO	SITE NAME	COUNTY	STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	THREATS TO RESOURCES/ VISITOR SERVICES
7	New Santa Fe	Jackson	MO	Olathe	This village, also called Little Santa Fe, had its beginnings in the 1840s and was incorporated in 1852. It was the last place for emigrants from Independence to buy supplies before entering Indian territory. Although never an important outfitting town, it was mentioned by many diarists. New Santa Fe grew up at the western edge of Missouri. Trading stores were established here, especially to sell liquor, which was prohibited in the Indian lands west of Missouri. A cemetery, historical marker, two homes from the trail era, and a faint trail swale are all that remain of this site today.	Not listed	Private (New Santa Fe Church)	None known. There is a Santa Fe Trail DAR marker at 122nd and State Line Road, one block west of the church and cemetery. An interpretive wayside exhibit is planned for the site.
8	Lone Elm Campground	Johnson	KS	Olathe	Located at the head of Cedar Creek, the 40-acre Lone Elm Campground was the first campground in Indian country for parties following the Santa Fe Trail/Independence Road from Independence, Missouri. It was first known as Round Grove but was later called Lone Elm, named for its single surviving tree. The site was mentioned in many journals. In May 1849, James Pratt found the tree was “fast being hacked away by the travelers, for firewood,” and by 1852, Gilbert Cole reported “no Lone Tree to be found.” In use from 1820 through the 1850s, Lone Elm was one of the most important frontier trail campgrounds.	Not listed	Private	Encroaching subdivisions and commercial development by the city of Olathe may impact the area.
9	Parting of the Oregon-California and Santa Fe Trails	Johnson	KS	Olathe	So far, Oregon-bound emigrant trains had been traveling in the wrong direction—southwest toward Santa Fe instead of west. They did this to stay on the divide between the Kansas and Osage river drainages and avoid numerous difficult stream crossings. Now it was necessary to move north; so the Oregon and California trails branched to the right (northwest) and the older Santa Fe Trail branched to the left (southwest). The site is relatively flat farmland. The actual junction probably moved around the surrounding area over the years. Historian William Ghent reported that the junction had been marked with a signpost: “Here, in the early days, some well-disposed person had set up a sign with the words, ‘Road to Oregon’.” The Westport and Independence roads came together just east of this junction.	Not listed	Private	Farming impacts the whole area. A roadside park, 0.25mile south on U.S. Highway 56, contains a Kansas State Historical Society marker describing the junction.
10	Blue Mound	Douglas	KS	Lawrence	Blue Mound was a major camping site and the first natural landmark encountered by emigrants, many of whom climbed to the top for the view. Its oval, tree-covered summit, approximately 150 feet high and 0.5 mile long, is one of a series of mounds in this area. John C. Fremont used it as a signal mound in 1843. The trail passed the south edge of the mound on its way to the Upper Wakarusa Crossing.	Not listed	Private	The mound has been used as a ski slope, but it is now a tree-covered pasture. Wayside exhibits should be installed on nearby county roads to interpret the trail and this landmark.
11	Upper Wakarusa Crossing/ Blanton’s Bridge	Douglas	KS	Lawrence	This difficult crossing of the Wakarusa River rivaled the lower Bluejacket Crossings. In 1846, Virgil Pringle reported that about half the migration “missed the road [at the Bluejacket Crossings] and crossed about 4 miles above [at the Upper Wakarusa Crossing].” He described the Wakarusa as “a fine stream of clear water, between a creek and a river in size with fine timber on its banks.” The bridge was built by James Abbott in 1854. Napoleon Blanton bought the farmland around it the next year, thus the name.	Not listed	Private	There are no extant remains. Interpretation is needed on nearby U.S. Highway 59.
12	Pellant Ruts	Shawnee	KS	Topeka	Named for the current owner of the property, these three dramatic swales run for about 100 yards.	Not listed	Private	The house is fairly new and the owner is very proud of the site.

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13	Kansas River Crossing/Papin's Ferry	Shawnee	KS	Topeka	Upsets and drownings were frequent at the Kansas River crossings, for the river was 600 feet wide with, as John Charles Fremont described, a "swollen, angry, yellow turbid current." Papin's Ferry, the lower of the three crossings, was the most popular. It was established by Joseph and Louis Papin, two mixed-blood brothers, in 1843 and lasted into the mid-1850s. The ferry consisted of a platform floating on three dugout canoes. William Johnson described this operation in 1849: "By means of a rope, one end of which was coiled around a tree, the wagons were let down the steep banks of the river, and placed in the boat. Two wagons and twelve mules were taken over at a time, the boat being propelled by poles. . . . Double teams were required to haul the wagons up the northern bank, and through the deep sands extending _ mile back from the river." The river has moved very little in this area, and the site is now an industrial park at the river's edge.	Not listed	Private	None known.
14	St. Marys Mission	Pottawatomie	KS	Manhattan	St. Marys was a Catholic mission and school established among the Potawatomi Indians by Belgian Jesuits from Florissant, Missouri, in 1848. An important emigrant campground, the site was often mentioned in emigrant diaries. Lorena L. Hays passed the mission on May 10, 1853: "Came by the Catholic mission today. There is a log church in the shape of a cross. Most of the best houses have been white washed and the place had a very neat appearance. The Indians dress very fine in broadcloth but wear their clothes in rather an odd and slovenly manner." St. Marys is still operated as a Catholic school, named St. Mary's College.	Not listed	Private	None known.
15	Vieux Cemetery/Red Vermillion Crossing	Pottawatomie	KS	Manhattan	In 1847 or 1848, Louis Vieux, a mixed-blood Potawatomi Indian, established a toll bridge at the crossing of the Red (or little) Vermillion River. Vieux charged $1.00 to cross the bridge and also sold hay and grain to the emigrants. Plentiful water, grass, and wood made the east bank of the Red Vermillion River a favorite camping spot. On May 22, 1846, Edwin Bryant camped on the east bank and forded the stream the following morning: "The ford of the small creek on which we encamped last night was difficult, owing to its steep banks and muddy channel. We were obliged to fell small trees and a large quantity of brush, and fill up the bed of the stream, before the wagons could pass over." In 1849, an epidemic of Asiatic cholera struck a large wagon train camped at the river and left 50 dead within a week. Survivors carefully buried the victims and marked each grave with a slab of limestone, upon which the name and date of burial was carved. One stone, protected by a fence, survives from the cholera victims' cemetery.	Listed	Public	The modern bridge intrudes on the historic scene. The fence around the remaining grave is also intrusive but discourages vandalism. Both the cemetery and the crossing site need interpretation.
16	Scott Spring	Pottawatomie	KS	Manhattan	At a favorite emigrant campground on Rock Creek, Scott Spring was noted for its delicious cold water. The spring is at the base of a rocky ridge, and an emigrant grave can be found a few yards north. Edwin Bryant's party stopped to refresh themselves on May 24, 1846: "We found here, gushing from a ledge of limestone rock, a spring of excellent water, from which we refreshed ourselves in draughts that would be astonishing to the most fanatical cold water advocate." Adjacent Oregon Trail Park was a cooperative pride project to commemorate the 150th anniversary of the Oregon Trail that involved four historical societies. The site contains a covered-wagon and ox-team sculpture, historic signs, and Burr Oak trees (planted in all seven states that the Oregon Trail crossed).	Not listed	Public	None known.

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17	Coon Creek/Marshall Grave	Pottawatomie	KS	Manhattan	The Oregon-California Trail crossed Coon Creek on a solid rock ford, passing a clear spring and campsite. S.M. Marshall's grave is on the high promontory to the west. Two swales, fifteen feet deep, are north of the spring. Climbing the hill, the trail is seven swales wide. Marshall's grave is marked with an iron fence erected by the Rock Creek Historical Society.	Not listed	Private	None known.
18	Black Vermillion Crossing	Marshall	KS	Blue Rapids	The Black (or Big) Vermillion River was a considerable obstacle for overland emigrants—its steep banks requiring heavy spading and rope work. On May 25, 1846, Edwin Bryant's company spent several hours getting their wagons across the river: "The Vermilion is the largest water-course we have crossed since leaving the Kansas. Its current is more rapid than has been usually exhibited by the streams of these prairies, and would afford very good water-power. The timber at this point on its banks, is about a quarter of a mile in width, and consists chiefly of oak and elm."	Not listed	Private	None known. Although the site is now inundated by Tuttle Creek Lake and there are no extant resources, a marker commemorates the site on a nearby roadway. It has been there for 70 years, indicating the crossing was "70 rods north and 38 rods west" of the marker.
19	Alcove Spring	Marshall	KS	Blue Rapids	This picturesque area was a favorite campsite near the Independence Crossing of the Big Blue River. The spring originates in an unusual rock formation and falls over a rock ledge into a pool below. Emigrants carved their names in the rocks surrounding the spring, and many of these carvings are still visible. Edwin Bryant, traveling with the ill-fated Donner-Reed Party, wrote a detailed description of the spring on May 27, 1846: "We found a large spring of water, as cold and pure as if it had just been melted from ice. It gushed from a ledge of rocks, which composes the bank of the stream, and falling some ten feet, its waters are received into a basin. . . . A shelving rock projects over this basin, from which falls a beautiful cascade of water, some ten or twelve feet. The whole is buried in a variety of shrubbery of the richest verdure. . . . Altogether it is one of the most romantic spots I ever saw. . . . We named this the '*Alcove Spring;*' and future travelers will find the name graven on the rocks, and on the trunks of the trees surrounding it." Sarah Keys, Margaret Reed's mother, died here while the party was waiting for the river to fall enough to cross. She was buried somewhere in the area.	Listed	Private (Alcove Spring Historical Trust)	Vandalism and vegetation overgrowth threaten the site. A monument to Sarah Keyes is next to the parking lot.
20	Junction of the St. Joe and Independence Roads	Washington	KS	Blue Rapids	The St. Joe and Independence roads joined on this prairie west of Marysville, Kansas. By traveling two days farther up the Missouri River from Independence and starting their overland journey from St. Joe, emigrants were able to save two weeks of travel time. Where these two main feeder routes met, emigrants commonly reported a maze of wagons, animals, and humanity that stretched to the horizon. In 1849, it seemed to William Johnson that there was "an unending stream of emigrant trains, while in the still farther distance . . . could be seen great clouds of dust, indicating that yet others of these immense caravans were on the move. It was a sight which once seen can never be forgotten; it seemed as if the whole family of man had set its face westward." Today, the junction is in an area of isolated farmland that has been plowed for decades. No traces of either trail remain.	Not listed	Private	None known. There are two interpretive markers in the vicinity.

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21	Hollenberg Station	Washington	KS	Blue Rapids	The Hollenberg ranch house was built on Cottonwood Creek about 1857 by Gerat H. Hollenberg to capitalize on the Oregon-California emigrant trade that passed his door. In addition to living quarters for the Hollenburg family, the building served as a neighborhood grocery store, a tavern, and an unofficial post-office. Emigrants were able to obtain provisions at the ranch. Three years later, it became a Pony Express home station and later a stage station. Dr. C.M. Clark reached Cottonwood Creek in 1860 and found “a small stream which is dry during the summer months. The approach to it is winding and steep, and as the bed of the stream contains several large stones at the ford, some care is necessary in driving. There are two good springs here, but no wood. The Stage Company have a station here, and there is also one or two other buildings.” The original building still stands and houses a museum. It is a rare example of a Pony Express station that still stands unaltered in its original location.	National Historic Landmark	Public (Kansas State Historical Society)	The site is well-protected and the restored station is a museum. Several historical markers and monuments stand on the grounds. There is a new visitor center with interpretive exhibits near the historic building.
22	Rock Creek Station	Jefferson	NE	Fairbury	This site on the Oregon-California Trail was a supply point for later emigrants, a stagecoach station, and a Pony Express station. About 1,600 feet of trail ruts are still visible.	Listed	Public (Nebraska Game and Parks Commission)	None known. The site is well run as a Nebraska State Park. It has a new visitor center with excellent displays.
23	The Narrows	Nuckolls	NE	Fairbury	The trail was confined at the Narrows between the Little Blue River and the bluffs, making travelers vulnerable to Indian attacks. A small monument on the bluff above the Little Blue River and an Oregon-California Trails Association wayside exhibit on the county road near the entrance to the site interpret the story of the 1864 Indian attacks and their effects on the territory.	Listed	Private	Nuckolls County officials and the Nebraska chapter of the Oregon-California Trails Association could negotiate an agreement with the owner to allow visitors to hike to the bluffs above the river.
24	Ayr Ruts	Adams	NE	Red Cloud	Approximately three miles northeast of the present-day town of Ayr, Nebraska, is a 300-yard stretch of clearly defined Oregon-California Trail ruts. The ruts are adjacent to the grave of eight members of the Simonton-Smith wagon train, en route from St. Joseph to Denver with a consignment of hardware, which was attacked by Cheyenne and Arapaho Indians in August 1864.	Not listed	Private	None known.
25	Thirty-two Mile Station	Adams	NE	Grand Island	This way station served emigrants, stagecoaches, freight trains, and the Pony Express. It was named for its distance from Fort Kearny. The station, consisting of one long low building, was abandoned in August 1864, following several Indian attacks in that locality. Indians later burned it to the ground.	Listed	Private	None known. The site needs improved interpretation.
26	Susan Hail Grave/Sand Hill Station	Adams	NE	Grand Island	This is the marked grave of a woman who died June 2, 1852—probably of cholera. The grave is protected by a pipe fence. The story is told that her grieving bridegroom walked back to St. Joseph, had a granite stone engraved, and brought it back to her grave in a wheelbarrow. The present stone is not the original. Pristine ruts near the grave run for a quarter mile through unbroken sod. Emigrants on the main Oregon-California Trail got their first view of the Platte River Valley from this site.	Listed	Private	Interpretation and preservation of the site, surrounding swales, and viewshed are needed.
27	Fort Kearny	Kearney	NE	Kearney	Fort Kearny was established by the U.S. Army in 1848 to protect travelers going west from Indian attacks. This military post was strategically located at a junction where various eastern feeder trails merged, forming one broad trail. Although none of the original buildings have survived, the Nebraska Game and Parks Commission has reconstructed two of the fort buildings.	Listed	Public (Nebraska Game and Parks Commission)	The Nebraska Game and Parks Commission needs to increase interpretation of historic trails at this site.

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28	Plum Creek	Phelps	NE	Kearney	Although no plums grew here, Plum Creek was noted as a good campsite for overland emigrants. In later years, a Pony Express station and an Overland Stage station were located near the creek. On August 7, 1864, Cheyenne Indians attacked the station and a wagon train camped nearby, killing 11 men from the train and three occupants of the station. The victims are now commemorated in the Plum Creek cemetery.	Not listed	Public	None known.
29	Dan Smith's West Ranch	Dawson	NE	Gothenberg	This was one of a series of road ranches that sprang up along the Oregon-California Trail in the late 1850s to cater to the ever-increasing number of emigrant trains passing through Nebraska.	Not listed	Private	None known.
30	O'Fallon's Bluff	Lincoln	NE	Ogallala	Oregon-California Trail ruts can be found near this natural landmark on I-80. Here a series of high, sandy bluffs crowded the south bank of the Platte River, forcing emigrants to make a wearisome three-mile detour up and over the rolling, sandy hills.	Listed	Public (Nebraska Department of Roads)	Signs are needed on I-80 to direct visitors to the area.
31	California Hill/Upper Crossing of the South Platte River (later known as Old California Crossing or Lower California Crossing)	Keith	NE	Ogallala	Crossing the South Platte River allowed emigrants to reach the North Platte River and follow it toward South Pass. Several crossing sites were used, but the Upper Crossing was the most important because it led directly into Ash Hollow, the best approach to the North Platte. California Hill, encountered immediately after crossing the South Platte, was the first major grade faced by the emigrants. Imposing trail ruts are visible at this site.	Listed	Private (Oregon California Trails Association)	Improved access and interpretation are needed.
32	Ash Hollow Complex/Windlass Hill	Garden	NE	Chappell	Ash Hollow is a natural landmark that served as the gateway to the North Platte Valley. Windlass Hill was a difficult descent, which left five scars of trail ruts down its side. The source of the name is unknown. Emigrants never referred to it as Windlass Hill. The complex includes Ash Hollow Spring, Rachel Pattison's grave, Windlass Hill, an emigrant campsite, and good drinking water. An often-mentioned grave at the north end of Ash Hollow in a small cemetery contains the remains of other emigrants.	Listed	Public (Nebraska Game and Parks Commission)	None known. A visitor center with interpretive exhibits is operated at Ash Hollow State Historical Park. There are also interpretive waysides at Windlass Hill.
33	Amanda Lamin Grave	Morrill	NE	Crescent Lake	Amanda Lamin was a 28-year-old emigrant, born in Devonshire, England, who died of cholera in 1850. The gravesite stands on the top of a small knoll, in the middle of private pastureland, overlooking the North Platte River. One mile east is an excellent set of Oregon-California Trail ruts.	Listed	Private	None known. The site needs additional interpretation. On nearby Nebraska Highway 92 there is a large Nebraska State Historical Society marker.
34	Courthouse Rock/Jail Rock	Morrill	NE	Scottsbluff	Courthouse Rock was first noted by Robert Stuart in 1812 and quickly became one of the guiding landmarks for fur traders and emigrants. It is a massive monolith of Brule clay and Gering sandstone south of the trail, which was variously likened to a courthouse or a castle. A smaller feature just to the east was called the Jail House or Jail Rock. Courthouse Rock was the first of several impressive natural landmarks along the trail in western Nebraska.	Listed (Courthouse Rock)	Public (City of Bridgeport, Nebraska State Historical Society)	Dirt bikes, vandalism, and all-terrain vehicles pose threats to resources at this site. Interpretation is needed.
35	Chimney Rock	Morrill	NE	Scottsbluff	This prominent column of clay and sandstone, resembling a tall factory chimney, was mentioned in more diaries than any other landmark on the Oregon-California Trail. Visible for miles, Chimney Rock was more than a wonder of nature. As a milepost on a journey noted so far for its monotony, the column was a significant landmark in measuring the emigrants' progress west.	Listed	Public (Nebraska State Historical Society)	None known but ongoing erosion. A new visitor center contains excellent interpretive exhibits.

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36	Scotts Bluff National Monument/Mitchell Pass	Scotts Bluff	NE	Scottsbluff	Scotts Bluff was the first of many imposing barriers that travelers encountered as they made their way west. It was also the last famous landmark along the Great Platte River Road in Nebraska. Early travelers were forced to swing south away from the river and go through Robidoux Pass, a natural gateway in the great bluffs. In 1850, a shorter route was opened through Mitchell Pass, which stayed closer to the river and eliminated the eight-mile swing through Robidoux Pass.	National Historic Landmark/ National Natural Landmark	Public (NPS)	Visual intrusions and potential urban sprawl from Gering and Scottsbluff encroach on the site.
37	Robidoux Pass	Scotts Bluff	NE	Scottsbluff	The pass forms a broad U-shaped opening in the semicircular line of bluffs composing the Wildcat Hills. The climb to its summit was mitigated by fresh spring water and wood, two commodities that were quite scarce along the Platte River. The pass takes its name from Antoine Robidoux, an early trader whose family established a trading post and a blacksmith shop here in 1848. At that time, Robidoux's post was the first habitation encountered west of Fort Kearny on the Oregon Trail.	National Historic Landmark	Private	Threats have been made by a landowner to turn under the ruts.
38	Horse Creek Treaty Grounds	Scotts Bluff	NE	Scottsbluff	This is the site of the signing of the first Fort Laramie Treaty in 1851. The assembly of some 10,000 Plains Indians was the largest in history. The Federal government made the treaty to protect the traffic along the Oregon-California Trail, as the Indians became increasingly resentful of the growing numbers of emigrants. The document established tribal grounds and the right of emigrant travel along the trails.	Not listed	Private	None known.
39	Fort Laramie	Goshen	WY	Torrington	Fort Laramie traces its origin to Fort William, a fur-trading post constructed on the Laramie River in 1834. For the next 15 years, it served as an important outfitting and resupply point for fur trappers, emigrants, and military expeditions. Acquired by the U.S. Army in 1849, it became one of the most important military posts in the trans-Mississippi West and continued to serve as a stop for overland emigrants. Important diplomatic negotiations with the tribes of the northern plains were held here. Fort Laramie was a key installation during the Indian conflicts of 1850-1890. The Bedlam Ruts (administered by BLM) are nearby.	National Historic Landmark	Public (NPS)	None known. Fort Laramie National Historic Site maintains a visitor center/museum with interpretive exhibits and several restored buildings from the military era.
40	Mexican Hill	Platte	WY	Torrington	At Mexican Hill the trail made a steep and dramatic cut through the river bluffs from the benchland to the floodplain of the North Platte River. Where the Bluff and River routes intersected, ruts lead up to the hill from 0.75 mile to the east. They are some of the most-memorable swales anywhere on the trails. The origin of the name is obscure.	Not listed	Private	The site has been impacted by erosion and unauthorized vehicle use.
41	Register Cliff	Platte	WY	Torrington	Among the most famous of the surviving emigrant registers, thousands of names were inscribed on this mile-long prominent sandstone cliff on the south side of the North Platte River. Cliffs to the east and west also contain hundreds of well-preserved emigrant inscriptions.	Listed	Public (State of Wyoming)	Natural deterioration, housing development, vandalism, and National Guard activities to the west all impact the site. The state of Wyoming needs to update the interpretive materials.
42	Guernsey Ruts (Deep Rut Hill)	Platte	WY	Torrington	At this site, where the trail was forced away from the river and crossed a ridge of soft sandstone, the track is worn to a depth of five feet, creating some of the most-spectacular ruts remaining along the entire length of the Oregon-California Trail. The geography of the area dictated that practically every wagon that went west crossed the ridge in exactly the same place, with impressive results.	National Historic Landmark	Public (State of Wyoming)	This site needs better marking and interpretation. Visitor use should be channeled to protect the ruts and surrounding terrain from the effects of indiscriminate wandering. National Guard activities in the area have caused major visual intrusions.
43	Warm Springs Canyon	Platte	WY	Torrington	These two free-flowing springs, one gushing from a ledge of rock and the other bubbling up in a large pool, were only slightly warm. Often called the "emigrants' wash tub," this was a particularly popular camping place, available to travelers on both the Black Hills Road and the River Route. Pursey Graves, who camped nearby on June 24, 1850, wrote, "After I finished my letter to send back to the Ft. I proceeded to the spring a distance of 1_ miles with my bucket of dirty clothes." The spring still flows strongly and the site is in nearly pristine condition.	Not listed	Private	National Guard activities threaten the canyon. The site has been marked by the Oregon-California Trails Association.

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44	Laramie Peak	Albany	WY	Laramie Peak	This famous 10,272 foot landmark in the Black Hills (named for the dark appearance of its tree-covered slopes) guided emigrants' travel for many days. First sighted when descending from Robidoux or Mitchell passes, this mountain was constantly in view for almost 100 miles. It must have seemed that the peak would never be passed.	Not listed	Public (USFS-Medicine Bow National Forest)	None known.
45	Ayres Natural Bridge	Converse	WY	Douglas	This natural feature was often mentioned in emigrant diaries, and spring-fed La Prele Creek was used as a campsite. The natural bridge is in a beautiful red-rock canyon, which offered good water and plentiful forage for animals.	Not listed	Public (Wyoming State Parks and Historic Sites)	The site shows signs of overuse. Improved interpretation is needed.
46	Hembree Grave	Converse	WY	Douglas	Six-year-old Joel Hembree was killed when he fell under a wagon on July 18, 1843, and was run over by a wheel. The boy was the first casualty of the "Great Migration" of 1843, and his grave is the oldest marked burial related to the Oregon Trail emigration. The body was moved to this site from a spot 0.25 mile east and was reburied next to the grave of Private Ralston Baker, who was killed in an Indian skirmish in 1867. The Hembree grave is still marked with the original headstone.	Not listed	Private	None known. The grave has been fenced and marked by the Oregon-California Trails Association.
47	Mormon Ferry (1849)	Natrona	WY	Casper	Mormons operated a ferry at this North Platte River crossing in 1847 and 1848, but it is best-remembered for its service in the gold rush. Mormons ran three boats alongside an operation called the "Missouri Ferry." They told M. B. Moorman on June 19, 1849, that each day they crossed 300 wagons at $5.00 each using "decidedly the best boats I ever saw." Bill Hickman ran a similar operation here in 1850. At the Casper-area ferries, emigrants finally left the Platte River system, which they had followed from Fort Kearny, Nebraska, over 440 miles to the east.	Not listed	Public (City of Casper)	None known. The ferry is located on the grounds of the North Casper ballfields. An interpretive sign is placed near the entrance and the concessions stand.
48	Emigrant Gap	Natrona	WY	Casper	Most emigrants who crossed the North Platte River on the ferries and bridges below Fort Caspar passed through Emigrant Gap, a shallow pass through a ridge west of present-day Casper, Wyoming. From this point, travelers were afforded a sweeping view to the west, the scene of their next week's travel. Here they began their ascent into the Rocky Mountains, which gradually led up and over the Continental Divide at South Pass.	Not listed	Public (BLM)	None known. A BLM interpretive marker is located here.
49	Avenue of Rocks	Natrona	WY	Casper	These natural rock formations jut out of the Wyoming rangeland, and the Oregon-California Trail was forced to wind through the rocks as it vaulted the rocky spine. At the end of Rock Avenue is the Devil's Backbone, described by British traveler Richard Burton in 1860 as a "jagged, broken ridge of huge sandstone boulders, tilted edgeways, and running in a line over the crest of a long roll of land . . . like the vertebrae of some great sea-serpent."	Not listed	Public (State of Wyoming)	Vandalism and increasing erosion on country roads are the main threats. This site needs interpretation of the natural formation and the emigrant trails.
50	Willow Springs	Natrona	WY	Casper	Willow Springs provided the first safe water west of Casper. These free-flowing springs offered cool refreshing water and nearby forage for animals. The area quickly became a popular campsite. To the southwest, visible ruts ascend Prospect Hill. The springs are in the yard of an abandoned ranch, where several deteriorating shacks and outbuildings barely stand.	Not listed	Private	Low-key and unobtrusive interpretive panels should be selectively placed to point out trail-related geographical features.
51	Prospect (Ryan) Hill	Natrona	WY	Casper	Just west of Willow Springs is a low ridge called Prospect Hill, where emigrants gained their first sight of the Sweetwater Mountains to the west. The 400-foot climb was very hard on draft animals. It was reportedly named because emigrants could see the gentle valley of the Sweetwater River from the top of the hill, giving them a view—or prospect—of an easier road ahead. Prospect Hill has clearly visible ruts on its eastern slope. The view from the top has changed little from the one seen by emigrants 150 years ago.	Not listed	Public (BLM)	Mineral development may impact the site. Two BLM interpretive markers are located at the top of Prospect Hill.

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52	Saleratus Lake	Natrona	WY	Rattlesnake Hills	This alkali deposit, or "pan," about a quarter-section in size, provided emigrants a soda compound used in baking. Sir Richard Burton passed the lake on August 17, 1860: "It [Saleratus Lake] lies to the west of the road, and is only one of a chain of alkaline waters and springs whose fetor, without exaggeration, taints the land. . . . The appearance of the Saleratus Lake startles the traveler. . . . On a near inspection, the icy surface turns out to be a dust of carbonate of soda, concealing beneath it masses of the same material, washed out of the adjacent soil, and solidified by evaporation. . . . It is still transported westward, and declared to be purer than the saleratus of the shops."	Not listed	Private	An agreement to permit access should be negotiated with the private owner.
53	Independence Rock	Natrona	WY	Bairoil	Independence Rock was the most-noted landmark on the emigrant trails west of Fort Laramie. An oval outcrop of granite rock, it is 1,900 feet long, 700 feet wide, and rises 128 feet above the range. The rock derived its name from a party of fur trappers who camped there and celebrated Independence Day in their own style on July 4, 1830. Independence Rock was also widely used by emigrants as a place to inscribe their names and to leave messages for those coming behind.	National Historic Landmark	Public (State of Wyoming)	The site shows signs of overuse. A complete inventory of inscriptions is needed. Lichen growth is encroaching on several panels. A highway rest area provides parking and interpretive wayside exhibits.
54	Devil's Gate	Natrona	WY	Bairoil	Devil's Gate is a narrow cleft carved by the Sweetwater River, 370 feet deep, 1,500 feet long, and only 50 feet wide in places. Devil's Gate is among the more interesting geographical landmarks along the emigrant trails. This natural feature became visible approximately 15 miles to the east. It was a rest stop and campground and is thought to have more than 20 graves in the immediate vicinity, although only one is marked. There are inscriptions on the rocks.	Listed	Public (BLM)	The impacts of visitor use should be closely monitored. The BLM manages the Devil's Gate interpretive site.
55	Split Rock	Fremont	WY	Bairoil	This famous "gun sight" cleft in the mountains is another prominent geographical feature within the South Pass segment. It was noted in many diaries.	Not listed	Public (BLM)/ Private	Access to the trail should be improved. Just east of Split Rock Station, the BLM has developed an attractive interpretive site that describes the area and its history.
56	Three Crossings/Deep Sand Route	Fremont	WY	Rattlesnake Hills	At this narrow canyon, emigrants had a choice. They could follow the Sweetwater River through the canyon, a trip that required three difficult river crossings within two miles, or they could travel via the "deep sand" route to the south of the Sweetwater River. Most emigrants followed the river route because pulling the wagon across the deep sand was exhausting.	Not listed	Public (BLM)/ Private	A nearby uranium processing plant has been torn down, and a reclamation effort has been underway at the mill site for several years. The BLM would like to acquire the site but might not be able to do so if the area is contaminated.
57	Ice Slough	Fremont	WY	Lander	At this cold spring, emigrants occasionally found ice underneath the soil until late summer. The ice was insulated by four to six inches of water above the ice and by rich grassy sod that grew thick enough to bear a man's weight. Ice Slough became a major camping site for travelers, who enjoyed the cold refreshment after several days of dry and dusty terrain.	Not listed	Public (BLM)	Hydric soils are susceptible to trampling damage by wild horses and the season-long livestock grazing that has occurred for over a century. This has caused a loss of the humus that provided the insulation that preserved the ice. Access to the site is across private land. There is a state historical marker nearby.
58	Rocky Ridge	Fremont	WY	South Pass	Here the emigrants were forced up and away from the Sweetwater River to cross a high, barren, and rocky ridgeline. The crossing required much jarring travel over a rock-strewn landscape. There is no specific spot that can be labeled Rocky Ridge. The name refers to a geographic area spread over two square miles, where wind and erosion have kept soil from collecting and have laid bare a washboard of bedrock. Well-defined ruts still wander over the top of the ridge.	Not listed	Public (BLM)	The site needs a cultural landscape report. The area has great visual integrity. Overuse may be a problem with increased visitation.

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59	Burnt Ranch (Ninth Crossing of the Sweetwater River)	Fremont	WY	South Pass	Burnt Ranch, at the ninth and final crossing of the Sweetwater River, was one of the great hubs of emigrant trail activity. By 1862, this popular campsite had grown into such a key communications and transportation center that a detachment of the 11th Ohio Volunteers was sent out to protect the mail and stage station and overland travelers from Indian attack. When the soldiers departed in 1868, Indians promptly burned the station to the ground; hence the name—Burnt Ranch.	Nominated	Private	None known. An Oregon-California trail marker from 1913 still stands.
60	South Pass	Fremont	WY	South Pass	South Pass was perhaps the most important landmark along the emigrant trails. It marked the end of the long ascent to the Continental Divide and the emigrants' arrival at the frontier of the Oregon country. It was also thought to be the halfway point along the trail. South Pass dictated the location of the emigrant trail, for only via its gradual ascent was wagon travel over the Continental Divide practical for large-scale emigration. South Pass is the wide, flat summit of a long and gradually ascending plateau, with low ridges and hills on both sides and a wide sage and grass covered saddle between. Many emigrants commented that they scarcely noticed the ascent or the crossing.	National Historic Landmark	Public (BLM)	In spite of an abandoned railroad grade, a diversion ditch, and evidence of an AT&T buried cable, this site should be protected from additional visual intrusions. Any pipeline crossing of this area might intrude on the extraordinary historic character of the site. Historic monuments are at the pass and a wayside exhibit is nearby.
61	Pacific Springs	Fremont	WY	South Pass	Pacific Springs was the first good water source after emigrants crossed South Pass and entered the Pacific watershed. The springs created an extensive marsh, which appeared as a green oasis in the dry landscape. Emigrants often camped at the site and many commented on the destination of its waters.	Not listed	Private	Vandalism is a continuing problem. An impressive overlook/rest area on Wyoming Highway 28 contains several interpretive waysides about the South Pass/Pacific Springs area.
62	Dry Sandy Crossing	Sublette	WY	Farson	The Dry Sandy was the first water reached west of Pacific Springs. It was crossed below a broad basin that collected subsurface water. In dry seasons, water could be found here by digging in the streambed, but it was tainted with alkali. Many emigrants reported the loss of livestock. The river flowed more below the surface than above ground. Emigrants only stopped here when absolutely necessary. Evidence of "tanks" dug by emigrants to water their oxen can still be found in the area.	Not listed	Private	None known.
63	Parting of the Ways	Sweetwater	WY	Farson	The Oregon Trail and the Sublette Cutoff separated at Parting of the Ways. In the midst of a wide-open expanse of land, both trails are plainly visible, and the eye can follow them for miles toward the horizon. At this point, emigrants had to make a hard decision. Should they save 46 miles by taking the Sublette Cutoff, which bypassed the southern loop to Fort Bridger but also demanded 50 miles of travel with no water? Decisions were based on the condition of the grass, animals, people, and supplies.	Listed	Public (BLM)	Encroaching mineral exploration and development threaten the viewshed.
64	Little Sandy Crossing	Sweetwater	WY	Farson	Little Sandy Crossing, a popular campsite on the road to Fort Bridger, was the first good water west of Pacific Springs. Numerous emigrant graves are located in the area.	Not listed	Public (BLM)	Visitors need to travel through a half mile of private property to access the site. There is a BLM marker east of the creek.
65	Big Sandy Crossing	Sweetwater	WY	Farson	Emigrants on the trail to Fort Bridger made the difficult crossing of the Big Sandy River here and followed its north bank to the Green River. There are excellent examples of pristine ruts nearby.	Not listed	Public (BLM)/ Private	Currently there are few threats to the site because of limited access, but vehicle overuse could threaten nearby ruts, as well as damage the river crossing.
66	Lombard Ferry (Green River Mormon Ferry)	Sweetwater	WY	Rock Springs	Lombard Ferry, named after the trail era for its proximity to Lombard Buttes, was the main crossing of the Green River. During periods of low water, wagons could ford the river, but the shallow sand bar they used was only 10 feet wide. When the Mormon pioneers arrived on June 30, 1847, they built rafts and floated their wagons across the river. Later that year, they built ferryboats and provided a commercial ferry service, both to assist subsequent Mormon companies and as a commercial venture. The crossing is mentioned in many travelers' journals.	Listed	Public (USFWS-Seedskadee National Wildlife Refuge)	Gas development and fossil collectors are threats. The site is interpreted.

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67	Church Butte	Uinta	WY	Kemmerer	This large butte, with its temple-like shape, deeply eroded walls, and flattop mesa, is about 1,000 feet in diameter and rises 75 to 100 feet above the plain of the Blacks Fork Valley. Believed to have been first named by fur traders, it became one of the landmarks along the trail and excited the comment of many emigrants.	Not listed	Private	Gas wells and mineral development have negatively impacted the historic viewshed. Vandalism and litter are also problems.
68	Name Rock	Uinta	WY	Evanston	Name Rock itself is unimposing, being but a short section of cliff about 400 feet long and 20 feet high. On the face of the cliff, which is protected from the weather by a natural overhang, several dozen emigrants wrote dates, their names, and places of origin, mostly with wagon tar. Most of the names and dates are still clearly visible.	Not listed	Private	Vandalism is a big problem. The inscriptions need to be stabilized, protected, and interpreted.
69	Fort Bridger	Uinta	WY	Evanston	Jim Bridger established Fort Bridger in 1843 as a fur-trading post. It was composed of two double-log houses about 40 feet long that were joined by a pen for horses. To the emigrants, Fort Bridger offered the chance to obtain supplies, have essential blacksmith work done, and trade worn-out livestock for fresher animals. Here the main Oregon-California Trail turned north toward Fort Hall, and the Mormon Trail/Hastings Cutoff continued west to the Valley of the Great Salt Lake. The fort served as a Pony Express, Overland Stage, and transcontinental telegraph station in the 1860s and was garrisoned by the U.S. Army between 1857 and 1890.	Listed	Public (State of Wyoming)	None known. The fort has a museum/visitor center and a reconstruction of Bridger's log trading post.
70	West End of the Sublette Cutoff	Lincoln	WY	Fontenelle Reservoir	Three miles south of present-day Cokeville, Wyoming, the main route of the Sublette Cutoff, which left the Oregon-California Trail at Parting of the Ways, rejoined the primary emigrant route. There is nothing on the ground to indicate the junction, for both trails have been erased by subsequent development.	Not listed	Private	None known.
71	Thomas Fork Crossing	Bear Lake	ID	Preston	This crossing of swift-flowing Thomas Fork was particularly difficult because of steep, muddy inclines into and out of the stream. A toll bridge solved the problem in the early 1850s for those emigrants who could afford its $1.00 charge. Emigrants found traders and large numbers of Indians camping here and good grass and water along the fork and in the Bear River bottoms. Excellent trail traces are present in the Sheep Creek Hills west of the fork.	Not listed	Private	None known. There is an Idaho state historical marker on U.S. Highway 30.
72	Big Hill	Bear Lake	ID	Preston	Big Hill was one of the greatest impediments on the whole Oregon Trail route. To avoid the marshy bottoms of the Bear River, it was necessary to make a very steep, difficult ascent and descent of the Sheep Creek Hills. Ruts caused by the locking of wheels for the descent are visible from the west.	Not listed	Public (BLM)	This site can only be reached by crossing private land. BLM has no easement for access. An Idaho state historical marker is located on U.S. Highway 30.
73	Soda Springs Complex	Caribou	ID	Soda Springs	The natural fountains at "Beer Springs" were rightfully considered to be one of the marvels of the overland trails. Almost every emigrant account noted the picturesque scenery and the natural curiosities of the area. The development of the town and the building of Alexander Reservoir have destroyed or covered many of these historic springs. Steamboat Spring, Wagonbox Grave, Hooper Spring, Octagon Spring, and two short traces of ruts can still be seen in the area.	Not listed	Public (City of Soda Springs)/ Private	None known. The City of Soda Springs has completed a historical resource study of Oregon Trail sites in the area, is preparing a visitor brochure, and hopes to develop wayside exhibits. There is a historic monument at the west end of town.
74	Sheep Rock (Soda Point)	Caribou	ID	Soda Springs	Rising 1200 feet above the trail, this tree-covered point was a prominent landmark for emigrants. The Bear River flows through this gap between the Bear River Range and the Soda Springs Hills and turns south toward the Great Salt Lake. At this important junction, the Oregon-California Trail headed northwest and the Bidwell-Bartleson Route turned south along the west bank of the Bear River. After 1849, the Hudspeth Cutoff went directly west from this site. This point and the volcanic craters to the west were often noted in emigrant journals.	Not listed	Public (BLM)/ Private	None known.

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75	Fort Hall	Bingham	ID	Blackfoot	Fort Hall was built by American Nathaniel Wyeth in 1834 but became the property of the Hudson's Bay Company in 1838. The fort was an important camping spot and trading center on the Oregon-California Trail until the middle of 1849, when the Hudspeth Cutoff was opened west of Soda Springs. From that time on, almost all travel to California took the Hudspeth Cutoff. Those traveling to Oregon continued to pass the fort until it was abandoned in 1856. An excellent replica now stands south of the site in present-day Pocatello, Idaho.	National Historic Landmark	Private (Fort Hall Indian Reservation)	Erosion caused by the flooding of the Snake River seriously threatens the future existence of the site.
76	American Falls	Power	ID	Pocatello	American Falls was one of the great natural wonders of the overland trails. These impressive falls were enthusiastically noted in the accounts of all who passed by. The roar of the falls, as the Snake River dropped 50 feet, could be heard several miles away. The area below the falls became a favorite camping and resting spot for emigrants. Below modern American Falls Dam, the still-impressive river enters a rugged volcanic canyon.	Not listed	Public	None known.
77	Massacre Rocks	Power	ID	Pocatello	Massacre Rocks are two rock masses south of the trail, with just enough gap between them to allow the passage of a wagon. Three to five miles northeast of these rocks, on August 9-10, 1862, a skirmish took place between several emigrant wagon trains and Indians. The fight, one of the last hostile encounters between emigrants and Indians in this part of Idaho, ended with the death of ten whites and an unknown number of Indians.	The ruts between Massacre Rock and Coldwater Hill are listed	Public (Idaho Department of Parks and Recreation)	Massacre Rocks State Park maintains a museum with interpretive exhibits. Pristine ruts and interpretive waysides can be accessed from the Massacre Rocks Rest Area off I-86, two miles east of Massacre Rocks State Park. The ruts near the wayside exhibits show the impact of heavy visitation.
78	Register Rock	Power	ID	Lake Walcott	Register Rock is a half-buried boulder, 25 feet in diameter, with many clearly visible names and dates inscribed upon it by emigrants, some dating from 1849. The small stream that provided water at this campsite was known to the emigrants as both Fall Creek and Rock Creek. Today the area has been developed as a day-use picnic area. Register Rock is enclosed by a chain link fence and protected from weathering by an octagonal pavilion.	Listed	Public (Idaho Department of Parks and Recreation)	None known. Massacre Rocks State Park maintains the site and an interpretive sign.
79	Coldwater Hill	Power	ID	Lake Walcott	Cold Water was a camping area along the Snake River. At the western end of the valley, the trail climbed Coldwater Hill and turned southwest, away from the Snake River and toward the crossing of the Raft River. Intact trail remnants are clearly visible as the trail ascends this hill. They are easily accessibly from an eastbound rest stop off I-84.	Listed	Private	None known.
80	California Trail Junction/Raft River Crossing	Cassia	ID	Lake Walcott	Immediately after fording Raft River, the California Trail branched south and traveled up the Raft River Valley to Cassia Creek and City of Rocks. The Oregon Trail continued west over rolling rangelands to rejoin the Snake River. There are trail markers at the parting of the two trails, and nearby emigrant graves have been fenced and marked. There are traces of the trail on public lands both west (the Oregon Trail) and south (the California Trail) of the junction.	Not listed	Public (BLM)	None known. Access to the site from the east is over private land.
81	Milner Ruts (Cedars Emigrant Campsite)	Cassia	ID	Lake Walcott	Approaching the Cedars Emigrant Campsite on the Snake River are two extensive traces of the Oregon Trail, which join at the BLM's Milner Interpretive Site. The south trail is marked by both concrete and carsonite trail markers for several miles. The BLM maintains an interpretive kiosk at the site. The north trail is unmarked.	Listed	Public (BLM)	Vandalism at the interpretive site is a continuing problem. Some BLM staff want to develop the north trail into a bike and recreational trail. BLM recently initiated entry fees to the interpretive area.

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82	Caldron Linn	Twin Falls	ID	Rogerson	Caldron Linn (Linn is a Gaelic word for waterfall) is a narrow, rock-walled chute on the Snake River that terminates with a drop of 40 feet and prevents water transportation through this part of southern Idaho. The roar of the water was audible miles away, and some emigrants took time to visit and comment on the site. In 1812, mountain man Robert Stuart wrote, “At the Caldron Linn the whole body of the River is confined between 2 ledges of Rock somewhat less than 40 feet apart, and here indeed its terrific appearance beggars all description.” Today, the Snake River has been tamed with dams and irrigation projects and the Linn is much less impressive.	Listed	Private	None known.
83	Stricker Store/Rock Creek Station	Twin Falls	ID	Rogerson	The Stricker Store was the first trading post on the Oregon Trail west of Fort Hall. Prior to its establishment in 1865, Oregon Trail emigrants used the area as a campsite. They were drawn here by good water and grass along Rock Creek, which flows just south of the store. In later years, the store served as Rock Creek Station on the Ben Holladay Stage Line. The store is still relatively intact, although some intrusive adaptations have been made. Screens cover the windows and a tin roof protects the old sod roof from weathering. Other structures from the 1860s and a two-story frame home built by Herman Stricker in 1890 also remain on the site. The cemetery and a portion of the trail west of the state property are privately owned.	Listed	Public (Idaho State Historical Society)/ Private	The cemetery and intervening land should be purchased and added to the historic site. At the very least, an easement should be negotiated to provide a formal right of way to access the cemetery.
84	Shoshone Falls	Twin Falls, Jerome	ID	Twin Falls	Shoshone Falls was a horseshoe-shaped cataract of impressive dimensions. Here, the Snake River fell 212 feet, creating a roar that was audible for miles. Although the falls were located five miles north of the trail, some emigrants made a trip to investigate the cause of the noise. Today, only a trickle of water normally escapes the upstream dam, but one can still visualize the former power of the cataract and understand why explorers and emigrants were unable to develop the river as a transportation route.	Not listed	Public (City of Twin Falls)	None known. The City of Twin Falls has created a nice little park next to the south side of the falls with facilities for picnicking and sightseeing.
85	Rock Creek Crossing	Twin Falls	ID	Twin Falls	Rock Creek, first encountered by emigrants at Stricker Store, proved to be one of the most difficult streams to cross along the Oregon Trail. This was not due to the width or depth of the stream but because Rock Creek had cut a deep chasm through the volcanic rock of the area—100-200 yards wide and 50-100 feet deep, with almost vertical walls. This was the first cut in the banks of the chasm that permitted emigrant wagons to cross the stream. Traces of the crossing remain in spite of heavy development in the area. A marked grave is located near the site, and emigrant names are still visible on the canyon wall a few hundred feet west of Blue Lakes Boulevard South.	Not listed	Private	None known.
86	Kanaka Rapids	Gooding, Twin Falls	ID	Twin Falls	Having veered south at Caldron Linn, the Oregon Trail returned to the Snake River at Kanaka Rapids. The rapids were a welcome site for most emigrants, for it was the first of several spots along the Snake River where they could trade with Indians for fresh salmon. A natural barrier to migrating salmon, this had long been a favorite Indian fishing spot.	Not listed	Public (Gooding County)	None known.

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87	Thousand Springs Complex	The springs are in Gooding; the trail remnants are in Twin Falls	ID	Twin Falls	At Thousand Springs numerous streams gush from beneath the rimrock on the north bank of the Snake River and cascade into the river below. A short section of fairly good Oregon Trail ruts are in the vicinity as the trail climbs a low ridge and heads northwest across range and farmland. Another south-side route follows the Snake River. Emigrants could also cross the river near here and head west on the North Alternate Oregon Trail. On August 15, 1851, Elizabeth Wood wrote, “On the opposite side of the river from us is a spring flowing out of a wall of rock, large enough to turn a mill; it is a very beautiful stream, clear as crystal, and runs so rapidly that it looks white as ice as it flows over the rock and roars like a mill race.” This spring can still be seen, along with about 100 others in the area.	Not listed	Public (Nature Conservancy, BLM)/ Private	Agricultural use of private lands threatens both the trail ruts and the water supply for Thousand Springs. Off-highway parking is needed near the springs. Carsonite markers have been placed on the trail ruts.
88	Upper Salmon Falls	Gooding, Twin Falls	ID	Twin Falls	Upper Salmon Falls consisted of two rapids where Indians gathered to spear salmon that were so obstructed in their ascent of the Snake River that they could be easily taken. Emigrants bartered with the Indians for this salmon, which was a great help, since many had used up most of the food brought with them from the states. Joel Palmer recorded on August 20, 1845, “Here are eighteen or twenty Indian huts. Salmon came up to these falls; the Indians have an abundance of them, which they very readily dispose of for books, powder, balls, clothing, calico and knives, and in fact for almost anything we have at our disposal.”	Not listed	Private (Idaho Power Company)	None known.
89	Three Island Crossing	Elmore	ID	Glenns Ferry	Three Island Crossing was the most-important and difficult river crossing in Idaho. Crossing the Snake River was always dangerous, but when the water was low enough, everyone crossed who could, to take advantage of the more favorable northern route to Fort Boise. During high water, most emigrants were forced to travel along the South Alternate route into Oregon—a dry, sandy, dusty, and hot trail that wore out man and beast. The Nature Conservancy has recently purchased land on the southern approach that will connect the formerly isolated south unit of the park to the crossing and visitor facilities on the north bank.	Listed	Public (Idaho Department of Parks and Recreation)	None known. Three Island Crossing State Park maintains a campground, picnic area, interpretive trails, a museum with exhibits, and other visitor services on the north bank of the river. Each year in August, the park reenacts the river crossing by driving wagons across the ford at Three Island Crossing.
90	Teapot Dome Hot Springs	Elmore	ID	Mountain Home	Teapot Dome Hot Springs, a series of small springs on the primary route of the Oregon Trail, occupied a basin 1,000 feet across at the head of Hot Springs Creek. In 1843, Peter Burnett described them as “hot enough to cook an egg. It runs out at three different places, forming a large branch, which runs off smoking and foaming.” The springs were a favorite emigrant campsite.	Not listed	Private	None known.
91	Rattlesnake Station	Elmore	ID	Mountain Home	Rattlesnake Station was established in 1864 as an important stage stop and later as a freighting stop for the Rocky Bar mining area. The station was renamed Mountain Home in 1879. When the railroad arrived in 1883, the town of Mountain Home, which had grown up around the station, was moved nine miles southwest to the Union Pacific tracks. Before and after the establishment of the station, the area was used as a campground by Oregon Trail emigrants.	Not listed	Private	None known.
92	Canyon Creek Station	Elmore	ID	Mountain Home	Canyon Creek Station was another stage station used during the later years of the Oregon Trail. The station was located where the trail crossed Canyon Creek. The availability of water and grass made the creek bottoms a favorite camping spot for emigrants. The station was a private residence until the 1970s, when a fire gutted the structure. The rock walls are all that remain.	Not listed	Private	None known.

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93	Inscription Rock	Elmore	ID	Mountain Home	This sharp rock outcropping was one of the smaller and less-known inscription points along the Oregon Trail. Names and dates were painted on its sides with wagon tar. Although the names are not clearly legible, it appears that the earliest names are from the 1860s. This site was previously referred to as Register Rock, but the name has been changed to avoid confusion with the Register Rock in Power County, Idaho. The southern variant of the Goodale Cutoff comes down Ditto Creek and rejoins the primary Oregon Trail near this rock.	Not listed	Private	None known.
94	Ditto Station	Elmore	ID	Mountain Home	Ditto Station was built at a spring near Soles Rest Creek and was a stop on the freight and stage routes that followed the Oregon Trail. Little evidence of the station remains, but vegetation and land depressions help to identify the location. The northern variant of the Goodale Cutoff comes down Soles Rest Creek and rejoins the primary Oregon Trail just north of the station.	Not listed	Private	None known. An interpretive wayside exhibit is needed.
95	Indian Creek Station	Elmore	ID	Mountain Home	Indian Creek was a popular emigrant campground. Emigrants were able to purchase fresh vegetables from settlers, who came to the area in 1863. Indian Creek Station was a stop on the Overland and Kelton Road stage routes. A lava-rock structure dates to the stage-station era. A small agricultural community known as Mayfield eventually developed around the station.	Listed	Private	Private land development may impact the site. Protection is needed for the extant stage structures and Mayfield's remaining buildings. An interpretive wayside exhibit is needed.
96	Bonneville Point	Ada	ID	Murphy	Bonneville Point is a high promontory that overlooks the fertile Boise River Valley and present-day Boise, Idaho. The point was named for Captain Benjamin Bonneville, who ascended it in 1833 while on a fur-trading expedition. The primary route of the Oregon Trail crossed this summit before descending to the Boise River, and good ruts are still evident on the site. This point marked the end of the difficult trip across the northern Snake River plains and foothills. From here, it was an easy 59-mile pull to Fort Boise.	Not listed	Public (BLM)	None known. The BLM maintains an interpretive site atop Bonneville Point and has marked the trail as it ascends and descends to the point.
97	Ward Massacre Site	Canyon	ID	Boise	On August 20, 1854, Indians attacked and killed 18 of the 20 emigrants in the Alexander Ward train. The survivors were young boys who were left for dead. Winfield Scott Ebey arrived at the site two days later: "Everything showed signs of a hard Struggle. Six bodies lay by the road partly covered. . . . We got our spades & some of us stopped & gave them a decent burial. The ground is covered with blood." Subsequent retaliation by U.S. troops was indiscriminate and resulted in hostilities that imperiled emigrant use of the trail for a decade and caused the Hudson's Bay Company to abandon both Fort Hall and Fort Boise.	Listed	Public (State of Idaho)	None known. A small two-acre park contains a simple monument listing the names of those killed, and there is a historical marker on U.S. Highway 20/26.
98	Canyon Hill Ruts	Canyon	ID	Boise	This 300-foot section of Oregon Trail ruts descends a short, steep break in the cliff leading down to the east bank of the Boise River Crossing, just north of Caldwell, Idaho. Looking up a natural cut in the bluff between two rock outcroppings, one can easily visualize wagons negotiating the steep slope.	Not listed	Private	Private development could threaten the site. The site should be interpreted and made accessible to the public.
99	Fort Boise (Hudson's Bay Company)	Canyon	ID	Vale	Fort Boise was an important Hudson's Bay Company trading post, established on the east bank of the Snake River in 1834. The post was constructed of logs and later covered with adobe. Emigrants paused here to obtain supplies and assistance in crossing the river. The ford was at the head of two islands, 1,200 feet below the fort. The river could be forded when the water was low; otherwise, ferrying above the fort was necessary. On September 2, 1845, Joel Palmer wrote, "At this fort they have a quantity of flour in store, brought from Oregon City, for which they demand twenty dollars per cwt. in cash." The post operated until 1853, when the river flooded and washed away most of the structures. Due to Indian hostilities following the Ward Massacre, the company decided to abandon the post rather than rebuild it.	Listed	Public (State of Idaho)	Nothing remains of Fort Boise. The general area is now a grassy meadow along the banks of the Snake River. No traces of the fort are visible, and only a crudely made statue marks the spot.

NO	SITE NAME	COUNTY	STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	THREATS TO RESOURCES/ VISITOR SERVICES
100	C. J. Strike Ruts	Owyhee	ID	Glenns Ferry	This dramatic, 1.5 mile section of ruts on the South Alternate Oregon Trail has eroded in some places to a depth of several feet. Those who could not cross the Snake River at Three Island Crossing were forced to endure the difficulties of taking wagons through this dry, sandy rangeland. The ruts are located on the west side of the Bruneau River, where those who crossed the Bruneau at the south crossing turned north and headed back to the Snake River.	Not listed	Public (BLM)	None known.
101	Utter Massacre Site	Owyhee	ID	Murphy	A major emigrant campsite was located on the South Alternate Oregon Trail at Henderson Flats near Castle Butte. On Sept 9, 1860, the Elijah Utter party of 44 emigrants was attacked by Indians. During the two-day siege, 11 people were killed. Seventeen others managed to escape but subsequently died or were killed. Only 16 emigrants survived the attack and the hardships that followed. This was one of the rare occasions when Indians sustained a prolonged assault on encircled emigrant wagons. The exact site of the battle has not been located.	Not listed	Private	Private land development and farming impact the site. A survey to locate the exact massacre site and an interpretive wayside exhibit are needed.
102	Givens Hot Springs	Owyhee	ID	Murphy	This series of hot springs bubbling up from a flat near the south bank of the Snake River was first noticed by emigrants using the South Alternate Oregon Trail in 1843. On August 27,1849, Osborne Cross wrote, “The water was extremely hot—too much so to immerse the fingers. The taste was a little metallic . . . no unpleasant smell.” This spot was a favorite campground for both emigrants and American Indians. Today the springs have been extensively modified and capped to provide hot water for a commercial “plunge.”	Not listed	Private	None known. The site needs interpretation.
103	Keeney Pass	Malheur	OR	Vale	A half-mile of deeply worn ruts atop Keeney Pass is the centerpiece of this BLM interpretive area. The South Alternate branch of the Oregon Trail rejoins the main northern route four miles southeast of Keeney Pass. The combined route ascends East Cow Hollow to reach this low and relatively flat divide between the Snake and Malheur rivers. Sarah Sutton described this crossing on August 5, 1854: “Come 15 miles without water across the most dusty dry and hot bare desert that any person ever travers’d and camp for the night on the creek Maleher.” Keeney Pass may have been named for Joseph B. Keeney and his son Edward Keeney, who operated a stage business between Boise and Walla Walla in the 1880s.	Listed as a Historic District	Public (BLM)	None known. The BLM interpretive site consists of a shelter with interpretive signs, additional signs near the trail ruts, and a hiking trail to an interpretive overlook of the pass.
104	Vale Complex	Malheur	OR	Vale	The town of Vale grew up where the Oregon Trail crossed the Malheur (unlucky or unfortunate) River. This river was the first good water emigrants encountered since crossing the Snake River at Fort Boise. The general area of the crossing site and hot springs was a popular campground. The town contains several Oregon Trail historic and interpretive sites, including Malheur Hot Springs, the Old Stone House, the Malheur River Crossing, and the grave of John D. Henderson. In 1845, Stephen L. Meek lead an estimated 1,000 emigrants west from Vale on a “shortcut” across the desert, now known as the Meek Cutoff.	The Old Stone House is listed.	Public (City of Vale)/Private	None known. There is an Oregon Trail kiosk in the city park, a historical marker at the Malheur River, and an Ezra Meeker marker at the county courthouse.
105	Farewell Bend	Baker	OR	Brogan	Here the Oregon Trail left the Snake River for the last time. Emigrants first encountered the Snake at Fort Hall and generally followed its course for 350 miles through Idaho and eastern Oregon. The Snake swung north, toward its junction with the Columbia, while the Oregon Trail veered northwest across the sagebrush steppes of eastern Oregon. The spot also served as a popular emigrant campground.	Not listed	Public (Oregon Parks and Recreation Division)	None known. There is an Oregon Trail kiosk and a historical marker at the state park. An Ezra Meeker marker is in nearby Huntington.

NO	SITE NAME	COUNTY	STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	THREATS TO RESOURCES/ VISITOR SERVICES
106	Flagstaff Hill/National Historic Oregon Trail Interpretive Center	Baker	OR	Baker	This 23,000 square-foot center overlooks a well-preserved segment of the Oregon Trail. Living history programs, an amphitheater, and an interpretive trail system support the center's theme of describing life along the trail. Trail ruts survive on BLM land and on adjacent private land on Virtue Flat.	Not listed	Public (BLM)	None known. An Ezra Meeker marker and Oregon Trail monument are nearby on Highway 86.
107	Hilgard Junction	Union	OR	La Grande	After crossing the mountain from La Grande, emigrants camped here along the banks of the Grande Ronde River before making the ascent into the Blue Mountains. This state park offers streamside camping and interpretive panels.	Not listed	Public (Oregon Parks and Recreation Division)	None known. There is an Oregon Trail interpretive kiosk at the site.
108	Blue Mountain Crossing Interpretive Park	Umatilla	OR	Pendleton	This Oregon Trail interpretive park features pristine ruts, fully accessible interpretive trails, and living history demonstrations developed by the U.S. Forest Service.	Not listed	Public (USFS-Wallowa-Whitman National Forest)	None known.
109	Meacham	Umatilla	OR	Pendleton	The little town of Meacham has several Oregon Trail related sites. An Oregon Trail campsite is located nearby, and the area has several emigration era graves. The townsite got its start when Major Henry A.G. Lee of the Oregon Rifles camped there during the Indian hostilities following the Whitman Massacre. The town later evolved into a freighting, stagecoach, and railroad stop.	Not listed	Public/Private	The town has a monument honoring "those who died blazing the Old Oregon Trail."
110	Emigrant Springs	Umatilla	OR	Pendleton	Emigrant Springs was discovered in 1834 by Jason Lee, an Oregon-bound missionary. The springs were one of several good water sources in the Blue Mountains and became a favorite camping spot. The springs have been destroyed by pipeline and highway construction, but a beautiful little state park preserves the site. The park contains a facsimile of a covered wagon and interprets the history of the springs and the Oregon Trail through the Blue Mountains.	Not listed	Public (Oregon Parks and Recreation Division)	None known. The park contains an interpretive kiosk and a historic monument that was dedicated by President Warren G. Harding in 1923.
111	Deadman Pass	Umatilla	OR	Pendleton	Deadman Pass is a narrow pass that was the last obstacle before the Oregon Trail left the Blue Mountains. The north end of the pass brought the emigrants to the top of a long sloping hill, which led down out of the Blue Mountains and into the Umatilla Valley. The name comes from the late emigration period, when seven men were killed in three separate incidents during the Bannock War of 1878. Ruts on private land are visible and accessible near the highway rest areas on I-84.	Not listed	Public (Oregon Department of Transportation)/Private (Umatilla Indian Reservation)	Preservation and marking of trail ruts on private land is needed. Oregon Trail interpretive kiosks are easily accessible at both rest areas.
112	Echo Complex	Umatilla	OR	Hemiston	This was an important campsite on the lower crossing of the Umatilla River, offering plentiful grass, water, and wood. The Utilla Indian Agency headquarters was located on the north bank but was burned in the Yakima War. Fort Henrietta was built in its place. This is the only certified site for the Oregon National Historic Trail.	Not listed	Public/Private	The complex contains interpretive wayside exhibits at Fort Henrietta, the Koontz grave, the Fort Henrietta archeological site, Echo Historic Museum, and various rut segments.
113	Echo Meadows	Umatilla	OR	Hemiston	From the lower Umatilla River crossing, emigrants could travel west across the Columbia Plateau or follow the Umatilla River to the Columbia. Those who chose the plateau route passed through Echo Meadows. A pristine section of Oregon Trail ruts can still be seen cutting across the land.	Not listed	Public (BLM)/ Private	None known. BLM maintains an interpretive site and handicapped accessible hiking trail to the ruts.

NO	SITE NAME	COUNTY	STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	THREATS TO RESOURCES/ VISITOR SERVICES
114	Well Spring	Morrow	OR	Hemiston	Well Spring, an important emigrant campsite and water source, made travel possible for weary emigrants and their worn-out teams across this dry stretch of the Columbia Plateau. Most emigrants left the Umatilla River, crossed Butter Creek, and pressed on to camp at Well Spring. The spring was always a meager source of water, but it was a crucial oasis, since this portion of the trail was usually traveled in late August or early September when the intermittent streams were normally dry. Riley Root made the journey from Butter Creek on August 24, 1848, and camped at Well Spring: "18_ miles, over a poor tract of the Columbia River valley, to camp, at the foot of a hill, by a spring, calld Well spring, rising in the center of a large mound of decayd vegetation, and sinking suddenly again, within a few feet of where it issues. . . . No grass nor water exists along this day's route, where emigrants might refresh themselves and their weary teams. . . . The spring at camp should be watched during the night by a strong guard, to keep thirsty cattle from falling into it, out of which they cannot extricate themselves." The spring has been seriously impacted over the years and is now virtually dry. Remains of a stage station, a graveyard which dates from the emigration era, and trail ruts can be found nearby.	Listed	Public (DOD)	Support of the U.S. Navy is needed to complete the development of Well Spring. Several wayside exhibits have been erected near the spring.
115	Fourmile Canyon	Gilliam	OR	Goldendale	After the Oregon Trail passed the desert-like range near Well Spring, it entered more rolling range country, transected by numerous small canyons. Over a mile of deep ruts can be found at a BLM interpretive site where the trail crossed Fourmile Canyon. Emigrants pressed on as rapidly as possible across this country because of dwindling supplies and their concern that winter would soon be upon them. Lydia A. Rudd struggled across Fourmile Canyon on September 23, 1852: "Continued our tedious journey . . . encamped on the hills wood plenty a little dry grass but no water ice nearly an inch thick this morning Mount Hood a peak of the Cascades loomed in the [sky] covered with snow Henry and myself are just able to move and that is all."	Not listed	Public (BLM)/ Private	Vandalism is a problem. Ruts on private land should be marked and preserved.
116	John Day River Crossing	Gilliam, Sherman	OR	Goldendale	After three days of sand, rock, blustery winds, and shortages of wood and water while crossing the Columbia Plateau, emigrants were relieved to arrive at the John Day River. This was the first of several major rivers flowing north toward the Columbia that would have to be crossed, but the McDonald ford provided an easy crossing. The river is normally only 8-12 inches deep during late summer, and the ford has a smooth, pebbly bottom. Esther Belle McMillan Hanna arrived at McDonald Ford on September 1, 1852: We had a very steep hill to descend in coming to it [John Day River]. We all rejoiced to see water once more as our poor beasts had had none since yesterday noon. We have encamped on the river bottom, which is large and very level. Will remain here until tomorrow to rest out cattle and ourselves and conclude on the route we will take." After ascending the west side of the canyon—"one of the most difficult hills we have met on the whole journey across the plains"—emigrants could take the right fork of the trail to go to the Dalles, or, after 1848, they could take the left fork and follow a cutoff to the Barlow Road.	Not listed	Public (BLM)/ Private	None known.

NO	SITE NAME	COUNTY	STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	THREATS TO RESOURCES/ VISITOR SERVICES
117	Biggs Junction	Sherman	OR	Goldendale	After crossing McDonald Ford, the Oregon Trail slowly wound its way through the hills towards the Columbia River. About 25 miles west of the ford, emigrants abruptly topped a ridge and saw spread out before them the magnificent Columbia River Valley, with Mt. Hood rising from the western horizon. This was one of the most impressive and joyful sights along the trail, for the Oregon country was finally beginning to resemble its publicized beauty, and reaching the Columbia River meant the long overland journey was almost at an end. Michael Fleenen Luark wrote on August 23, 1853, "4 miles further we reached the Columbia river for the first time after going down a long but not a steep hill. . . . the river is quite low at this time leaving large banks of beautiful white sand showing that the river is extremely high at some seasons of the year." A one mile section of trail ruts cross a bench above old highway 30 west of the present-day town of Biggs Junction. This is one of the last remaining stretches of the Oregon Trail along the Columbia River not destroyed by highway and railroad construction in the past century.	Not listed	Private	Permanent signs are needed to explain the rules for accessing the trail segment on private land. There is a small monument on old U.S. Highway 30 just west of the present-day town of Biggs Junction.
118	Deschutes River Crossing	Sherman	OR	Goldendale	Emigrants frequently camped at the mouth of the Deschutes River before attempting the difficult crossing of this "considerable tributary of the Columbia." Some parties crossed at the mouth of the river, using rocky islands as stepping-stones. Wagons were usually floated across, while the animals swam. Joel Palmer wrote a detailed description of the crossing on September 28, 1845: "The river is about one hundred yards wide, and the current very rapid; the stream is enclosed by lofty cliffs of basaltic rock. Four hundred yards from the Columbia is a rapid or cascade. Within the distance of thirty yards its descent is from fifteen to twenty feet. The current of this stream was so rapid and violent, and withal of such depth, as to require us to ferry it. Some of the companies behind us, however, drove over at its mouth by crossing on a bar."	Not listed	Public (State of Oregon)	Trail remnants on private land west of the Deschutes River need to be preserved and marked. The original river crossing is now submerged by Lake Celilo.
119	The Dalles Complex	Wasco	OR	Hood River	Until 1846, the Dalles marked the end of overland travel on the Oregon Trail. At the mouth of Chenoweth Creek, emigrants embarked on steamboats, rafts, or canoes for the 83-mile journey down the Columbia River to Fort Vancouver. With the opening of the Barlow Road, emigrants at The Dalles faced a decision—whether to float their families and wagons down the Columbia or to cross the southern flank of Mount Hood by wagon. Neither option was easy. Rafts and livestock were difficult to maneuver along the river's swift currents and the Barlow Road's steep and rocky grades made travel dangerous for exhausted livestock. When Celinda Heines reached the Dalles on September 19, 1853, her family decided to take the river route. They planned to "go ourselves down the river and send the cattle & horses down the pack trail which goes along near the river. . . . The men engaged a barge to take us to the Cascades & we put our things on board & went on ourselves but it began to leak & we were obliged to get off also to remove our baggage." The next day Celinda reported, "We took what provision and clothing was necessary & repaired on board the stream boat Allan which was already crowded with passengers. It is a poor apology for a boat very small having no cabin & we were obliged to seat ourselves as best we could on the floor or whatever we could find to sit upon."	Listed	Public (City)/ Private	None known. The Columbia Gorge Discovery Center is a major interpretive facility that contains exhibits focusing on the Oregon Trail.

NO	SITE NAME	COUNTY	STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	THREATS TO RESOURCES/ VISITOR SERVICES
120	Cascades of the Columbia	Hood River	OR	Hood River	While the men drove livestock along the river shore, women and children stayed with the wagons and floated the Columbia River as far as the Cascades. This was the last dangerous obstacle on the Oregon Trail for those traveling the Columbia River Route. John C. Fremont described this foaming cataract in November 1843: "The river forms a great cascade, with a series of rapids, in breaking through the range of mountains. . . . In making a short run to the south, the river forms the cascades in breaking over a point of agglomerated masses of rocks . . . the water being white with foam among ugly rocks, and boiling into a thousand whirlpools." Although these rapids were occasionally run with fully loaded boats, the practice was dangerous and fraught with accidents. Most emigrants resorted to a back-breaking three to five mile portage. Local Indians helped the emigrants transport their loads until portage roads were built around the obstruction in the 1850s.	Listed	Public (US Corps of Engineers)	None known.
121	Tygh Valley	Wasco	OR	Mount Hood	Travel along the Columbia River was so slow, expensive, and dangerous, that Samual K. Barlow decided in 1845 to develop a wagon route across the Cascade Mountains. Barlow and his party left the Dalles in the fall of 1845 and headed south, following broad valleys until he descended Tygh Ridge to camp along Tygh Creek. In later years, emigrants camped in this valley and traded with Indians before turning west to the Barlow Road. On September 4, 1853, Amelia Stewart Knight recorded in her journal, "After descending a long, steep, rocky, and very tedious hill [from Tygh Ridge] we have campt in a Valley on the bank of Indian [Tygh] creek, near some French men who have a trading post, there are also a good many indians encampt around us." The next day, after climbing out of the valley on Tygh Valley Grade, she wrote, "Ascended a long steep hill this morning which was very hard on the cattle, and also on my self as I thought I never should get to the top although I rested two or three times." Today, about 1,000 feet of ruts can still be seen where wagons climbed that grade in the southwest corner of the valley.	Not listed	Private	None known.
122	Barlow Gate	Wasco	OR	Mount Hood	Barlow Gate was the first of five tollgates operated along the Barlow Road to collect a fee from emigrants crossing the Cascade Mountains. This tollgate was in operation from 1846 to 1852. In later years, the tollgate moved to other locations along the Barlow Road, as its operators attempted to thwart the continuous efforts of the emigrants to avoid paying toll for the road whenever possible. In 1852, E.W. Conyers grumbled, "Toll is supposed to be taken for the great benefit to be derived by the poor emigrant, worn out by his long trip of two thousand miles across the continent with an ox team, who now has the privilege of paying a few paltry dollars for crossing the last range of mountains that lays between him and civilization. . . . We find no one here to take toll, and the poor, worn-out emigrants is not one bit sorry.	National Historic District	Public (USFS-Mt. Hood National Forest)/ Private	None known.

NO	SITE NAME	COUNTY	STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	THREATS TO RESOURCES/ VISITOR SERVICES
123	Barlow Pass Complex	Clackamas	OR	Mount Hood	Barlow Pass, where the Barlow Road crosses the summit of the Cascade Mountains, is a historical complex that runs for almost three miles from Devil's Half Acre on the east side of the pass to Summit Meadows on the west. The complex is rich in trail ruts, emigrant graves, and historic sites. Devil's Half Acre is a small meadow, whose name was derived from the "devil" of a climb that faced emigrants between the meadow and the summit of Barlow Pass. At 4,157 feet, Barlow Pass itself is not spectacular, but it was the key to the location of the entire Barlow Road. Joel Palmer discovered the pass in the fall of 1845 by following an Indian trail over the mountains. From the pass, the trail cuts through forest for about a mile to Pioneer Woman's Grave. This grave, a mound of stones six feet wide, 10 feet long, and four feet high, marks the burial of an unknown emigrant woman. Two miles west of the grave is Summit Meadow—the location of Summit House (the toll station between 1866 and 1870) and the Baby Morgan Grave. Grass had been scarce for several day's travel, and emigrants were grateful to finally reach a place to rest and recruit their exhausted animals on the lush meadow grasses. In 1852, John Tulley Kerns "found some grass near the divide and some on this side near our camp and grass having been so scarce as 'Morality' for the last two days our cattle & horses were ravenous enough to swallow it whole." Kerns was not too exhausted to enjoy the view from Summit Meadow: " Mt. Hood stands just north of our camp, with its lofty, white dome penetrating the ethereal Blue as if it had sworn to remain an eternal Barrier to the clouds, while time awaits eternity."	National Historic District	Public (USFS-Mt. Hood National Forest)/Private	Trail marking and direction signs are needed.
124	Government Camp	Clackamas	OR	Mount Hood	In 1849, the First U.S. Mounted Rifles arrived in Oregon after a long march overland from Fort Leavenworth. Most of the men were shipped down the Columbia River to Fort Vancouver, but a small contingent, under the command of Lieutenant David M. Frost, was ordered to take animals and wagons over the Barlow Road to Oregon City. The crossing was a disaster. The weakened animals died on their feet, and 45 wagons had to be abandoned on the southwest shoulder of Mt. Hood. In 1851, Lieutenant Frost reported, "Although every effort was made by officers and soldiers to save our animals, still they literally starved to death as we proceeded, until on arriving in Oregon City, we had mere skeletons of only about one hundred left. . . . The road through these mountains [is] about one hundred thirty miles in length through a dense fir forest, where not a single blade of grass could be found for four days. . . . Officers and men were obliged . . . [to] support the poor animals up the steep ascents by putting a rail behind them and pushing them forward." Emigrants who later camped in the area found the abandoned wagons and called the site Government Camp.	National Historic District	Public (USFS-Mt. Hood National Forest)/Private	None known.

NO	SITE NAME	COUNTY	STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	THREATS TO RESOURCES/ VISITOR SERVICES
125	Laurel Hill	Clackamas	OR	Mount Hood	Laurel Hill was the last major obstacle on the Oregon Trail. As emigrants made their way down the western slopes of Mount Hood, lowering their wagons down the various chutes, they frequently resorted to dragging trees behind the wagons or wrapping ropes around trees and belaying the wagons down. Amelia Stewart Knight descended Laurel Hill on September 10, 1853: "It would be useless for me with my pencil to describe the awful road we have just passed over (let fancy picture a train of wagons and cattle passing through a crooked chimney, and we have big laurel hill). . . . It is something more than _ mile long, very rocky all the way, quite steep, winding, sideling deep down and muddy, made so by a spring running the entire length of the road, and this road is cut down so deep that at times the cattle and wagons are almost out of sight, . . . and to make the matter worse, there was a slow poking train ahead of us . . . and another behind us which kept swearing, and hurrying our folks on."	National Historic District	Public (USFS-Mt. Hood National Forest)	None known.
126	West Barlow Tollgate	Clackamas	OR	Mount Hood	This site, one mile southeast of present-day Rhododendron, was the last of the five locations used to collect tolls on the Barlow Road. It operated from 1883 to 1918, a period more associated with the use of the Barlow Road as a freighting route than for emigration. Emigrants frequently complained about having to pay another toll, an expense that many could ill-afford. On July 5, 1881 (when the toll gate was still at Two Mile Camp) Frank Stevens found the "toll here—4-horse team, $2.25; 2-horse team, $2.00; loose cattle, 12_ c. per head. Had a small store here for the accommodation of emigrants." A replica of the 1883 tollgate stands today between two maple trees planted by tollgate-keeper Daniel Parker in the 19th century.	National Historic District	Public (USFS-Mt. Hood National Forest)	Highway 26 impacts the site.
127	Wildwood Recreation Area	Clackamas	OR	Mount Hood	After traveling down the ash flows of the Zigzag River, emigrants looking for a campsite stopped at present-day Rhododendron or continued west along the south bank of the Sandy River to the present-day town of Wildwood. Between 1845 and 1847, emigrants crossed to the north bank of the Sandy River near present-day ZigZag. After 1847, almost all emigrants stayed on the south bank of the Sandy through Wildwood on their way to the lower crossing. Benjamin Cleaver took this route on September 12, 1848: We traveled about 3 miles & struck Sandy Creek [near present-day Zigzag] a Rapid muddy stream 30 or 40 paces wide. We then traveled 4 miles further & Camped on Sandy [just west of Wildwood]. the Road runs down Sandy. the road today is tolerable level but Rocky & sandy. we had no grass to night—tied up our cattle & horses & fed them Alder leaves."	Listed	Public (BLM)	None known.
128	Philip Foster Farm	Clackamas	OR	Oregon City	In 1846, Philip Foster joined Sam Barlow's efforts to build and operate the Barlow Road. For many emigrants, Foster's farm was their fist sign of settlement at the end of the trail. Here they could rest, buy food, or sample one of Mrs. Foster's home-cooked meals. Amelia Hadley stopped here on August 23, 1851: "Camp tonight at a farm, the man's name is Foster from the state of Maine was kind and entertained us very fine I could not walk straight after not being in a house for so long. . . . They had about 2 hundred bushels of peaches which looked delightful." Foster succeeded Barlow as the primary owner of the toll road in 1851 and operated it under territorial charter until 1857. The house, built in 1882, still stands on the site.	Listed	Private	None known.

NO	SITE NAME	COUNTY	STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	THREATS TO RESOURCES/ VISITOR SERVICES
129	Oregon City Complex	Clackamas	OR	Oregon City	The Oregon Trail officially ended at Abernethey Green in Oregon City. The town was not much to boast of in the 1840s. Maria Belshaw called it the "worst looking place for a City I ever saw." The town was started in 1842 by Dr. John McLoughlin, who chose the site because of its location next to the falls of the Willamette River. The falls prohibited water navigation farther south and provided power for McLoughlin's sawmill. From here, emigrants fanned out across the fertile Willamette Valley to the south in search of the new homes they had come so far to find. Today, the End of the Oregon Trail Interpretive Center is located at Abernethy Green.	Listed	Public (Oregon City)/Private	None known. The interpretive center, consisting of three buildings in the shape of covered wagons, contains museum exhibits, educational facilities, and a museum store. During the summer an outdoor drama on the Oregon Trail is presented in front of the center.
130	Whitman Mission	Walla Walla	WA	Walla Walla	Although Whitman Mission is 31 miles north of the primary route of the Oregon Trail, its history is indelibly tied to the early years of Oregon migration. The mission was established in 1836 by Dr. Marcus Whitman, a Presbyterian missionary determined to bring religion and civilization to the Indians of the Pacific Northwest. Whitman, his wife Narcissa, and Reverend Henry and Eliza Spaulding made the long overland journey to Oregon, helping to blaze what would become the Oregon Trail. In 1843, Marcus Whitman guided members of the first great emigrant wagon train to the mission, which served as a vital way station and supply point. John C. Fremont arrived at the site in October while the emigrants were still there. He found "some cleared patches, where corn and potatoes were cultivated . . . [and] one adobe house—i.e., built of unburnt bricks, as in Mexico." Although the mission was bypassed after 1844, when a shorter route was developed thirty miles to the south, it still served as an emergency station for emigrants who needed the services of a blacksmith, had run out of food, or were too sick or destitute to travel farther. The mission was abandoned after 1847, when Cayuse Indians killed Marcus, Narcissa, and 11 others.	National Historic Site	Public (NPS)	Future incompatible development on surrounding private farmland could impact the character of the trail.
131	Fort Vancouver	Clark	WA	Vancouver	Founded by the Hudson's Bay Company in the winter of 1824-1825 as a fur trading post and supply depot, Fort Vancouver was the most important settlement in the Pacific Northwest for more than 20 years. Dr. John McLoughlin, Chief Factor of the post until 1845, greatly assisted the exhausted, penniless emigrants who arrived at his doorstep. He helped them with transportation, lodging, subsistence, and even extended credit for supplies obtained at the post until they could raise their first crops. When John Boardman arrived on November 3, 1843, he was "well received by Doct. McLaughlin, who charged nothing for the use of his boat sent up for us, nor for the provisions, but not satisfied with that sent us plenty of salmon and potatoes, furnished us house room, and wood free of charge, and was very anxious that all should get through safe." The First Regiment of Mounted Riflemen arrived at Fort Vancouver on October 4, 1849, after their long march overland from Fort Leavenworth and established the first U.S. Army base in the Pacific Northwest. Today, Fort Vancouver is operated as a National Historic Site and includes a replica of the original Hudson's Bay Company post.	National Historic Site	Public (NPS)	None known.

Appendix I. Mormon Pioneer National Historic Trail: High-Potential Segments

APPENDIX I. MORMON PIONEER NATIONAL HISTORIC TRAIL—HIGH-POTENTIAL SEGMENTS

NO	SEGMENT NAME	LENGTH (miles)	COUNTY/ STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	THREATS TO RESOURCES/ VISITOR SERVICES
1	Fort Laramie to Warm Springs	14	Goshen, Platte, WY	Torrington	On June 4, 1947, the Mormon Pioneers took the "road under the Bluffs" (River Route) out of Fort Laramie, following the river bottom for several miles until it reached a sharp bend in the North Platte. Here they turned due west to climb a long sandy slope to the benchland, where in 1.5 miles they merged with the Plateau Route. Thomas Bullock described the climb to the bluffs: "The road is very irregular & uneven. We came to a very steep bank of Sand where the teams had to halt several times. A Mr. Archibald Litle [Lytle] ill used his oxen very bad, striking them on the head & body with the butt end of his Whip." The trail remains virtually intact and continuous, except when crossed by pipelines and county roads, from the climb out of the Laramie River Valley to Mexican Hill. Huge swales are visible in places, and the junction of various branches is clearly visible where the Bluff and River routes join east of Mexican Hill.	Not listed	Public (Wyoming National Guard)/Private	National Guard activities near Guernsey impact the area.
2	Prospect Hill	3	Natrona, WY	Casper	Just west of Willow Springs is a low ridge called Prospect Hill. Here emigrants climbed 400 feet to gain their first sight of the Sweetwater Mountains to the west. The view, or prospect, of the gentle valley gave travelers hope for better water and an easier road ahead. The Mormon Pioneer Company crossed Prospect Hill on June 20, 1847, and Thomas Bullock wrote: "[We] again ascend [a] hill [and] on the summit see Snow on mountains, the Sweetwater, Rocks, Hills, & Plain. Presidents Young, Kimball, & Richards examine Map, then descend hill. One place very steep."	Determined eligible	Public (BLM)/ Private	Mineral development threatens the historic viewshed. There is a BLM interpretive panel at the top of the hill.

NO	SEGMENT NAME	LENGTH (miles)	COUNTY/ STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	THREATS TO RESOURCES/ VISITOR SERVICES
3	South Pass (Horse Creek to Little Sandy Crossing)	145	Natrona, Carbon, Fremont, Sublette, Sweetwater, WY	Casper, Bairoil, Rattlesnake Hills, Lander, South Pass, Farson	The quality of the resources and the visual experience make South Pass one of the most impressive segments on the entire trail. It starts where the trail fords Horse Creek and heads southwest to cross Wyoming Highway 220 a half mile northeast of Steamboat Rock. The segment continues southwest past present-day Pathfinder Reservoir to strike the Sweetwater River south of Saleratus Lake. Following the banks of the Sweetwater, the route heads generally west—past Independence Rock; around Devil's Gate; past Soda Lake, Split Rock, and Castle Rock—to Three Crossings. The Mormon Pioneer Company chose to take the Deep Sand Route to the south, avoiding the three fords of the Sweetwater at Three Crossings and another at Fifth Crossing. The Deep Sand Route rejoined the main trail about a mile west of Names Rock. William Clayton described the spectacular scenery viewed by the Mormon Pioneer Company along the Deep Sand Route on June 23, 1847: "We were suddenly cheered with a very plain view of the Wind river chain of the Rocky Mountains towering high up in the air and perfectly white with snow. Some of the peaks appear to run up very high. . . . The land over which we have traveled . . . is perfectly baren except for wild sage which abounds, but there is scarcely a spear of grass to be seen." The segment next passes Ice Slough; crosses Warm Springs Creek; fords the Sweetwater three more times at Sixth, Seventh, and Eighth crossings; and arrives at the foot of Rocky Ridge. The Mormon Pioneer Company avoided the regular climb up Rocky Ridge by continuing southwest into the narrow canyon of the Sweetwater and then climbing up the steep south slope of the ridge to rejoin the primary route west of Lewiston Lakes. The trail crosses Strawberry, Rock, and Willow creeks and leaves the Sweetwater River at the Ninth Crossing—a site later known as Burnt Ranch. The route then climbs past Twin Mounds and crosses the Wind River Range and the Continental Divide at South Pass. Descending into the Pacific drainage, the segment passes Pacific Springs and Plume Rock, crosses Dry Sandy Creek, and follows the north side of Dry Sandy Creek past Parting of the Ways to end at Little Sandy Crossing.	South Pass is a National Historic Landmark	Public (BLM)/ Private	Mining exploration around Lewiston and Dickie Springs has been a low-level threat to the trail and its viewshed for many years. If large-scale development is proposed, the threat would increase greatly. Ranchette development on the upper Sweetwater River near Split Rock is a concern.
4	Big Sandy to Green River	50	Sweetwater, WY	Farson, Rock Springs	This segment begins at the Big Sandy Crossing near present-day Farson and follows unimproved roads southwest along the north side of the Big Sandy River. William Clayton traveled this segment on June 29, 1848: "Our course still lies about southwest, the road generally good over gently rolling, hard, sandy land and in some places the surface is covered with loose fragments of hard rock. . . . In places the loose fragments of rocks made it very bad traveling, but many were thrown from the road by the spare men." The segment ends at the Lombard Ferry crossing of the Green River, three miles north of the confluence of the Big Sandy and Green rivers.	Not listed	Public (BLM, BOR)/ Private	Access to the eastern end of the segment is possible from Wyoming Highway 28 at a state historical marker. The segment crosses public and private lands. Visitors should acquire written permission from private landowners before entering private land. Access is not continuous along the trail by automobile. Travelers may park their vehicles and hike portions of the trail.

NO	SEGMENT NAME	LENGTH (miles)	COUNTY/ STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	THREATS TO RESOURCES/ VISITOR SERVICES
5	Fort Bridger to Cache Cave	44	Uinta, WY; Summit, UT	Evanston, Ogden	This segment includes a series of high-quality trail remnants, historic resources, and natural landmarks. It begins at Fort Bridger; ascends Cottonwood Creek, passing between Bridger Butte and Sugar Loaf Butte; climbs onto Bigelow Bench; descends to Muddy Creek; and ascends Soda Hollow. The Mormon Pioneer route then detours down Pioneer Hollow to Antelope Creek and climbs the flanks of Aspen Mountain to rejoin the main trail. The trail crosses the rim of the Great Basin at Aspen Mountain. Its elevation of more than 8,300 feet makes it the highest point on the pioneer trek. Thomas Bullock described the danger of this crossing on July 10, 1847: "Ascended the 'dividing ridge' by a zigzag road. . . . Descended by two steep pitches, almost perpendicular, which on looking back from the bottom looks like jumping off the roof of a house to a middle story, then from the middle story to the ground & thank God there was no accident happened. Presidents Young & Kimball cautioned all to be very careful & locked the Wheels of some Wagons themselves. It was a long, steep & dangerous descent." The route then descends Sulphur Creek to cross the Bear River, climbs up Coyote Creek past the Needles, crosses Yellow Creek, and ends at Cache Cave, an elongated cavity in a yellow sandstone formation.	Not listed	Public (BLM)/ Private	None known.
6	Castle Rock to This Is the Place Heritage Park	51	Summit, Morgan, Salt Lake, UT	Ogden, Salt Lake	Beginning at Castle Rock, a geologic formation that towers 200 feet above the trail, this segment goes down Echo Canyon to the present-day town of Echo. Passing through Echo Canyon on July 17, 1847, William Clayton described the canyon's acoustical properties: "There is a singular echo in this ravine, the rattling of wagons resembles carpenters hammering at boards inside the highest rocks. The report of a rifle resembles a sharp crack of thunder and echoes from rock to rock for some time. The lowing of cattle and braying of mules seems to be answered beyond the mountains. . . . The echo, the high rocks on the north, high mountains on the south with the narrow ravine for a road, form a scene at once romantic and more interesting than I have ever witnessed." At the mouth of Echo Canyon, the segment turns northwest along the Weber River, past Witch Rocks, to present-day Henefer. After crossing the Weber River, the trail turns south up Main Canyon to Hogsback Summit. It then goes down Dixie Hollow, up Broad Hollow, and descends to East Canyon Creek (now inundated by East Canyon Reservoir). The trail then ascends East Canyon Creek to Little Emigration Canyon. The four-mile trail through Little Emigration Canyon climbs 1,400-feet to the top of Big Mountain, the longest sustained climb on the entire Mormon Trail. Today, it provides a rare opportunity to walk a pristine section of the original trail in Utah. From Big Mountain Pass, the trail descends Clear Creek to Mountain Dell Canyon, makes its last ascent to Little Mountain Summit, and follows Emigration Canyon to This Is the Place Heritage Park.	Not listed	Public (USFS-Wasatch National Forest, Utah Division of Parks and Recreation)/ Private	None known.

Appendix J. Mormon Pioneer National Historic Trail: High-Potential Sites

APPENDIX J. MORMON PIONEER NATIONAL HISTORIC TRAIL—HIGH-POTENTIAL SITES

NO	SITE NAME	COUNTY	STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	THREATS TO RESOURCES/ VISITOR SERVICES
1	Nauvoo National Historic District	Hancock	IL	Burlington	In the spring of 1839, the Church of Jesus Christ of Latter-day Saints established a new settlement on the banks of the Mississippi River in Illinois. The town was named Nauvoo—reportedly from a Hebrew word meaning beautiful place. Nauvoo was the Mormon headquarters for seven years, during which time the church flourished, and the settlement quickly became one of the largest cities in Illinois. Hostility, suspicion, and trouble increased in direct proportion to the community's growth and success, and the Mormons were forced to flee their homes during the winter and spring of 1846. On April 24, 1846, Newel Knight, who departed with the spring exodus, lamented: "We all halted & took a farewell view of our delightful City. . . . We allso beheld the magnificent Temple rearing its lofty tower towards the heavens . . . we allso took a farewell look of our Comfortable homes we had labored so hard to rear for the Comfort of our families . . . my heart did swell within me."	National Historic Landmark	Private	None known. This site contains 1,100 acres of authentically restored homes and shops, including Brigham Young's home. The historic district in the town of Nauvoo contains streets, 18 restored houses, shops, and a visitor center.
2	Nauvoo Landing	Hancock	IL	Burlington	The eastern departure point of the 1846 Mormon migration west was at the foot of Parley Street on the riverfront in Nauvoo. Teams and wagons lined up along Parley Street waiting their turn to be ferried across the Mississippi River. When the river froze solid, teams were able to cross on the ice. On February 28, 1846, Brigham Young recorded, "The great severity of the weather, and . . . the difficulty of crossing the river during many days of running ice, all combined to delay our departure, though for several days the bridge of ice . . . greatly facilitated the crossing."	National Historic Landmark	Private	None known. A pavilion, granite marker, bronze plaque, and flagpole commemorate and honor the exodus from Nauvoo.
3	Montrose Landing	Lee	IA	Burlington	The pioneers landed here on the west shore of the Mississippi River during their exodus from Nauvoo in 1846. The first wagon, belonging to Charles Shumway, was ferried across the river on February 4. Orson Pratt recorded his crossing on February 14: "The falling of the snow and the cold northwest wind have made the weather very disagreeable. . . . We found the ferryman and his man standing in the open air around a small fire. We prevailed upon them to venture across and in a short time we found ourself safely landed on the West bank of the great Mississippi." The Mormons continued their exodus from Nauvoo through September, when the last members of the church were run out of town by hostile mobs.	Not Listed	Public (City Park)	None known. An accessible wayside exhibit has been installed.
4	Sugar Creek Camp	Lee	IA	Burlington	The first campsite for the Camp of Israel, Sugar Creek is well known as a place of intense hardship during the late winter of 1846. The Mormons organized at this staging area for the difficult spring trek across Iowa. Orson Pratt found the Sugar Creek Camp "suffering considerably from the storm and cold." Lorenzo Snow crossed the Mississippi River on February 9 and "camped at Sugar Creek . . . having got away in so much haste that we were not so well prepared as we otherwise should have been. There were seven in family: So with Two wagons and a Tent we made ourselves as comfortable as the circumstances of the weather would admit. There were a hundred families gathered in there before us."	Not Listed	Private	None known. The site needs interpretation.

NO	SITE NAME	COUNTY	STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	THREATS TO RESOURCES/ VISITOR SERVICES
5	Des Moines River Crossing	Van Buren	IA	Burlington	On Thursday, March 5, 1846, Brigham Young's advance party crossed their first major river since the Mississippi at the village of Bonaparte, Iowa. The ford had a good rock bottom and the crossing caused few problems. However, the muddy roads made progress slow and difficult after the crossing was completed. Hosea Stout wrote on March 5, 1846, "We came to the little town of Bonaparte. . . . There was a splendid Mill on the des Moines in this town. The mill dam was built entirely across the river with lock to pass boats up and down. . . . The River was beautiful and had a good ford with a rock bottom and was for a river of its size very convenient for travellors to ford at this time."	Not Listed	Private	None known. An accessible wayside exhibit has been installed in the city park on the riverbank.
6	Chariton River Crossing	Appanoose	IA	Centerville	The Mormon Pioneer Company made the difficult crossing of the Chariton River 0.75 mile southwest of present-day Sedan, Iowa. Steep banks on both sides of the river made it necessary to use long ropes as brakes for the wagons going down and to assist the oxen up the hill on the other side. On March 22, William Clayton described the ordeal: "We had to let the teams down into Shariton river by ropes and also helped them up again by the same means. . . . I spent the day helping the teams till I was so sore and tired I could scarcely walk." Poor weather conditions forced the Saints to camp on a ridge just west of the crossing for 10 days, from March 22 to March 31, 1846. There are some extant wagon ruts at the site.	Not Listed	Public (State of Iowa)	None known. Access to the site is across private land. There is a wayside exhibit on the ridge overlooking the valley.
7	Locust Creek Camp	Wayne	IA	Leon	At this site on April 15, 1846, William Clayton wrote the words to the now-famous Mormon hymn "Come, Come Ye Saints." Clayton received word that morning that his wife, Diantha Farr, had safely given birth to a healthy baby boy and wrote the hymn in celebration. Clayton recorded the event in his journal: "This morning Ellen Kimball came to me and wishes me much joy. She said Diantha has a son. I told her I was afraid it was not so, but she said Brother Pond had received a letter. I went over to Pond's and he read that she had a fine fat boy on the 30th. . . . Truly I feel to rejoice at this intelligence but feel sorry to hear of her sickness. . . . This morning I composed a new song—'All is well.' I feel to thank heavenly father for my boy and pray that he will spare and preserve his life and that of his mother."	Not listed	Private	None known. Wayside exhibits have been placed in the Tharp Cemetery.
8	Garden Grove	Decatur	IA	Leon	Garden Grove, the first permanent settlement on Potawatomi Indian lands in territorial Iowa, served as a Mormon way station from 1846 to 1852. Cabins and fences were built, wells were dug, and crops were planted to provide a resting place for those who could not continue and for those who would soon arrive. Orson Pratt recorded on May 10, 1846, "A large amount of labour has been done since arriving in this grove: indeed the whole camp are very industrious. Many houses have been built, wells dug, extensive farms fenced, and the whole place assumes the appearance of having been occupied for years, and clearly shows what can be accomplished by union, industry, and preserverance." The present-day town of Garden Grove, Iowa, grew up near the old Mormon camp.	Not Listed	Public (County)/ Private	None known. Two wayside exhibits have been placed at the site.

NO	SITE NAME	COUNTY	STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	THREATS TO RESOURCES/ VISITOR SERVICES
9	Mount Pisgah	Union	IA	Creston	A Mormon way station from 1846 to 1852, at its height Mount Pisgah had over 2,000 inhabitants. Like Garden Grove, it was a semi-permanent camp for the benefit of Mormons who followed the Pioneer Company. On May 19, 1846, Orson Pratt wrote, "We concluded to form another settlement here, for the benefit of the poor, and such as were unable, for the want of teams, to proceed further. Accordingly, the camp commenced building houses, ploughing, planting, and fencing in farms, an immense quantity of labour was performed in a very few days." Today, the old campsite is a nine-acre park.	Not Listed	Public (Union County Conservation Board)/ Private	None known. The site contains interpretive wayside exhibits, historical markers, and a reconstructed log cabin.
10	Grand Encampment	Pottawattamie	IA	Omaha	The vanguard of the Mormon migration reached the Missouri River on June 14, 1846, and established Grand Encampment on Mosquito Creek as a temporary stopping place. The enlistment of the historic Mormon Battalion took place here in July. Thomas L. Kane, visiting the area that summer, wrote eloquently of the camp: "[The bottomlands] were crowded with covered carts and wagons; each one of the Council Bluff hills opposite were crowned with its own great camp, gay with bright white canvas, and alive with the busy stir of swarming occupants. In the clear blue morning air, the smoke steamed up from more than a thousand cooking fires. . . . Herd boys were dozing upon the slopes; sheep and horses, cows and oxen, were feeding around them . . . in the luxuriant meadow of the then swollen river. From a single point I counted four thousand head of cattle in view at one time. As I approached the camps, it seemed to me the children were to prove still more numerous." The lack of adequate wood, water, and grass for such a large party caused the Mormons to move into the surrounding country, and Grand Encampment was abandoned by late July.	Not listed	Private (Iowa School for the Deaf)	None known. Several wayside exhibits and a trail through a restored section of prairie are at the site.
11	Kanesville Tabernacle	Pottawattamie	IA	Omaha	The 1847 Kanesville Tabernacle, which Norton Jacob called "the biggest log cabin in the world," was the first tabernacle built by the Church of Jesus Christ of Latter-day Saints. Cottonwoods were felled, trimmed, hauled to the site, hewn, and built into a 40-by-60 foot tabernacle in two and a half winter weeks under the direction of Bishop Henry W. Miller. On December 27, 1847, Brigham Young was sustained as the second president of the church in this building. The tabernacle also served as a community center. On February 7, 1849, the Frontier Guardian newspaper reported: "Cotillion Party at the Tabernacle on Tuesday, at 3 o'clock P.M., February 13th. The Musicians Benefit will come off at the above time and place. This will close the dancing for the season. Company will furnish their own refreshments. . . . Admittance 50 cents per couple." The original structure was dismantled because of underground water problems, but this replica was built in 1996.	Not listed	Private	None known. A visitor center is next to the tabernacle.

NO	SITE NAME	COUNTY	STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	THREATS TO RESOURCES/ VISITOR SERVICES
12	Middle Mormon Ferry (Missouri River)	Pottawattamie	IA	Omaha	In 1846, the Mormon pioneers built a ferry on the east bank of the Missouri River, which was used by emigrants traveling between Grand Encampment/ Kanesville and Winter Quarters. Louisa Barnes Pratt vividly recalled this journey in her memoirs: "There were so many teams ahead of us we had to wait nearly the whole day for our turn [to cross the river]. I was extremely weak! There was great confusion on the boat, the cattle were frightened. I was terrified, and it caused my fever to return. There was a dreadful hill to climb as we drove off the boat, deep mud, and at the top thick woods. It was dark, and we dared not drive on. Had no place to pitch the tent. So there we must remain till morning, musketoes beyond endurance." The site is located five miles west of the Iowa School for the Deaf, just off Iowa Highway 92.	Not listed	Private	None known.
13	Winter Quarters Complex	Douglas	NE	Omaha	Built on Indian land with permission from the U.S. Army, Winter Quarters served as the main settlement of the Mormons on the Missouri River until they moved the fitting-out site to Kanesville in Iowa. The winter of 1846-47 was devastating, and with inadequate shelter and food they died by the hundreds of malaria, scurvy, dysentery, and a host of other unidentified ailments. Louisa Barnes Pratt recalled in her memoirs, " I hired a man to build me a sod cave. He took turf from the earth, laid it up, covered it with willow brush and sods. Built a chimney of the same. . . .I paid a five dollar gold piece for building my sod house, 10 x 12. . . . A long cold rain storm brought more severely again the chills and fever. These with scurvy made me helpless indeed! . . . Many of my friends sickened and died in that place, when I was not able to leave my room, could not go to their bedside to administer comfort to them in the last trying hours, not even to bid them farewell. Neither could I go to see their remains carried to their final resting place where it was thought I would shortly have to be conveyed." Winter Quarters encompassed the area of North Omaha near State and 33rd Streets. Historic sites include the Mormon Pioneer Memorial Bridge, Florence Mill, Florence Park, Mormon Pioneer Cemetery, Cutler's Park, and the first Mormon pioneer camp after leaving Winter Quarters.	Not listed	Private (LDS Church, City of Omaha, Winter Quarters/ Florence Mill Inc.)	A major interpretive center was built by the LDS Church at Winter Quarters Historical Site in 1997.
14	Military Road Ruts	Douglas	NE	Omaha	This 100-foot section of ruts just west of Little Papillion Creek is one of the very few remaining in the Omaha area. The Mormon Pioneer Company passed this way in 1847, and the route was subsequently used by California gold seekers on the Council Bluffs Road. Thomas Bullock wrote of this day's journey on April 10, 1847: "[We] travelled on the divide of a rolling prairie, crossed the creek 'Tapion' [Little Papillion Creek] and also a marshy creek [Big Papillion Creek], at both which places the 'Mormon team' [men who were assigned to help pull wagons out of difficult spots] was called into requisition. On the banks of this last marsh the Camp halted to feed the cattle."	Not listed	Public	Urban development is a threat to the site.

NO	SITE NAME	COUNTY	STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	THREATS TO RESOURCES/ VISITOR SERVICES
15	Crossing of the Elkhorn River	Douglas	NE	Fremont	This was the first major river crossing west of the Missouri River. Described as a "wide and rambunctious stream" the river could not generally be forded in the spring, but wagons could be floated or ferried across on rafts. Thomas Bullock's party arrived at the Elkhorn River on the afternoon of April 19, 1847: "5 teams arrived at 'the Horn' about 6 o'clock, where the brethren were busily engaged Rafting over the Wagons. . . . Cotton Wood Trees in full blossom, Slippery Elm Trees in leaf, also Willows." The exact site where the Mormon Pioneer Company crossed is in doubt. Some claim it was approximately where U.S. Highway 6 crosses the Elkhorn near Waterloo, Nebraska. But the most-recent research suggests it was upriver, just south of where Nebraska Highway 36 crosses the river. The Highway 36 crossing was heavily used in later years by all who traveled west along the north side of the Platte River.	Not listed	Public/Private	None known. A wayside exhibit is planned.
16	Liberty Pole Camp	Dodge	NE	Fremont	At this important camp, the 1847 pioneers were organized along military lines on April 16. William Clayton recorded the meeting: "About 8:00 a.m. the camp was called together, and organized two Captains of 100's viz. Stephen Markham and A.P. Rockwell were appointed, also five captains of 50's and 14 Captains of 10's. There were 143 men and boys on the list of the pioneer company, three women and Lorenzo Young's two children. There are 73 wagons." The Liberty Pole, was erected on June 14, 1847, to mark the staging ground for the move across Nebraska. Eliza Snow arrived at Liberty Pole Camp on June 15 and recorded in her journal, "The brethren called a meeting around a Liberty pole which was erected yesterday for the purpose of organizing the Camp. Judg'd to be more than 300 wagons cross'd over at noon this day." A reconstructed liberty pole, made from a trimmed cottonwood tree, was erected for the Mormon Trail Sesquicentennial.	Not listed	Private	None known. The liberty pole has been re-erected, and a wayside exhibit is scheduled for installation.
17	Lower Loup River Ford	Nance	NE	David City	On April 24, 1847, the pioneers crossed another major Nebraska river, the Loup, three miles northeast of present-day Fullerton, Nebraska. Thomas Bullock observed the crossing: "The brethren continued rowing the goods over the River in the Boat, while the light loaded wagons continued crossing at the Ford, until a pretty good road was made on the Quicksand. . . . The last wagon crossed over at 20 minutes to 3, thus passing our greatest obstacle on our route without any accident for which blessing from our Heavenly Father all the camp felt to render thanks & praise." After crossing, the pioneer company remained near the Loup River, traveling west along its south bank for approximately 17 miles before turning south and heading back toward the Platte River. Creeks and marshy ground between the two rivers prevented them from turning south earlier.	Not listed	Private	None known.

NO	SITE NAME	COUNTY	STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	THREATS TO RESOURCES/ VISITOR SERVICES
18	Murdock Site	Hall	NE	Grand Island	The Murdock site is located on the south side of the Wood River, two miles south of present-day Alda, Nebraska, and one mile southwest of the Wood River Crossing. The trail crossed this 2.4-acre site in a northeast-to-southwesterly direction. The Mormon Pioneer Party crossed the site on April 29, 1847, and William Clayton reported, "The morning very cool. There seems to be very little rain in this country and no dew. . . . After traveling about two miles came to a pretty stream of good water [Wood River], about ten feet wide on an average, but at the fording place about a rod wide. . . . We then traveled on a table or prairie gently ascending for four or five miles but very even and good traveling." During the 1860s, a sawmill and dwelling, referred to as the Murdock Homestead, were located here.	Not listed	Private (Hall County Historical Society)	None known. A wayside exhibit is being planned.
19	Sand Hill Ruts	Lincoln	NE	Ogallala	This is one of the few points where emigrants had to leave the north side of the North Platte River and go across the hills. William Clayton recorded the detour on May 14, 1847: "We passed among and around the high bluffs, our course lying nearly in a north direction for some time, then turning south and on approaching the river, nearly southwest. When within about three-quarters of a mile of the river, we stopped to feed at twenty minutes to two, having traveled six and a quarter miles. We have got on the level bottom again and are probably not more than three miles in a direct line from where we started this morning." There are excellent swales still visible in the sand hills.	Not listed	Private	None known.
20	Ash Hollow Complex/Windlass Hill	Garden	NE	Chappell	The site is a natural landmark on the south side of the North Platte River. It served as the gateway to the North Platte River Valley for the main Oregon-California Trail. When the Mormon Pioneer Company saw the mouth of the ravine on May 20, 1847, they sent four men across the river in a boat to verify that this was indeed the Ash Hollow on John C. Fremont's maps. This identification allowed them to better test Fremont's mileages on into Fort Laramie. William Clayton recorded, "Opposite where we halted, we can see a ravine running up the bluffs and at the foot, a flat bottom of about fifteen acres. At the farther side of this bottom is a grove of trees not yet in leaf. Brother [John] Brown thinks they are ash and that the place is what is called Ash Hollow. . . . We all felt anxious to ascertain the fact whether this is Ash Hollow or not, for if it is, the Oregon Trail strikes the river at this place."	Listed	Public (Nebraska Game and Parks Commission)	None known. A visitor center with interpretive exhibits is operated at Ash Hollow State Historical Park. There are also interpretive waysides at Windlass Hill.
21	Ancient Bluff Ruins	Morrill	NE	Crescent Lake	This frequently mentioned landmark is the most dramatic and extensive bluff formation along the north side of the North Platte River. These three erosional remnant buttes were named by English Mormons who thought they resembled castles in their homeland. On Sunday, May 23, 1847, Mormon leaders climbed the highest bluff, wrote their names on a buffalo skull, and placed it at the southwest corner. Thomas Bullock "found that all of the Twelve had started on an exploring excursion to the mountains. At 9:24 they visited several of the Bluffs. . . . Professor Pratt took an observation by which he found it was 235 Feet higher than the River. . . . [They] rolled down some large stones from the top, and returned to Camp at 11:05." Trail ruts are found nearby.	Not listed	Private	The site needs interpretation and adequate access.

NO	SITE NAME	COUNTY	STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	THREATS TO RESOURCES/ VISITOR SERVICES
22	Courthouse Rock/Jail Rock	Morrill	NE	Scottsbluff	Courthouse Rock was first noted by Robert Stuart in 1812 and quickly became one of the guiding landmarks for fur traders and emigrants. It is a massive monolith of Brule clay and Gering sandstone south of the trail, which was variously likened to a courthouse or a castle. A smaller feature just to the east was called the Jail House or Jail Rock. Courthouse Rock was the first of several impressive natural landmarks along the trail in western Nebraska. Though located on the south side of the North Platte River, this formation was clearly visible to the Mormon pioneers as they passed by on the north side. The Pioneer Party camped north of here on May 24, 1847, and William Clayton observed, "Opposite the camp on the south side of the river is a very large rock very much resembling a castle of four stories high, but in a state of ruin. A little to the east a rock stands which looks like a fragment of a very thick wall. . . . The scenery around is pleasant and romantic."	Listed (Courthouse Rock)	Public (City of Bridgeport, Nebraska State Historical Society)	Dirt bikes, vandalism, and all-terrain vehicles pose threats to resources at this site. Interpretation is needed.
23	Chimney Rock	Morrill	NE	Scottsbluff	This prominent column of clay and sandstone was a significant landmark in measuring the emigrants' progress west. Though located on the south side of the North Platte River, this formation was clearly visible to the Mormon pioneers as they passed by on the north side on May 26, 1847. The next morning William Clayton noted, "We have seen a number of romantic spots on our journey, but I consider our view this morning more sublime than any other. Chimney Rock lies southeast, opposite detached bluffs of various shapes and sizes. To the southwest, Scott's Bluff looks majestic and sublime. The prairie over which our route lies is very level and green as far as we can see. The bluffs on the north low, and about three miles distant. The scenery is truly delightful beyond imagination."	Listed	Public (Nebraska State Historical Society)	None known but ongoing erosion. A new visitor center contains excellent interpretive exhibits.
24	Scotts Bluff National Monument/Mitchell Pass	Scotts Bluff	NE	Scottsbluff	Scotts Bluff was the first of many imposing barriers that travelers encountered as they made their way west. It was also the last famous landmark along the Great Platte River Road in Nebraska. Though located on the south side of the North Platte River, this formation was clearly visible to the Mormon pioneers as they passed by on the north side. On May 27, 1847, William Clayton wrote, "Passed the meridian of the northernmost peak of Scott's Bluff. . . . These bluffs are very high, steep, and broken like many others, resembling ancient ruins. They are probably two miles from north to south extremity, but not very wide."	National Historic Landmark/ National Natural Landmark	Public (NPS)	Visual intrusions and potential urban sprawl from Gering and Scottsbluff encroach on the site.

NO	SITE NAME	COUNTY	STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	THREATS TO RESOURCES/ VISITOR SERVICES
25	Fort Laramie	Goshen	WY	Torrington	Fort Laramie traces its origin to Fort William, a fur-trading post constructed on the Laramie River in 1834. In 1841, the American Fur Company replaced the old log fort with a larger adobe structure, which they named Fort John. Fort John was noted as an island of civilization where information concerning trail conditions could be obtained from post personnel. Brigham Young found the inhabitants friendly and informative when the Mormon Pioneer Company passed through in 1847. Arriving on June 1, William Clayton reported they were "politely welcomed by Mr. [James] Bordeau who appears to be the principal officer. He conducted us up a flight of stairs into a comfortable room, and being furnished with seats, we rested ourselves. President Young and others entered into conversation with Mr. Bordeau. From him we learned that we cannot travel over four miles farther on the north side of the Platte before we come to bluffs which cannot be crossed with loaded wagons." Thomas Bullock recorded on June 3 that they "commenced ferrying the Wagons over at sunrise and continued all day." Acquired by the U.S. Army in 1849 and renamed Fort Laramie, the post continued to serve emigrants throughout the overland trails era. The Bedlam Ruts (administered by BLM) are nearby.	National Historic Landmark	Public (NPS)	None known. Fort Laramie National Historic Site maintains a visitor center/museum with interpretive exhibits and several restored buildings from the military era.
26	Mexican Hill	Platte	WY	Torrington	At Mexican Hill the trail made a steep and dramatic cut through the river bluffs from the benchland to the floodplain of the North Platte River. The Mormon Pioneer Party descended the bluffs on June 4, 1847, and Thomas Bullock wrote: "We had a very steep hill to descend between 4 & 5. We not only locked Wheels, but had attached ropes to the hind end of the Wagons [with] the brethren holding back [at] the same time. In about 2 hours we got safely thro' & halt for the night at 5:20 in the bottom, near the River." Where the Bluff and River routes intersected, ruts lead up to the hill from 0.75 mile to the east. They are some of the most-memorable swales anywhere on the trails. The origin of the name is obscure.	Not listed	Private	The site has been impacted by erosion and unauthorized vehicle use.
27	Register Cliff	Platte	WY	Torrington	Among the most famous of the surviving emigrant registers, thousands of names were inscribed on this mile-long prominent sandstone cliff on the south side of the North Platte River. Cliffs to the east and west also contain hundreds of well-preserved emigrant inscriptions. The first night west of Fort Laramie, June 4, 1847, the Pioneer Party camped in the pleasant cottonwood-shaded bottoms near Register Cliff. The next morning Thomas Bullock reported they passed "under some very bold Bluffs of Plaster of Paris." He did not record that any names were noted on these cliffs.	Listed	Public (State of Wyoming)	Natural deterioration, housing development, vandalism, and National Guard activities to the west all impact the site. The state of Wyoming needs to update the interpretive materials.
28	Guernsey Ruts (Deep Rut Hill)	Platte	WY	Torrington	At this site, where the trail was forced away from the river and crossed a ridge of soft sandstone, the track is worn to a depth of five feet, creating some of the most-spectacular ruts remaining along the entire length of the Mormon Trail. The geography of the area dictated that practically every wagon that went west crossed the ridge in exactly the same place, with impressive results. On June 5, 1847, Thomas Bullock lamented: "On coming to the hills we had a very difficult spot to ascend, pass thro' & again descend to a prairie."	National Historic Landmark	Public (State of Wyoming)	This site needs better marking and interpretation. Visitor use should be channeled to protect the ruts and surrounding terrain from the effects of indiscriminate wandering. National Guard activities in the area have caused major visual intrusions.

NO	SITE NAME	COUNTY	STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	THREATS TO RESOURCES/ VISITOR SERVICES
29	Warm Springs Canyon	Platte	WY	Torrington	These two free-flowing springs, one gushing from a ledge of rock and the other bubbling up in a large pool, were only slightly warm. Often called the "emigrants' wash tub," this was a particularly popular camping place, available to travelers on both the Black Hills Road and the River Route. The Mormon Pioneer Party nooned here on June 6, 1847, and William Clayton described the area: "Halted for noon opposite a very large spring noticed by Fremont. The water of this spring is very clear and soft, but considerably warmer than the river water." The spring still flows strongly and the site is in nearly pristine condition.	Not listed	Private	National Guard activities threaten the canyon. The site has been marked by the Oregon-California Trails Association.
30	Laramie Peak	Albany	WY	Laramie Peak	This famous 10,272 foot landmark in the Black Hills (named for the dark appearance of its tree-covered slopes) guided emigrants' travel for many days. First sighted when descending from Robidoux or Mitchell passes, this mountain was constantly in view for almost 100 miles. It must have seemed that the peak would never be passed. From Fort Laramie on June 2, William Clayton commented, "One can see the same black hill seen on Sunday evening and which is Laramie Peak. We could see the snow lying on it very plainly. We can also see several ranges of high hills in the distance which are no doubt parts of the Black Hills." On June 7, Thomas Bullock was still commenting on the peak: "Had a full view of Laramie Peak, covered with Timber & tipt with snow."	Not listed	Public (USFS-Medicine Bow National Forest)	None known.
31	Ayres Natural Bridge	Converse	WY	Douglas	This natural feature was often mentioned in emigrant diaries, and spring-fed La Prele Creek was used as a campsite. The natural bridge is in a beautiful red-rock canyon, which offered good water and plentiful forage for animals. The Mormon Pioneer Company camped on nearby La Prele Creek on June 9, 1847. The next day, William Clayton reported, "About a mile from where the road crosses [La Prele Creek], it runs through a tunnel from ten to 20 rods under the high rocky bluffs. The tunnel is high enough for a man to stand upright in, and when standing at the entrance one can see the light through on the other side. It seems as though this tunnel has been formed by some strange feat of nature. Several of the brethren went to see it."	Not listed	Public (Wyoming State Parks and Historic Sites)	The site shows signs of overuse. Improved interpretation is needed.
32	Upper Platte Ferry and Ford (1847)	Natrona	WY	Casper	In 1847, the Mormon pioneers used timber from the nearby mountains to build a ferry across the North Platte River. On June 13, Thomas Bullock recorded, "The Twelve and Captains met at the President's Wagon to take into cons[ideratio]n the manner of crossing the River in the best way. . . . Each company . . . went with Teams to the Pineries for trees to construct their rafts." On June 15, William Clayton noted, "The brethren continued ferrying wagons over on the raft and also built two other rafts." It took them nearly a week to get all of the wagons and provisions across the river. Brigham Young left nine men behind to trade ferry services for money and provisions. Consisting of two 30-foot dugout canoes with a plank bed, the ferry was soon moved downstream to respond to competition and was maintained for the use of both Mormon and non-Mormon emigrants.	Not listed	Public (City of Casper)	None known. Nearby Fort Caspar has a museum/visitor center with interpretive exhibits and a replica of the raft.

NO	SITE NAME	COUNTY	STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	THREATS TO RESOURCES/ VISITOR SERVICES
33	Bessemer Bend/Red Buttes Crossing	Natrona	WY	Casper	The last place to cross the North Platte River, Bessemer Bend was the preferred crossing prior to the establishment of the Mormon Ferry in 1847, after which its use declined. The Red Buttes, a physical feature to the north of the river, made the crossing a minor landmark. The Mormon Pioneer Company crossed the North Platte River at the Upper Platte Ferry and headed west toward Emigrant Gap. They soon turned south, however, until they again reached the North Platte River. They halted for noon opposite the Red Buttes and William Clayton reported, "The Red Buttes are nearly opposite to this place towards the southwest and appear to be two high bluffs of red earth or sand, presenting a very triangular, yet interesting appearance." Turning west, they rejoined the main trail about two miles above Avenue of Rocks.	Not listed	Public (BLM)	The site is adequately protected and well interpreted by the BLM.
34	Avenue of Rocks	Natrona	WY	Casper	These natural rock formations jut out of the Wyoming rangeland, and the Mormon pioneers were forced to wind through the rocks as the trail vaulted the rocky spine. Traveling across this torturous landscape on June 19, 1847, William Clayton wrote, "There is a high ridge of sharp pointed rocks running parallel with the road for near a quarter of a mile, leaving only sufficient space for wagons to pass. At the south point there is a very large rock lying close to where the road makes a bend, making it somewhat difficult to get by without striking it. The road is very rough with cobble stones."	Not listed	Public (State of Wyoming)	Vandalism and increasing erosion on country roads are the main threats. This site needs interpretation of the natural formation and the emigrant trails.
35	Willow Springs	Natrona	WY	Casper	Willow Springs provided the first safe water west of Casper. These free-flowing springs offered cool refreshing water and nearby forage for animals. The area quickly became a popular campsite. On June 20, 1847, William Clayton "arrived at the Willow spring and halted a little while to get water. This spring is about two feet wide and the water ten inches deep, perfectly clear, cold as ice water, and very good tasting. There is a willow grove extending for some distance above and below it which will answer very well for firing purposes. The grass is good and plentiful and it is one of the loveliest camping spots I have seen on the journey." To the southwest, visible ruts ascend Prospect Hill. The springs are in the yard of an abandoned ranch, where several deteriorating shacks and outbuildings barely stand.	Not listed	Private	Low-key and unobtrusive interpretive panels should be selectively placed to point out trail-related geographical features.
36	Prospect (Ryan) Hill	Natrona	WY	Casper	Just west of Willow Springs is a low ridge called Prospect Hill, where emigrants gained their first sight of the Sweetwater Mountains to the west. The 400-foot climb was very hard on draft animals. It was reportedly named because emigrants could see the gentle valley of the Sweetwater River from the top of the hill, giving them a view—or prospect—of an easier road ahead. Clayton continues his narrative: "At a quarter mile beyond the spring [Willow Springs] we began to ascend a very high hill which was one mile from the foot to the top and the ascent pretty steep. . . . From the top can be seen a vast extent of country. . . . The view from this hill is one of romantic beauty which cannot be easily surpassed and as President Young remarked, would be a splendid place for a summer mansion to keep tavern." Prospect Hill has clearly visible ruts on its eastern slope. The view from the top has changed little from the one seen by the Mormon Pioneer Company on June 20, 1847.	Not listed	Public (BLM)	Mineral development may impact the site. Two BLM interpretive markers are located at the top of Prospect Hill.

NO	SITE NAME	COUNTY	STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	THREATS TO RESOURCES/ VISITOR SERVICES
37	Saleratus Lake	Natrona	WY	Rattlesnake Hills	This alkali deposit, or "pan," about a quarter-section in size, provided emigrants a soda compound used in baking. William Clayton of the 1847 Mormon Pioneer Company reported, "After we halted, Sister Harriet Young made some bread using the lake saleratus and when baked was pronounced to raise the bread and taste equal to the best she had ever used and it requires less of this than the common saleratus. A number of the brethren went back during the halt and filled their pails with it, calculating to make use of it during our future journey."	Not listed	Private	An agreement to permit access should be negotiated with the private owner.
38	Independence Rock	Natrona	WY	Bairoil	Independence Rock was the most-noted landmark on the emigrant trails west of Fort Laramie. An oval outcrop of granite rock, it is 1,900 feet long, 700 feet wide, and rises 128 feet above the range. The rock derived its name from a party of fur trappers who camped there and celebrated Independence Day in their own style on July 4, 1830. Independence Rock was also widely used by emigrants as a place to inscribe their names and to leave messages for those coming behind. Louisa Barnes Pratt described her 1848 visit to the site in her memoirs: "Independence Rock was another novelty. The size was immensely large and rather difficult of ascent. A thousand names were inscribed on the rock, which proved we were not the first adventurers. Freemont had been there, also the pioneers to Salt Lake Valley. We left our names with the rest, and as we descended, in a crevice of the rock was water dripping down into a spring. . . . How much romance and beauty there is in nature, where she dwelt alone! "	National Historic Landmark	Public (State of Wyoming)	The site shows signs of overuse. A complete inventory of inscriptions is needed. Lichen growth is encroaching on several panels. A highway rest area provides parking and interpretive wayside exhibits.
39	Devil's Gate	Natrona	WY	Bairoil	Devil's Gate is a narrow cleft carved by the Sweetwater River, 370 feet deep, 1,500 feet long, and only 50 feet wide in places. Devil's Gate is among the more interesting geographical landmarks along the emigrant trails. This natural feature became visible approximately 15 miles to the east. It was a rest stop and campground and is thought to have more than 20 graves in the immediate vicinity, although only one is marked. There are inscriptions on the rocks. On June 22, 1847, William Clayton "went back to view the Devil's Gate where the river runs between two high rocky ridges for a distance of about 200 yards. . . . The river has a channel of about three rods in width through this pass which increases its swiftness and, dashing furiously against the huge fragments of rock which have fallen from the mountain, makes a roar which can be heard plainly in the camp. . . . The scenery is one of romantic grandeur and it seems wonderful how a river could ever find a channel through such a mass of heavy, solid rock."	Listed	Public (BLM)	The impacts of visitor use should be closely monitored. The BLM manages the Devil's Gate interpretive site.
40	Split Rock	Fremont	WY	Bairoil	This famous "gun sight" cleft in the mountains is another prominent geographical feature within the South Pass segment. It was noted in many diaries.	Not listed	Public (BLM)/ Private	Access to the trail should be improved. Just east of Split Rock Station, the BLM has developed an attractive interpretive site that describes the area and its history.

NO	SITE NAME	COUNTY	STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	THREATS TO RESOURCES/ VISITOR SERVICES
41	Three Crossings/Deep Sand Route	Fremont	WY	Rattlesnake Hills	The Mormon Pioneer Company chose to avoid the river route through this narrow canyon, a trip that required crossing the Sweetwater River three times within two miles. Leaving the river, they traveled via the Deep Sand Route to the south of the Sweetwater. This alternate allowed them to avoid the Three Crossings and the Fifth Crossing of the Sweetwater River. On June 23, 1847, Thomas Bullock described this detour: "Start at 1:15 leaving the River, going thro' very heavy Sand. . . . Very bold rocks. Travel thro' much Grease Wood & Artimesia, but very little grass. Get a fine view of the Wind River chain of Mountains. Came to the river at 4:43 & halt at 5:45 on good grass."	Not listed	Public (BLM)/ Private	A nearby uranium processing plant has been torn down, and a reclamation effort has been underway at the mill site for several years. The BLM would like to acquire the site but might not be able to do so if the area is contaminated.
42	Ice Slough	Fremont	WY	Lander	At this cold spring, emigrants occasionally found ice underneath the soil until late summer. The ice was insulated by four to six inches of water above the ice and by rich grassy sod that grew thick enough to bear a man's weight. Ice Slough became a major camping site for travelers, who enjoyed the cold refreshment after several days of dry and dusty terrain. William Clayton passed the spring on June 24, 1847: "There is some water standing around a small, circular, swampy spot of land probably about a half an acre. Near the edge at the northwest corner is a hole dug which is called the Ice Spring. The water in the hole smells strong of sulphur or alkali and is not pleasant tasting, but under the water which is over a foot deep there is as clear ice as I ever saw and good tasting. . . . The ice is said to be four inches thick."	Not listed	Public (BLM)	Hydric soils are susceptible to trampling damage by wild horses and the season-long livestock grazing that has occurred for over a century. This has caused a loss of the humus that provided the insulation that preserved the ice. Access to the site is across private land. There is a state historical marker nearby.
43	Rocky Ridge	Fremont	WY	South Pass	Here the pioneers were forced up and away from the Sweetwater River to cross a high, barren, and rocky ridgeline. The crossing required much jarring travel over a rock-strewn landscape. There is no specific spot that can be labeled Rocky Ridge. The name refers to a geographic area spread over two square miles, where wind and erosion have kept soil from collecting and have laid bare a washboard of bedrock. Well-defined ruts still wander over the top of the ridge. On June 25, 1847, the Mormon Pioneer Company avoided the usual climb to the ridge by turning southwest and entering the "very narrow vale" of Sweetwater Canyon and then climbing its south slope, a "long steep hill," to scale Rocky Ridge. Wilford Woodruf commented, "Early in the afternoon we began to ascend the highest & longest Hill that we have passed over on the Journey. We traveled about 5 miles before [we] reached the top. On the way up the brethren found snow Banks 20 or 30 rods long from 5 to 10 feet deep about _ of a mile from the road. They brought some to me & I ate some."	Not listed	Public (BLM)	The site needs a cultural landscape report. The area has great visual integrity. Overuse may be a problem with increased visitation.
44	South Pass	Fremont	WY	South Pass	South Pass was perhaps the most important landmark along the emigrant trails. It marked the end of the long ascent to the Continental Divide and the emigrants' arrival at the frontier of the Oregon country. South Pass dictated the location of the emigrant trail, for only via its gradual ascent was wagon travel over the Continental Divide practical for large-scale emigration. South Pass is the wide, flat summit of a long and gradually ascending plateau, with low ridges and hills on both sides and a wide sage and grass-covered saddle between. Many emigrants commented that they scarcely noticed the ascent or the crossing. Upon crossing this milestone of the journey on June 27, 1847, William Clayton wrote one understated sentence: "Arrived at the dividing ridge where Elder Pratt took a barometrical observation and found the altitude 7,085 feet above the level of the sea."	National Historic Landmark	Public (BLM)	In spite of an abandoned railroad grade, a diversion ditch, and an AT&T buried cable, this site should be protected from additional visual intrusions. Any pipeline crossing of this area might intrude on the extraordinary historic character of the site. Historic monuments are at the pass and a wayside exhibit is nearby.

NO	SITE NAME	COUNTY	STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	THREATS TO RESOURCES/ VISITOR SERVICES
45	Pacific Springs	Fremont	WY	South Pass	Pacific Springs was the first good water source after emigrants crossed South Pass and entered the Pacific watershed. The springs created an extensive marsh, which appeared as a green oasis in the dry landscape. Emigrants often camped at the site and many commented on the destination of its waters. On June 27, 1847 William Clayton arrived "on the head waters of the Green River and although the stream is small, we have the satisfaction of seeing the current run west instead of east." Here the Pioneer Company met Moses Harris, a mountain man who gave them a very discouraging description of the Valley of the Great Salt Lake. But Clayton was not dismayed by this report: "We generally feel that we shall know best by going ourselves, for the reports of travelers are so contrary it is impossible to know which is the truth without going to prove it." The Mormons later established a station at Pacific Springs.	Not listed	Private	Vandalism is a continuing problem. An impressive overlook/rest area on Wyoming Highway 28 contains several interpretive waysides about the South Pass/Pacific Springs area.
46	Dry Sandy Crossing	Sublette	WY	Farson	The Dry Sandy was the first water reached west of Pacific Springs. It was crossed below a broad basin that collected subsurface water. In dry seasons, water could be found here by digging in the streambed, but it was tainted with alkali. Many emigrants reported the loss of livestock. The river flowed more below the surface than above ground. Emigrants only stopped here when absolutely necessary. The Mormon pioneers camped at the Dry Sandy on June 27, 1847. William Clayton found "very little grass to be seen anywhere and not much near this creek. There is but little water in the creek at first site, but by digging and trampling on the quick sand, sufficient can easily be obtained to supply a large company." Evidence of "tanks" dug by emigrants to water their oxen can still be found in the area.	Not listed	Private	None known.
47	Parting of the Ways	Sweetwater	WY	Farson	The Oregon Trail and the Sublette Cutoff separated at Parting of the Ways. In the midst of a wide-open expanse of land, both trails are plainly visible, and the eye can follow them for miles toward the horizon. At this point, California and Oregon bound emigrants had to make a hard decision. Should they save 46 miles by taking the Sublette Cutoff, which bypassed the southern loop to Fort Bridger but also demanded 50 miles of travel with no water? When the Mormon Pioneer Company arrived at this important junction on June 28, 1847, Thomas Bullock simply stated, "Came to a Cross Road at 10:30. . . . Dr. Richards puts up a guide board to Oregon & California. We turned the left road in a SW direction over a level road." Subsequent Mormon companies would follow in their tracks, turning down the original Oregon Trail, heading southwest to Fort Bridger and on to the Valley of the Great Salt Lake.	Listed	Public (BLM)	Encroaching mineral exploration and development threaten the viewshed.
48	Little Sandy Crossing	Sweetwater	WY	Farson	The Mormon pioneers camped on the banks of Little Sandy Creek, the first good water west of Pacific Springs, on June 28, 1847. Thomas Bullock described it as "a deep, rapid, muddy stream of Water with many Willows, Gooseberry & Tea Rose Trees on its banks [and] pretty good grass." Here the pioneers met Jim Bridger, who gave them valuable advice on the route ahead and his opinions concerning lands suitable for settlement. William Clayton took copious notes of the meeting but decided in the end that "we shall know more about things and have a better understanding when we have seen the country ourselves."	Not listed	Public (BLM)	Visitors need to travel through a half mile of private property to access the site. There is a BLM marker east of the creek.

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49	Big Sandy Crossing	Sweetwater	WY	Farson	The Mormon Pioneer Company made the difficult crossing of the Big Sandy River on June 29, 1847. William Clayton reported that they "halted for noon on the banks of the Big Sandy. . . . This stream appears to be about seven rods wide at this place and about two feet deep in the channel, but is not generally so wide, but deeper. There is some timber on its banks and plenty of grass in places for teams." The company completed the crossing about 1:30 and followed the Big Sandy's north bank to the Green River. Excellent examples of pristine ruts can still be seen near the crossing.	Not listed	Public (BLM)/ Private	Currently there are few threats to the site because of limited access, but vehicle overuse could threaten nearby ruts, as well as damage the river crossing.
50	Lombard Ferry (Green River Mormon Ferry)	Sweetwater	WY	Rock Springs	Lombard Ferry, named after the trail era for its proximity to Lombard Buttes, was the main crossing of the Green River. During periods of low water, wagons could ford the river, but the shallow sand bar they used was only 10 feet wide. When the Mormon pioneers arrived on June 30, 1847, Thomas Bullock recorded, "Here is a good camping ground, tolerable grass, plenty of Cotton Wood & other Trees, the largest we have seen for upwards of 200 miles. . . . Mosquitoes very troublesome." Brigham Young gave orders to build a raft, and they spent three days floating their wagons across the river. Later that year, the Mormons built ferryboats and provided a commercial ferry service, both to assist subsequent Mormon companies and as a commercial venture.	Not listed	Public (USFWS-Seedskadee National Wildlife Refuge)	Gas development and fossil collectors are threats. The site is interpreted.
51	Church Butte	Uinta	WY	Kemmerer	This large butte, with its temple-like shape, deeply eroded walls, and flattop mesa, is about 1,000 feet in diameter and rises 75 to 100 feet above the level of the Blacks Fork Valley. Believed to have been first named by fur traders, Church Butte became one of the landmarks along the trail and excited the comment of many emigrants. Thomas Bullock described it simply as "the high bluff in the form of a semi circle."	Not listed	Private	Gas wells and mineral development negatively impact the historic viewshed. Vandalism and litter are also problems.
52	Fort Bridger	Uinta	WY	Evanston	Jim Bridger established Fort Bridger in 1843 as a fur-trading post. It was composed of two double-log houses about 40 feet long that were joined by a pen for horses. The Mormon Pioneer Company reached the fort on July 7, 1847, and spent a day there but considered its prices too high. Thomas Bullock commented, "Several brethren go to make trades with the French & Indians, but few succeeded, as they could not obtain sufficient for their goods." Here the main Oregon-California Trail turned north toward Fort Hall, and the Mormon Trail/Hastings Cutoff continued west to the Valley of the Great Salt Lake. The fort served as a Pony Express, Overland Stage, and transcontinental telegraph station in the 1860s and was garrisoned by the U.S. Army between 1857 and 1890.	Listed	Public (State of Wyoming)	None known. The fort has a museum/visitor center and a reconstruction of Bridger's log trading post.
53	Bear River Crossing	Uinta	WY	Evanston	This was the last major river crossing in Wyoming on the Hastings Cutoff/Mormon Pioneer/Pony Express route. On July 12, 1847, Orson Pratt of the Mormon Pioneer Company recorded, "The river here is about 60 feet wide, 2_ feet deep; a very rapid current, and the bottom completely covered with round boulders, some of which were about as large as a human head." William Clayton found the "banks lined with willows and a little timber, good grass, many strawberry vines and the soil looks pretty good."	Not listed	Private	None known. There is a marker east of the river.

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54	The Needles	Uinta	WY	Ogden	This prominent landmark rising abruptly near the Wyoming-Utah border is a formation of conglomerate rock that looks like cobblestones in hardened mud. Orson Pratt described it as “a pudding stone formation. . . . The rocks are from 100 to 200 feet in height, and rise up in a perpendicular and shelving form, being broken or worked out into many curious forms by the rains. Some quite large boulders were cemented in this rock.” Another imaginative traveler suggested that the spires reached up “like the pyramids of Egypt.” Near here on July 12, 1847, Brigham Young became violently ill with “mountain fever.” As a result, he entered the Valley of the Great Salt Lake two days later than the vanguard party.	Not listed	Private	None known.
55	Cache Cave	Summit	UT	Ogden	The first campsite for the Mormon Pioneer Company after entering present-day Utah on July 12, 1847, was 0.25 mile from Cache Cave. The cave is about 30 feet deep, 15 feet wide, from four to six feet high, and is covered inside with emigrant names. The Pioneer Company found many martins at the entrance and on observing closely could see numerous insects. It was supposed from appearances that trappers had used it as a “cache” for storage. Wilford Woodruff reported, “Many of us cut our names in it.”	Not listed	Private	Gradual erosion continues to threaten the signatures. Visitor access is rarely allowed.
56	Big Mountain Pass	Morgan	UT	Salt Lake City	Following the route blazed in 1846 by the Donner-Reed Party, the trail climbed Little Emigration Canyon to Big Mountain Pass, the third-highest point on the entire Mormon Trail and an important and difficult crossing. From this vantage point, the Mormon pioneers of 1847 and thousands of subsequent emigrants caught their first glimpse of the Valley of the Great Salt Lake. When Orson Pratt first saw this view on July 21, 1847, he recorded, “Beholding in a moment such extensive scenery open before us, we could not refrain from a shout of joy which almost involuntarily escaped from our lips the moment this grand and lovely scenery was within our view.”	Not listed	Public (Utah Department of Transportation highway right-of-way)	None known. There is an interpretive marker at the pass.
57	Little Mountain Summit	Salt Lake	UT	Salt Lake City	This was the last summit the Mormon pioneers crossed on the long trek. They hitched multiple teams together to pull the wagons straight up the slope. On the summit, they locked their wheels for brakes and slid down the other side into Emigration Canyon, which led directly, and finally, into the Valley of the Great Salt Lake. Mary Rich entered Emigration Canyon after 1,000 miles of ox-driving so ragged that she was not quite decent: “When we arrived in Emigration Canyon, the longest place on my dress was just a little below my knees. I had walked over the brush, driving my team, to keep them in the road, and could not stop to untangle my dress when it got fastened, but had to walk on, leaving part of my dress behind.”	Not listed	Public (Utah Department of Transportation highway right-of-way)	None known. There is an interpretive marker by the side of the road.
58	Last Camp	Salt Lake	UT	Salt Lake City	On July 23, 1847, Brigham Young spent his last night on the trail at a campsite in Emigration Canyon, six miles beyond the summit of Big Mountain. The next morning, July 24, 1847, a day revered in Mormon history, Young entered the Valley of the Great Salt Lake. That same day, Orson Pratt of the advance scouting party wrote in his journal, “This forenoon commenced planting our potatoes; after which we turned the water upon them and gave them quite a soaking.”	Not listed	Public (State of Utah)	None known. A granite marker was erected by the Daughters of the Utah Pioneers in 1936.

NO	SITE NAME	COUNTY	STATE	QUAD 1:100,000	DESCRIPTION	NATIONAL REGISTER STATUS	OWNERSHIP	THREATS TO RESOURCES/ VISITOR SERVICES
59	This Is the Place Heritage Park	Salt Lake	UT	Salt Lake City	On July 24, 1847, Wilford Woodruff came out of the mouth of Emigration Canyon "in full view of the great valley or Bason [of] the Salt Lake and land of promise held in reserve by the hand of GOD for a resting place for the Saints upon which a portion of the Zion of God will be built. We gazed in wonder and admiration upon the vast rich fertile valley. . . . Our hearts were surely made glad after a Hard Journey from winter Quarters." In 1947, to commemorate the centennial of the arrival of the Mormon Pioneer Company in the Valley of the Great Salt Lake, a massive memorial was designed by Mahroni M. Young and constructed on this site. Sixty feet high and eighty-four feet wide, it features fifteen plaques and many statues and bas-reliefs honoring the Mormon Pioneers, American Indians, and others who explored the Great Basin. There is a visitor center and a reconstructed pioneer village on this 500-acre park.	Listed	Public (Utah Division of Parks and Recreation)	None known. Extensive visitor facilities and living history programs are operated by the non-profit foundation that manages the site.

Attachment R-2. Glare Analysis Reports

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FORGESOLAR GLARE ANALYSIS

Project: **Biglow Canyon Solar**
Site configuration: **South Arrays Analysis 1 - 1st Story Receptors**

Created 09 Aug, 2024
Updated 09 Aug, 2024
Time-step 1 minute
Timezone offset UTC-8
Minimum sun altitude 0.0 deg
DNI peaks at 1,000.0 W/m^2
Category 100 MW to 1 GW
Site ID 126498.21638

Ocular transmission coefficient 0.5
Pupil diameter 0.002 m
Eye focal length 0.017 m
Sun subtended angle 9.3 mrad
PV analysis methodology V2

Summary of Results

Glare with potential for temporary after-image predicted

PV Array	Tilt	Orient	Annual Green Glare		Annual Yellow Glare		Energy
	°	°	min	hr	min	hr	kWh
PV array 1	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 10	SA tracking	SA tracking	12,856	214.3	5,211	86.8	-
PV array 11	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 12	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 13	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 14	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 15	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 16	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 17	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 18	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 19	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 2	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 20	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 3	SA tracking	SA tracking	39,425	657.1	6	0.1	-
PV array 4	SA tracking	SA tracking	41,350	689.2	282	4.7	-
PV array 5	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 6	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 7	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 8	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 9	SA tracking	SA tracking	0	0.0	0	0.0	-

Total glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

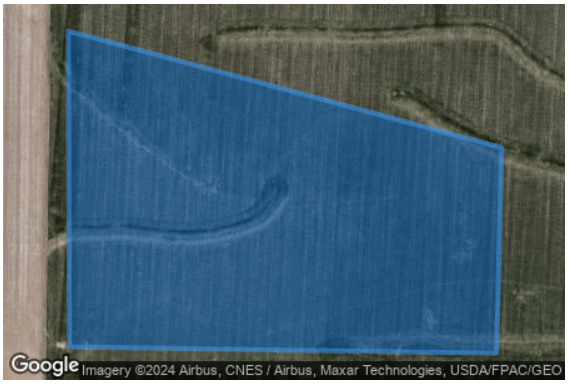
Emigrant Springs Ln	7,011	116.8	0	0.0
Herin Ln - 1	11,230	187.2	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Herin Ln - 2	4,354	72.6	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	12,794	213.2	4,662	77.7
N Klondike Rd	8,936	148.9	212	3.5
Oehman Rd	21,235	353.9	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	1,284	21.4	32	0.5
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	17	0.3	0	0.0
OP 5	360	6.0	0	0.0
OP 6	11,792	196.5	593	9.9
OP 7	2,121	35.4	0	0.0
OP 8	3,855	64.2	0	0.0
OP 9	4,733	78.9	0	0.0
OP 10	1,086	18.1	0	0.0
OP 11	1,016	16.9	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	1,533	25.6	0	0.0
OP 15	218	3.6	0	0.0
OP 16	56	0.9	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

Component Data

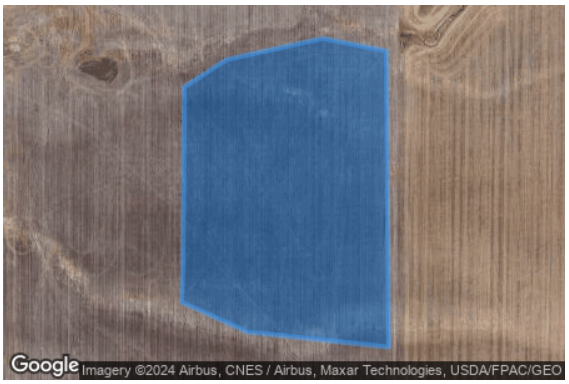
PV Arrays

Name: PV array 1
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



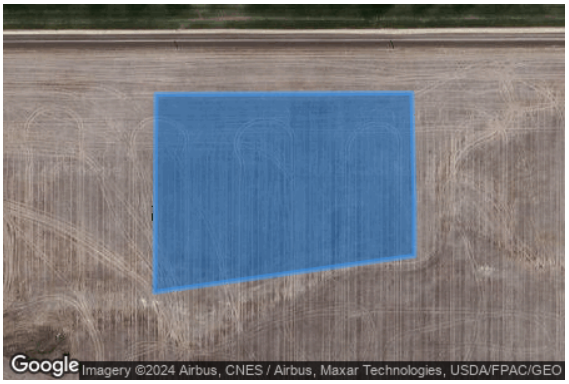
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.596127	-120.650423	1508.30	8.00	1516.30
2	45.592343	-120.650401	1563.40	8.00	1571.40
3	45.592268	-120.643063	1563.30	8.00	1571.30
4	45.594730	-120.642977	1557.80	8.00	1565.80

Name: PV array 10
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.618702	-120.649056	1399.10	8.00	1407.10
2	45.619032	-120.648326	1401.40	8.00	1409.40
3	45.619287	-120.646674	1410.90	8.00	1418.90
4	45.619137	-120.645580	1418.80	8.00	1426.80
5	45.615580	-120.645537	1455.70	8.00	1463.70
6	45.615760	-120.647961	1442.10	8.00	1450.10
7	45.616120	-120.649099	1451.60	8.00	1459.60
8	45.616533	-120.649077	1455.10	0.00	1455.10
9	45.617396	-120.649066	1424.50	0.00	1424.50

Name: PV array 11
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.620443	-120.649453	1423.70	8.00	1431.70
2	45.620450	-120.647253	1436.60	8.00	1444.60
3	45.619790	-120.647232	1411.60	8.00	1419.60
4	45.619475	-120.647232	1406.20	8.00	1414.20
5	45.619257	-120.649463	1404.50	8.00	1412.50

Name: PV array 12
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.620443	-120.647253	1436.20	8.00	1444.20
2	45.620450	-120.645708	1429.30	8.00	1437.30
3	45.619812	-120.645665	1427.70	8.00	1435.70
4	45.619797	-120.647232	1411.80	8.00	1419.80

Name: PV array 13
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



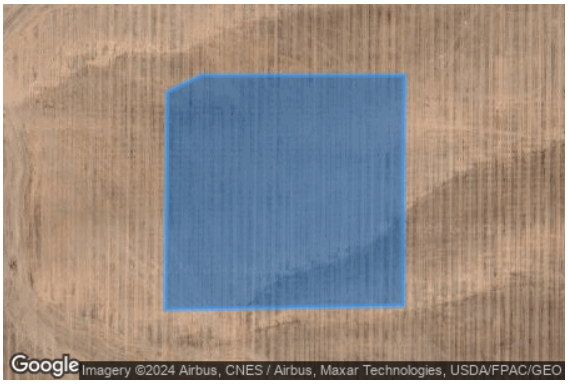
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.620398	-120.659709	1355.00	8.00	1363.00
2	45.620428	-120.657424	1371.90	8.00	1379.90
3	45.617666	-120.657381	1367.60	8.00	1375.60
4	45.617447	-120.658143	1365.00	8.00	1373.00
5	45.616960	-120.659055	1359.30	8.00	1367.30
6	45.616967	-120.659699	1359.40	8.00	1367.40

Name: PV array 14
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



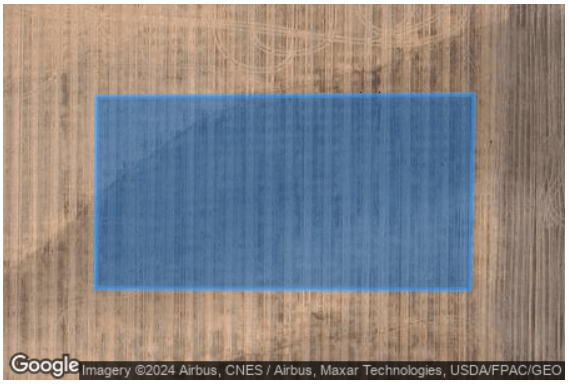
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.620427	-120.657424	1371.90	8.00	1379.90
2	45.620479	-120.653294	1410.80	8.00	1418.80
3	45.619774	-120.653304	1398.00	8.00	1406.00
4	45.619316	-120.654141	1391.10	8.00	1399.10
5	45.618423	-120.656416	1384.50	8.00	1392.50
6	45.617913	-120.656652	1373.10	8.00	1381.10
7	45.617673	-120.657381	1367.60	8.00	1375.60

Name: PV array 15
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



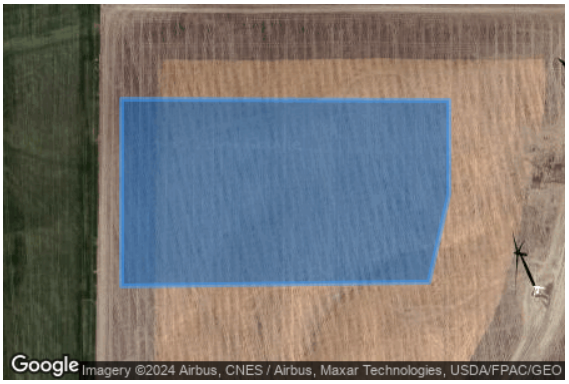
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.615114	-120.632150	1481.50	8.00	1489.50
2	45.617718	-120.632117	1488.60	8.00	1496.60
3	45.617921	-120.631527	1497.80	8.00	1505.80
4	45.617921	-120.628030	1557.60	8.00	1565.60
5	45.616847	-120.628051	1525.50	8.00	1533.50
6	45.615159	-120.628051	1488.30	8.00	1496.30

Name: PV array 16
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



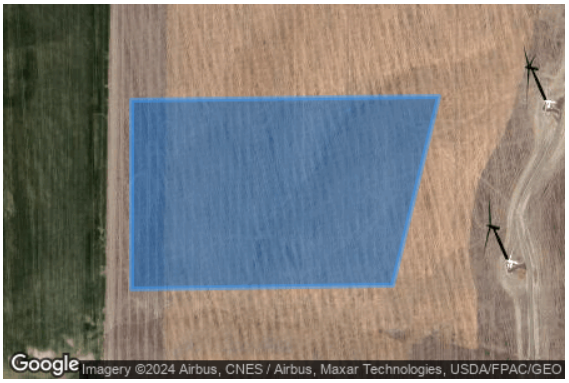
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.616847	-120.628051	1525.50	8.00	1533.50
2	45.616862	-120.624811	1530.70	8.00	1538.70
3	45.615692	-120.624843	1516.80	8.00	1524.80
4	45.615699	-120.628062	1507.10	8.00	1515.10

Name: PV array 17
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.626952	-120.634357	1507.10	8.00	1515.10
2	45.626937	-120.628735	1548.30	8.00	1556.30
3	45.625812	-120.628735	1523.30	8.00	1531.30
4	45.624762	-120.629078	1505.10	8.00	1513.10
5	45.624717	-120.634357	1504.70	8.00	1512.70

Name: PV array 18
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.624717	-120.634378	1504.50	8.00	1512.50
2	45.622450	-120.634378	1456.40	8.00	1464.40
3	45.622496	-120.629894	1463.00	8.00	1471.00
4	45.624762	-120.629100	1504.90	8.00	1512.90

Name: PV array 19
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.602191	-120.621856	1566.70	8.00	1574.70
2	45.602172	-120.619614	1566.30	8.00	1574.30
3	45.613114	-120.619496	1574.40	8.00	1582.40
4	45.613204	-120.622795	1558.30	8.00	1566.30
5	45.603473	-120.622752	1563.00	8.00	1571.00
6	45.603465	-120.621835	1572.30	8.00	1580.30

Name: PV array 2
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.594715	-120.642955	1557.90	8.00	1565.90
2	45.592238	-120.643084	1562.40	8.00	1570.40
3	45.592208	-120.636239	1578.50	8.00	1586.50
4	45.591923	-120.636239	1578.20	8.00	1586.20
5	45.591923	-120.635531	1581.90	8.00	1589.90
6	45.593229	-120.635638	1551.20	8.00	1559.20

Name: PV array 20
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.612665	-120.615036	1570.30	8.00	1578.30
2	45.612661	-120.613942	1560.60	8.00	1568.60
3	45.595340	-120.614075	1552.10	8.00	1560.10
4	45.594484	-120.616880	1564.40	8.00	1572.40
5	45.594496	-120.617873	1563.20	8.00	1571.20
6	45.601078	-120.617626	1572.90	8.00	1580.90
7	45.601067	-120.615437	1578.20	8.00	1586.20
8	45.602763	-120.615185	1586.00	8.00	1594.00

Name: PV array 3
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



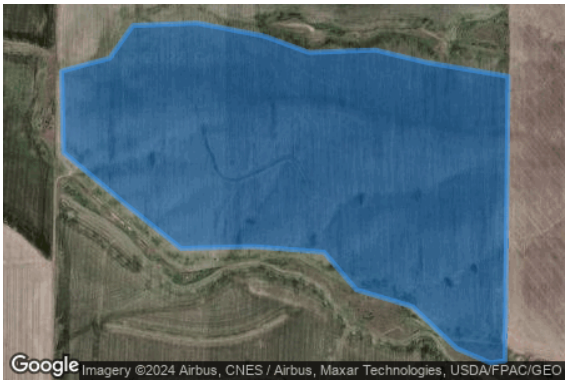
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.600030	-120.650423	1466.80	8.00	1474.80
2	45.596127	-120.650401	1508.70	8.00	1516.70
3	45.594730	-120.642977	1557.80	8.00	1565.80
4	45.598259	-120.642955	1462.50	8.00	1470.50
5	45.598499	-120.643771	1453.20	8.00	1461.20
6	45.598003	-120.645316	1461.00	8.00	1469.00
7	45.598064	-120.646217	1449.20	8.00	1457.20
8	45.598964	-120.647848	1444.00	8.00	1452.00
9	45.599775	-120.648985	1434.60	8.00	1442.60

Name: PV array 4
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.598259	-120.642977	1462.50	8.00	1470.50
2	45.594715	-120.642955	1557.90	8.00	1565.90
3	45.593214	-120.635638	1551.90	8.00	1559.90
4	45.595902	-120.635681	1505.00	8.00	1513.00
5	45.596652	-120.638664	1489.50	8.00	1497.50
6	45.597388	-120.641754	1507.10	8.00	1515.10
7	45.597958	-120.642011	1479.40	8.00	1487.40

Name: PV array 5
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



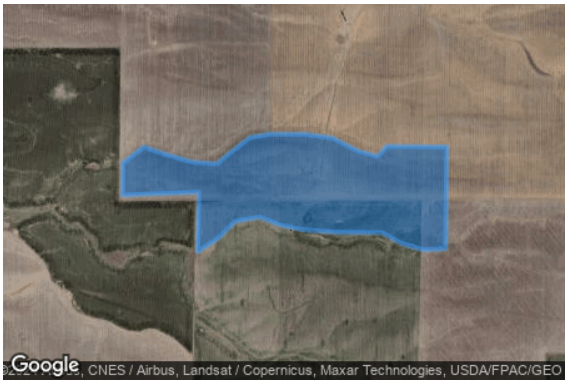
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.603409	-120.650462	1413.60	8.00	1421.60
2	45.601457	-120.650397	1438.00	8.00	1446.00
3	45.600211	-120.648252	1458.20	8.00	1466.20
4	45.599160	-120.646363	1466.40	8.00	1474.40
5	45.599205	-120.643853	1464.10	8.00	1472.10
6	45.599070	-120.641450	1483.80	8.00	1491.80
7	45.598169	-120.640334	1487.20	8.00	1495.20
8	45.597764	-120.638403	1502.80	8.00	1510.80
9	45.596758	-120.636879	1501.20	8.00	1509.20
10	45.596413	-120.635720	1508.00	8.00	1516.00
11	45.596473	-120.635227	1517.90	8.00	1525.90
12	45.603284	-120.635119	1507.70	8.00	1515.70
13	45.603614	-120.637909	1490.20	8.00	1498.20
14	45.603914	-120.639690	1474.00	8.00	1482.00
15	45.603854	-120.641964	1469.20	8.00	1477.20
16	45.604245	-120.643488	1448.90	8.00	1456.90
17	45.604560	-120.645805	1434.00	8.00	1442.00
18	45.604500	-120.648016	1420.90	8.00	1428.90
19	45.603719	-120.648809	1420.00	8.00	1428.00

Name: PV array 6
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.603314	-120.635141	1506.80	8.00	1514.80
2	45.596453	-120.635248	1516.70	8.00	1524.70
3	45.596723	-120.633896	1543.40	8.00	1551.40
4	45.596588	-120.632587	1535.80	8.00	1543.80
5	45.597474	-120.630163	1543.90	8.00	1551.90
6	45.598014	-120.627459	1562.20	8.00	1570.20
7	45.598119	-120.626730	1566.00	8.00	1574.00
8	45.599080	-120.626772	1591.30	8.00	1599.30
9	45.599065	-120.624927	1591.30	8.00	1599.30
10	45.601993	-120.624949	1576.00	8.00	1584.00
11	45.602008	-120.622781	1572.00	8.00	1580.00
12	45.602954	-120.622803	1566.80	8.00	1574.80
13	45.604109	-120.624133	1556.70	8.00	1564.70
14	45.604695	-120.625850	1540.00	8.00	1548.00
15	45.604920	-120.628038	1526.60	8.00	1534.60
16	45.604995	-120.630184	1513.20	8.00	1521.20
17	45.604140	-120.631665	1518.20	8.00	1526.20
18	45.603479	-120.632781	1518.10	8.00	1526.10

Name: PV array 7
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.608005	-120.655579	1402.90	8.00	1410.90
2	45.606474	-120.655622	1419.20	8.00	1427.20
3	45.606609	-120.650365	1455.40	8.00	1463.40
4	45.603757	-120.650451	1415.50	8.00	1423.50
5	45.604432	-120.648992	1424.70	8.00	1432.70
6	45.605213	-120.647876	1434.00	8.00	1442.00
7	45.605423	-120.646181	1434.30	8.00	1442.30
8	45.605048	-120.644786	1443.80	8.00	1451.80
9	45.604823	-120.643327	1450.30	8.00	1458.30
10	45.604687	-120.640902	1463.70	8.00	1471.70
11	45.604672	-120.637770	1492.80	8.00	1500.80
12	45.604162	-120.636439	1480.00	8.00	1488.00
13	45.603847	-120.634916	1499.40	8.00	1507.40
14	45.603907	-120.633414	1503.50	8.00	1511.50
15	45.608786	-120.633328	1529.10	8.00	1537.10
16	45.608816	-120.637448	1521.40	8.00	1529.40
17	45.608320	-120.638070	1506.50	8.00	1514.50
18	45.608575	-120.639400	1503.70	8.00	1511.70
19	45.609221	-120.641224	1483.60	8.00	1491.60
20	45.609386	-120.643027	1468.30	8.00	1476.30
21	45.609401	-120.645430	1452.70	8.00	1460.70
22	45.609236	-120.646846	1442.40	8.00	1450.40
23	45.608590	-120.648048	1434.70	8.00	1442.70
24	45.607975	-120.649121	1427.40	8.00	1435.40
25	45.608050	-120.650751	1418.20	8.00	1426.20
26	45.608440	-120.652726	1414.40	8.00	1422.40
27	45.608786	-120.654142	1407.70	8.00	1415.70

Name: PV array 8
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.617136	-120.655390	1378.50	8.00	1386.50
2	45.608948	-120.655551	1426.40	8.00	1434.40
3	45.608970	-120.654446	1410.10	8.00	1418.10
4	45.608880	-120.652558	1424.40	8.00	1432.40
5	45.608955	-120.648738	1430.90	8.00	1438.90
6	45.609676	-120.647000	1440.80	8.00	1448.80
7	45.609766	-120.645477	1449.00	8.00	1457.00
8	45.614659	-120.645434	1454.20	8.00	1462.20
9	45.615049	-120.647258	1448.60	8.00	1456.60
10	45.615635	-120.649854	1436.20	8.00	1444.20
11	45.616160	-120.651335	1421.70	8.00	1429.70
12	45.616745	-120.652214	1411.00	8.00	1419.00
13	45.617406	-120.654425	1379.40	8.00	1387.40
14	45.617695	-120.654425	1374.70	8.00	1382.70
15	45.617691	-120.655390	1367.80	8.00	1375.80

Name: PV array 9
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.612267	-120.645451	1519.40	8.00	1527.40
2	45.609736	-120.645451	1448.30	8.00	1456.30
3	45.609736	-120.641460	1483.70	8.00	1491.70
4	45.608820	-120.637405	1521.80	8.00	1529.80
5	45.608700	-120.622792	1552.00	8.00	1560.00
6	45.613203	-120.622792	1558.20	8.00	1566.20
7	45.613218	-120.625024	1555.60	8.00	1563.60
8	45.614730	-120.624981	1517.30	8.00	1525.30
9	45.614276	-120.632137	1468.80	8.00	1476.80
10	45.612119	-120.632191	1498.20	8.00	1506.20

Route Receptors

Name: Emigrant Springs Ln
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.628064	-120.624308	1541.50	5.00	1546.50
2	45.628045	-120.622929	1540.10	5.00	1545.10
3	45.628004	-120.621191	1509.90	5.00	1514.90
4	45.627981	-120.620113	1489.20	5.00	1494.20
5	45.627941	-120.618214	1484.00	5.00	1489.00
6	45.627893	-120.615987	1466.30	5.00	1471.30
7	45.627841	-120.613552	1478.50	5.00	1483.50
8	45.627852	-120.613037	1478.80	5.00	1483.80
9	45.627826	-120.610135	1480.70	5.00	1485.70
10	45.627772	-120.607501	1466.60	5.00	1471.60
11	45.627720	-120.605382	1446.80	5.00	1451.80
12	45.627653	-120.602690	1415.20	5.00	1420.20
13	45.627565	-120.598500	1406.80	5.00	1411.80
14	45.627463	-120.594560	1408.30	5.00	1413.30
15	45.627372	-120.590566	1440.10	5.00	1445.10
16	45.627267	-120.585705	1426.10	5.00	1431.10
17	45.627177	-120.582168	1397.40	5.00	1402.40
18	45.627188	-120.578665	1371.00	5.00	1376.00
19	45.627220	-120.561601	1229.70	5.00	1234.70
20	45.627258	-120.551237	1281.40	5.00	1286.40
21	45.627204	-120.531722	1227.50	5.00	1232.50
22	45.627078	-120.523316	1179.90	5.00	1184.90
23	45.627085	-120.516182	1190.50	5.00	1195.50
24	45.627055	-120.511354	1187.30	5.00	1192.30
25	45.627055	-120.510592	1182.50	5.00	1187.50

Name: Herin Ln - 1
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.658436	-120.623865	1386.00	5.00	1391.00
2	45.658443	-120.622814	1388.50	5.00	1393.50
3	45.658394	-120.621473	1390.30	5.00	1395.30
4	45.658278	-120.620180	1402.70	5.00	1407.70
5	45.658031	-120.619338	1414.60	5.00	1419.60
6	45.657569	-120.617986	1428.00	5.00	1433.00
7	45.657123	-120.616715	1438.60	5.00	1443.60
8	45.656962	-120.616044	1445.20	5.00	1450.20
9	45.656913	-120.615712	1449.50	5.00	1454.50
10	45.656880	-120.614757	1458.20	5.00	1463.20
11	45.656822	-120.613051	1458.00	5.00	1463.00
12	45.656695	-120.612826	1458.40	5.00	1463.40
13	45.656444	-120.612707	1459.30	5.00	1464.30
14	45.655990	-120.612702	1465.20	5.00	1470.20
15	45.653803	-120.612783	1471.20	5.00	1476.20
16	45.650107	-120.612851	1463.70	5.00	1468.70
17	45.649822	-120.612723	1467.70	5.00	1472.70
18	45.649645	-120.612529	1467.40	5.00	1472.40
19	45.649578	-120.612256	1465.30	5.00	1470.30
20	45.649489	-120.609604	1441.70	5.00	1446.70
21	45.649406	-120.605018	1380.40	5.00	1385.40
22	45.649335	-120.600190	1317.70	5.00	1322.70
23	45.649103	-120.592288	1263.80	5.00	1268.80
24	45.649050	-120.590577	1233.30	5.00	1238.30
25	45.649043	-120.589187	1213.80	5.00	1218.80
26	45.649200	-120.588688	1205.70	5.00	1210.70
27	45.650634	-120.586455	1185.90	5.00	1190.90
28	45.652457	-120.584663	1154.50	5.00	1159.50
29	45.653023	-120.584154	1141.20	5.00	1146.20
30	45.653961	-120.583574	1128.90	5.00	1133.90

Name: Herin Ln - 2
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.653976	-120.583548	1128.20	5.00	1133.20
2	45.654253	-120.583312	1124.40	5.00	1129.40
3	45.654482	-120.582974	1116.20	5.00	1121.20
4	45.654954	-120.582587	1105.40	5.00	1110.40
5	45.655700	-120.581954	1086.30	5.00	1091.30
6	45.656117	-120.581552	1079.30	5.00	1084.30
7	45.656503	-120.580989	1063.30	5.00	1068.30
8	45.656776	-120.580624	1051.60	5.00	1056.60
9	45.657020	-120.580468	1046.20	5.00	1051.20
10	45.657313	-120.580383	1042.90	5.00	1047.90
11	45.657909	-120.579980	1035.90	5.00	1040.90
12	45.658299	-120.579583	1038.70	5.00	1043.70
13	45.658535	-120.579326	1040.50	5.00	1045.50
14	45.658805	-120.579130	1032.80	5.00	1037.80
15	45.659195	-120.578980	1021.00	5.00	1026.00
16	45.659487	-120.579023	1011.00	5.00	1016.00
17	45.660023	-120.579125	1004.50	5.00	1009.50
18	45.660368	-120.579372	997.30	5.00	1002.30
19	45.661157	-120.579484	983.70	5.00	988.70
20	45.661693	-120.579479	972.10	5.00	977.10
21	45.662192	-120.579506	961.10	5.00	966.10

Name: Hwy 206
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.546018	-120.625806	1460.10	5.00	1465.10
2	45.547416	-120.626600	1493.80	5.00	1498.80
3	45.548498	-120.627801	1510.40	5.00	1515.40
4	45.549279	-120.629024	1528.30	5.00	1533.30
5	45.552480	-120.635011	1606.60	5.00	1611.60
6	45.554118	-120.638058	1640.00	5.00	1645.00
7	45.555350	-120.640161	1652.20	5.00	1657.20
8	45.556777	-120.641835	1648.50	5.00	1653.50
9	45.562862	-120.648615	1631.50	5.00	1636.50
10	45.564815	-120.650933	1622.40	5.00	1627.40
11	45.567030	-120.654392	1588.70	5.00	1593.70
12	45.571506	-120.661688	1504.30	5.00	1509.30
13	45.577124	-120.670657	1401.10	5.00	1406.10
14	45.583417	-120.680871	1331.60	5.00	1336.60
15	45.584288	-120.682566	1324.20	5.00	1329.20
16	45.586570	-120.687888	1312.60	5.00	1317.60
17	45.588823	-120.693596	1297.50	5.00	1302.50
18	45.589694	-120.695849	1283.70	5.00	1288.70
19	45.590565	-120.697694	1271.60	5.00	1276.60

Name: I97
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.574282	-120.697086	1427.10	5.00	1432.10
2	45.581972	-120.707815	1382.10	5.00	1387.10
3	45.584630	-120.711591	1344.00	5.00	1349.00
4	45.585621	-120.712557	1331.20	5.00	1336.20
5	45.586162	-120.713029	1325.50	5.00	1330.50
6	45.587003	-120.713437	1312.10	5.00	1317.10
7	45.588294	-120.713716	1297.60	5.00	1302.60
8	45.589751	-120.714080	1281.90	5.00	1286.90
9	45.590862	-120.714424	1272.20	5.00	1277.20
10	45.592018	-120.715089	1267.60	5.00	1272.60
11	45.593204	-120.715969	1264.40	5.00	1269.40
12	45.594509	-120.717201	1253.00	5.00	1258.00
13	45.595935	-120.718703	1239.00	5.00	1244.00
14	45.598037	-120.720892	1231.30	5.00	1236.30
15	45.598623	-120.721342	1221.80	5.00	1226.80
16	45.599313	-120.721750	1208.80	5.00	1213.80
17	45.600217	-120.722052	1196.10	5.00	1201.10
18	45.601058	-120.722052	1184.30	5.00	1189.30
19	45.602409	-120.721945	1170.60	5.00	1175.60
20	45.604555	-120.721645	1147.60	5.00	1152.60
21	45.605591	-120.721795	1139.40	5.00	1144.40
22	45.606537	-120.722224	1134.20	5.00	1139.20
23	45.607528	-120.722975	1127.10	5.00	1132.10
24	45.608909	-120.724777	1116.50	5.00	1121.50
25	45.612151	-120.729498	1083.80	5.00	1088.80
26	45.612871	-120.730871	1076.20	5.00	1081.20
27	45.613457	-120.732459	1069.30	5.00	1074.30
28	45.614027	-120.733961	1063.00	5.00	1068.00
29	45.614688	-120.735206	1057.90	5.00	1062.90
30	45.615363	-120.735978	1051.50	5.00	1056.50

Name: Klondike Rd
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.584323	-120.682296	1326.50	5.00	1331.50
2	45.584443	-120.681695	1330.60	5.00	1335.60
3	45.584398	-120.675472	1397.70	5.00	1402.70
4	45.584383	-120.664668	1434.00	5.00	1439.00
5	45.584353	-120.653587	1427.20	5.00	1432.20
6	45.584353	-120.644970	1531.00	5.00	1536.00
7	45.584338	-120.633806	1535.50	5.00	1540.50
8	45.584263	-120.621228	1559.70	5.00	1564.70
9	45.584158	-120.613439	1547.10	5.00	1552.10
10	45.583872	-120.602796	1521.80	5.00	1526.80
11	45.583932	-120.597432	1513.70	5.00	1518.70
12	45.583992	-120.582132	1450.80	5.00	1455.80
13	45.584068	-120.576344	1439.70	5.00	1444.70
14	45.584113	-120.569950	1452.00	5.00	1457.00
15	45.584068	-120.557118	1382.30	5.00	1387.30
16	45.583799	-120.534859	1381.20	5.00	1386.20
17	45.583717	-120.523039	1316.60	5.00	1321.60
18	45.583717	-120.520910	1304.00	5.00	1309.00

Name: Medler Ln
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.620780	-120.697244	1233.10	5.00	1238.10
2	45.620789	-120.690002	1288.50	5.00	1293.50
3	45.620797	-120.684799	1318.10	5.00	1323.10
4	45.620798	-120.678539	1315.90	5.00	1320.90
5	45.620806	-120.676363	1308.60	5.00	1313.60
6	45.620786	-120.669762	1370.20	5.00	1375.20
7	45.620736	-120.662578	1340.40	5.00	1345.40
8	45.620740	-120.655545	1381.80	5.00	1386.80
9	45.620748	-120.645646	1434.90	5.00	1439.90
10	45.620763	-120.638432	1442.40	5.00	1447.40
11	45.620763	-120.626023	1488.70	5.00	1493.70
12	45.620733	-120.625325	1493.00	5.00	1498.00
13	45.620785	-120.624875	1492.00	5.00	1497.00
14	45.620961	-120.624537	1490.40	5.00	1495.40

Name: N Klondike Rd
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.584163	-120.613405	1547.00	5.00	1552.00
2	45.587263	-120.613393	1575.30	5.00	1580.30
3	45.591409	-120.613389	1562.60	5.00	1567.60
4	45.591800	-120.613271	1546.60	5.00	1551.60
5	45.592197	-120.613249	1552.20	5.00	1557.20
6	45.593140	-120.613195	1552.10	5.00	1557.10
7	45.595257	-120.613163	1551.90	5.00	1556.90
8	45.599148	-120.613170	1582.50	5.00	1587.50
9	45.606076	-120.613159	1539.50	5.00	1544.50
10	45.612918	-120.613143	1557.90	5.00	1562.90
11	45.620015	-120.613108	1561.40	5.00	1566.40
12	45.627848	-120.613076	1478.70	5.00	1483.70

Name: Oehman Rd
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.621007	-120.624496	1490.30	5.00	1495.30
2	45.621195	-120.624325	1492.30	5.00	1497.30
3	45.621562	-120.624314	1498.40	5.00	1503.40
4	45.624900	-120.624282	1514.10	5.00	1519.10
5	45.628062	-120.624321	1541.50	5.00	1546.50
6	45.630213	-120.624226	1504.00	5.00	1509.00
7	45.632395	-120.624172	1500.50	5.00	1505.50
8	45.636064	-120.624129	1462.20	5.00	1467.20
9	45.641060	-120.624078	1507.70	5.00	1512.70
10	45.646394	-120.624000	1512.20	5.00	1517.20
11	45.651890	-120.623940	1482.40	5.00	1487.40
12	45.658455	-120.623849	1385.80	5.00	1390.80
13	45.666166	-120.623727	1305.40	5.00	1310.40
14	45.666518	-120.623652	1303.00	5.00	1308.00
15	45.668559	-120.623008	1295.10	5.00	1300.10
16	45.670052	-120.622507	1288.40	5.00	1293.40
17	45.670479	-120.622443	1288.30	5.00	1293.30
18	45.671560	-120.622410	1287.80	5.00	1292.80
19	45.673173	-120.622357	1284.90	5.00	1289.90
20	45.674328	-120.622582	1293.20	5.00	1298.20
21	45.674792	-120.622571	1301.50	5.00	1306.50
22	45.675487	-120.622464	1321.40	5.00	1326.40
23	45.675989	-120.621971	1337.60	5.00	1342.60
24	45.676364	-120.621316	1353.10	5.00	1358.10
25	45.676589	-120.620629	1351.40	5.00	1356.40

Name: Old Wasco-Heppner Hwy
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.591737	-120.695232	1307.40	5.00	1312.40
2	45.591715	-120.686340	1425.00	5.00	1430.00
3	45.591698	-120.677285	1485.90	5.00	1490.90
4	45.591683	-120.664594	1475.50	5.00	1480.50
5	45.591645	-120.649788	1555.40	5.00	1560.40
6	45.591608	-120.635203	1581.70	5.00	1586.70
7	45.591608	-120.626383	1567.50	5.00	1572.50
8	45.591473	-120.615718	1574.30	5.00	1579.30
9	45.591408	-120.613407	1562.50	5.00	1567.50

Name: Webfoot Rd
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.606047	-120.613135	1539.50	5.00	1544.50
2	45.606062	-120.611965	1536.80	5.00	1541.80
3	45.606043	-120.609766	1524.30	5.00	1529.30
4	45.606032	-120.606848	1523.10	5.00	1528.10
5	45.605998	-120.603238	1513.70	5.00	1518.70
6	45.605938	-120.601312	1506.30	5.00	1511.30
7	45.605902	-120.598984	1479.20	5.00	1484.20
8	45.605857	-120.597235	1467.80	5.00	1472.80
9	45.605796	-120.595051	1468.80	5.00	1473.80
10	45.605723	-120.592141	1458.20	5.00	1463.20
11	45.605678	-120.589904	1436.80	5.00	1441.80
12	45.605599	-120.586846	1418.50	5.00	1423.50
13	45.605565	-120.585038	1404.60	5.00	1409.60
14	45.605502	-120.582415	1382.80	5.00	1387.80
15	45.605509	-120.580248	1391.60	5.00	1396.60
16	45.605497	-120.577594	1393.30	5.00	1398.30

Discrete Observation Point Receptors

Name	ID	Latitude (°)	Longitude (°)	Elevation (ft)	Height (ft)
OP 1	1	45.581671	-120.650971	1462.10	6.00
OP 2	2	45.591202	-120.693499	1345.50	6.00
OP 3	3	45.595312	-120.700334	1283.30	6.00
OP 4	4	45.605526	-120.665361	1365.50	6.00
OP 5	5	45.617148	-120.690993	1231.10	6.00
OP 6	6	45.625705	-120.652694	1408.60	6.00
OP 7	7	45.627981	-120.607648	1475.00	6.00
OP 8	8	45.657315	-120.612840	1458.70	6.00
OP 9	9	45.685485	-120.604651	997.80	6.00
OP 10	10	45.699712	-120.546563	983.00	6.00
OP 11	11	45.650975	-120.557140	1098.90	6.00
OP 12	12	45.633880	-120.525643	1191.60	6.00
OP 13	13	45.584821	-120.519879	1309.30	6.00
OP 14	14	45.647816	-120.590278	1236.50	6.00
OP 15	15	45.629485	-120.559316	1191.50	6.00
OP 16	16	45.622847	-120.562188	1256.80	6.00
OP 17	17	45.548417	-120.552628	1485.10	6.00
OP 18	18	45.549640	-120.592761	1590.70	6.00
OP 19	19	45.568232	-120.603758	1535.50	6.00
OP 20	20	45.583640	-120.614099	1557.40	6.00
OP 21	21	45.591961	-120.627507	1560.20	6.00

Glare Analysis Results

Summary of Results

Glare with potential for temporary after-image predicted

PV Array	Tilt	Orient	Annual Green Glare		Annual Yellow Glare		Energy
	°	°	min	hr	min	hr	kWh
PV array 1	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 10	SA tracking	SA tracking	12,856	214.3	5,211	86.8	-
PV array 11	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 12	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 13	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 14	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 15	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 16	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 17	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 18	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 19	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 2	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 20	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 3	SA tracking	SA tracking	39,425	657.1	6	0.1	-
PV array 4	SA tracking	SA tracking	41,350	689.2	282	4.7	-
PV array 5	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 6	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 7	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 8	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 9	SA tracking	SA tracking	0	0.0	0	0.0	-

Total glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	7,011	116.8	0	0.0
Herin Ln - 1	11,230	187.2	0	0.0
Herin Ln - 2	4,354	72.6	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	12,794	213.2	4,662	77.7
N Klondike Rd	8,936	148.9	212	3.5
Oehman Rd	21,235	353.9	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	1,284	21.4	32	0.5
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	17	0.3	0	0.0
OP 5	360	6.0	0	0.0
OP 6	11,792	196.5	593	9.9
OP 7	2,121	35.4	0	0.0
OP 8	3,855	64.2	0	0.0
OP 9	4,733	78.9	0	0.0
OP 10	1,086	18.1	0	0.0
OP 11	1,016	16.9	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	1,533	25.6	0	0.0
OP 15	218	3.6	0	0.0
OP 16	56	0.9	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV: PV array 1 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV array 1 and Route: Emigrant Springs Ln

No glare found

PV array 1 and Route: Herin Ln - 1

No glare found

PV array 1 and Route: Herin Ln - 2

No glare found

PV array 1 and Route: Hwy 206

No glare found

PV array 1 and Route: I97

No glare found

PV array 1 and Route: Klondike Rd

No glare found

PV array 1 and Route: Medler Ln

No glare found

PV array 1 and Route: N Klondike Rd

No glare found

PV array 1 and Route: Oehman Rd

No glare found

PV array 1 and Route: Old Wasco-Heppner Hwy

No glare found

PV array 1 and Route: Webfoot Rd

No glare found

PV array 1 and OP 1

No glare found

PV array 1 and OP 2

No glare found

PV array 1 and OP 3

No glare found

PV array 1 and OP 4

No glare found

PV array 1 and OP 5

No glare found

PV array 1 and OP 6

No glare found

PV array 1 and OP 7

No glare found

PV array 1 and OP 8

No glare found

PV array 1 and OP 9

No glare found

PV array 1 and OP 10

No glare found

PV array 1 and OP 11

No glare found

PV array 1 and OP 12

No glare found

PV array 1 and OP 13

No glare found

PV array 1 and OP 14

No glare found

PV array 1 and OP 15

No glare found

PV array 1 and OP 16

No glare found

PV array 1 and OP 17

No glare found

PV array 1 and OP 18

No glare found

PV array 1 and OP 19

No glare found

PV array 1 and OP 20

No glare found

PV array 1 and OP 21

No glare found

PV: PV array 10 potential temporary after-image

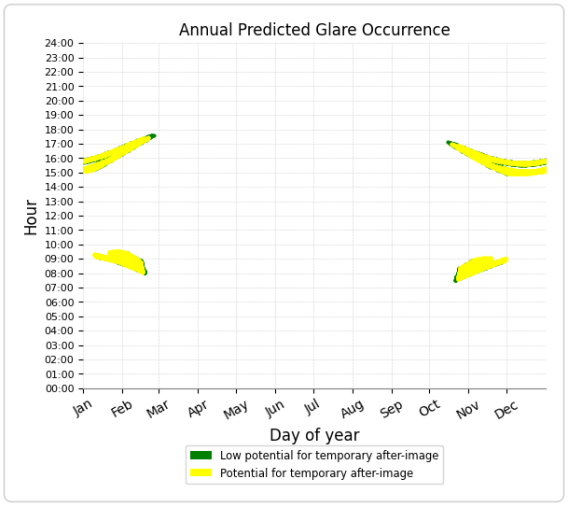
Receptor results ordered by category of glare

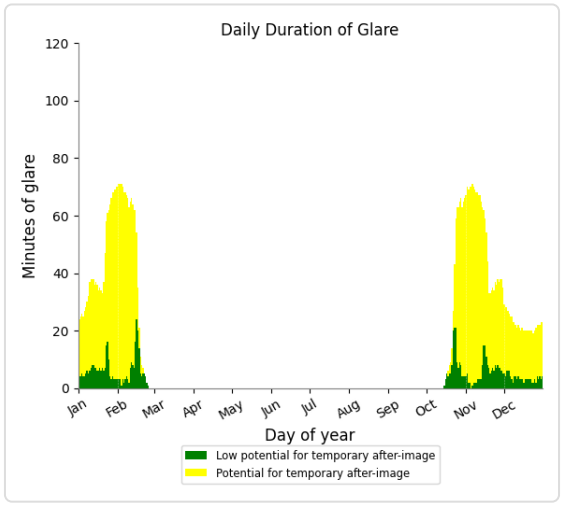
Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Medler Ln	760	12.7	4,618	77.0
Emigrant Springs Ln	1,223	20.4	0	0.0
Herin Ln - 1	1,340	22.3	0	0.0
Herin Ln - 2	391	6.5	0	0.0
Oehman Rd	4,232	70.5	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 6	4,073	67.9	593	9.9
OP 7	26	0.4	0	0.0
OP 9	614	10.2	0	0.0
OP 10	109	1.8	0	0.0
OP 14	88	1.5	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

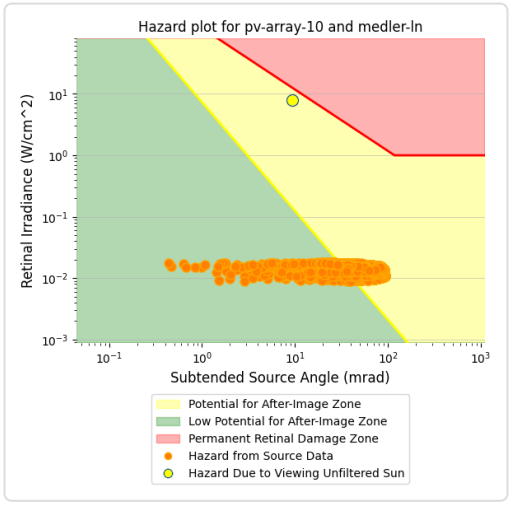
PV array 10 and Route: Medler Ln

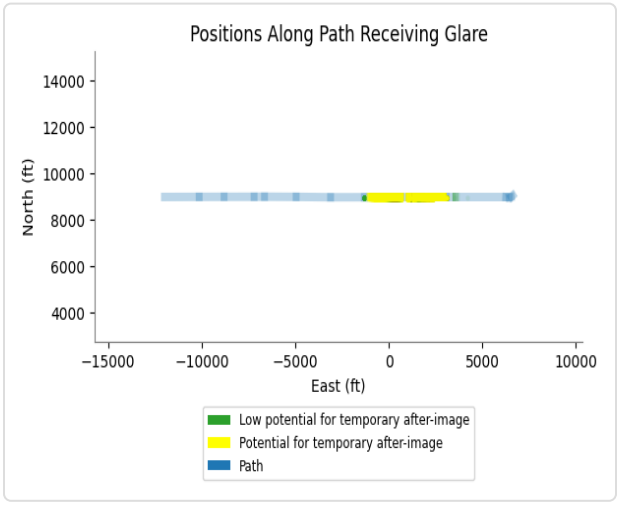
Yellow glare: 4,618 min.

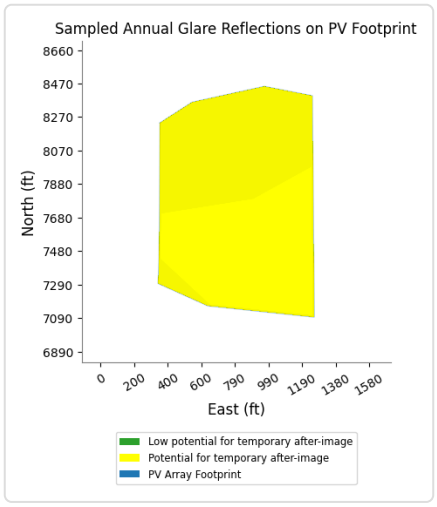
Green glare: 760 min.







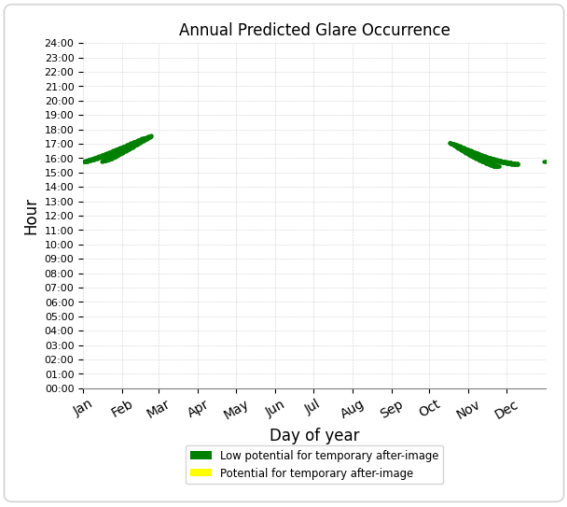


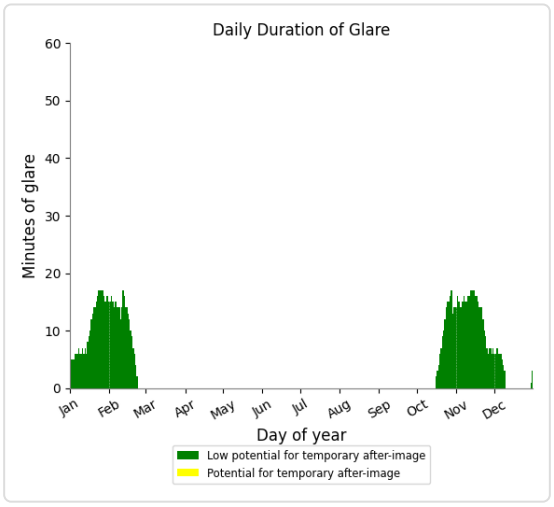


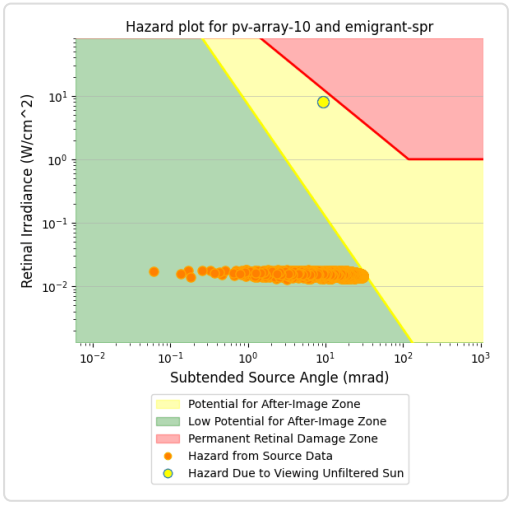
PV array 10 and Route: Emigrant Springs Ln

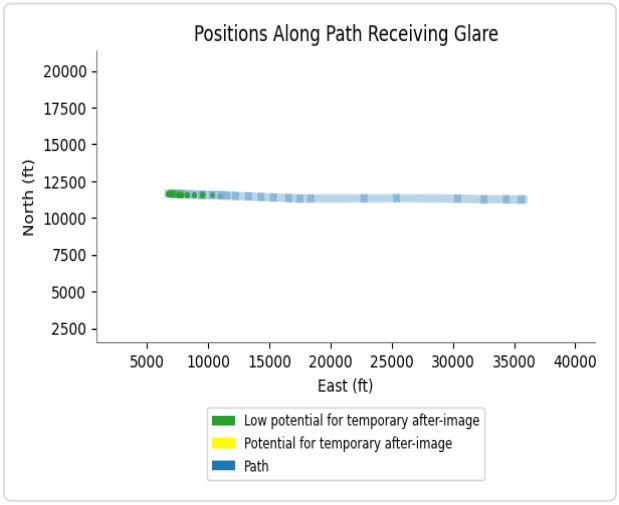
Yellow glare: none

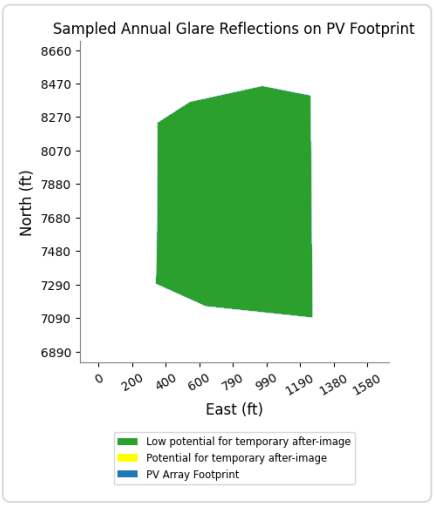
Green glare: 1,223 min.







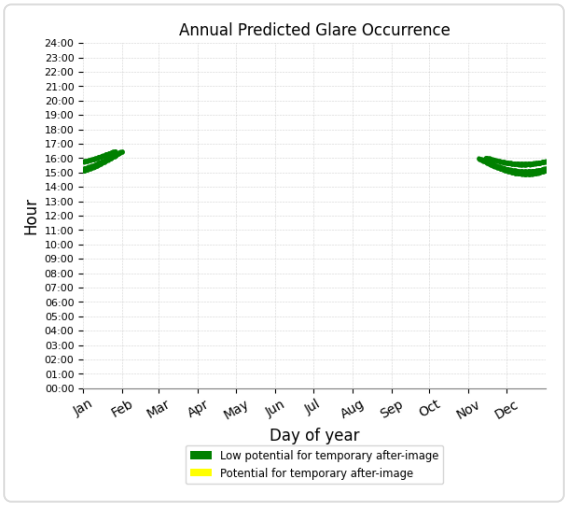


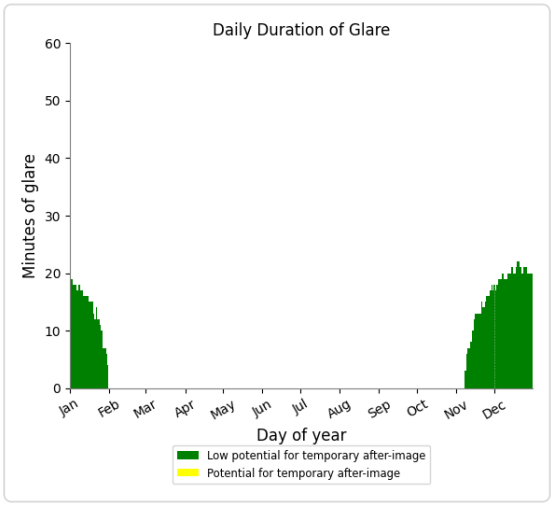


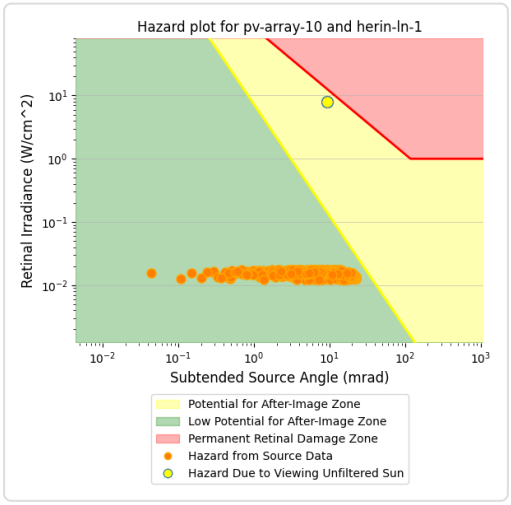
PV array 10 and Route: Herin Ln - 1

Yellow glare: none

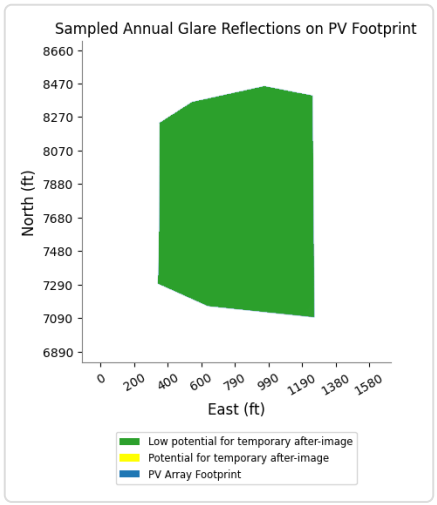
Green glare: 1,340 min.







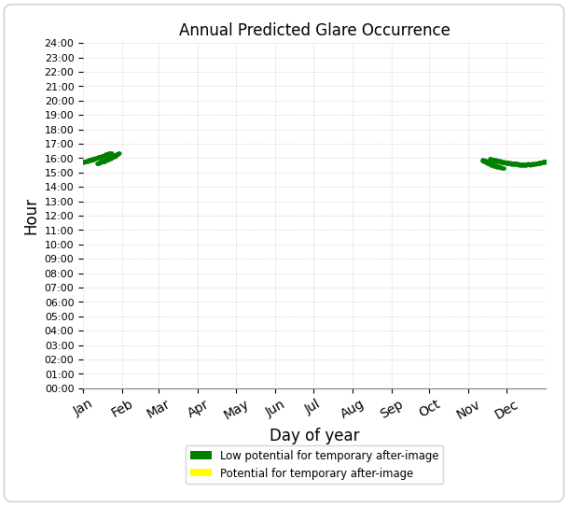


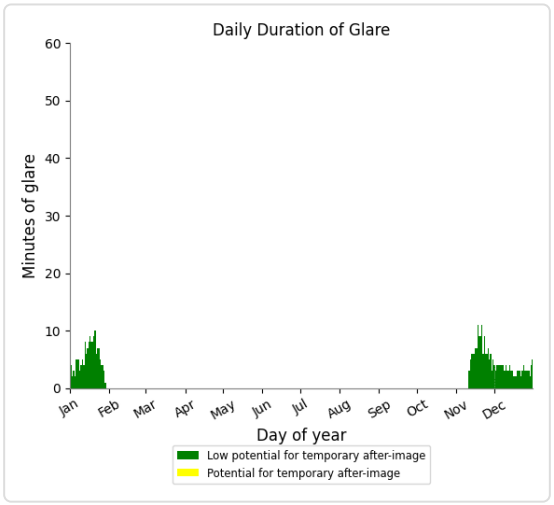


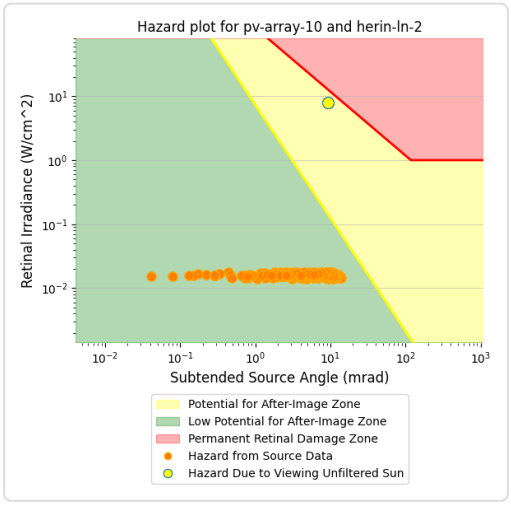
PV array 10 and Route: Herin Ln - 2

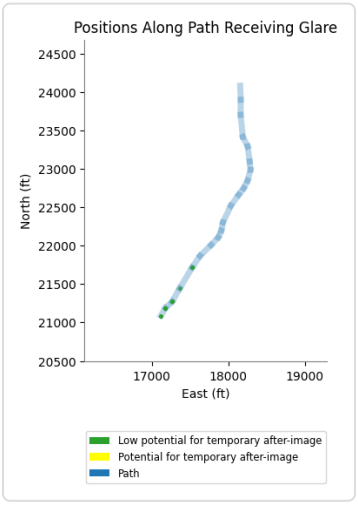
Yellow glare: none

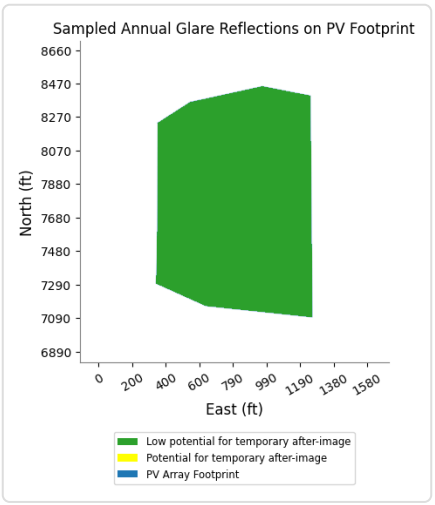
Green glare: 391 min.







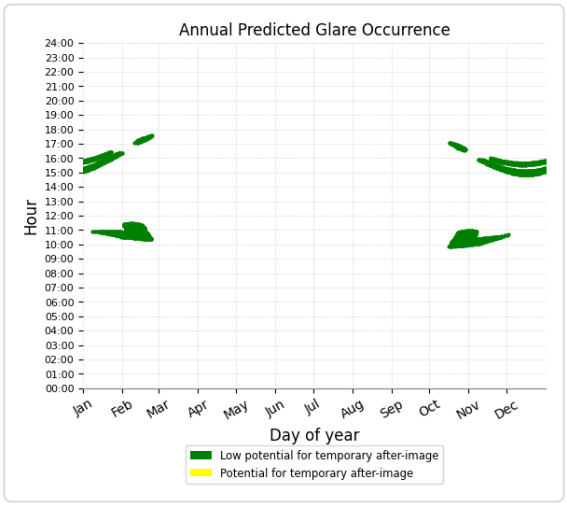


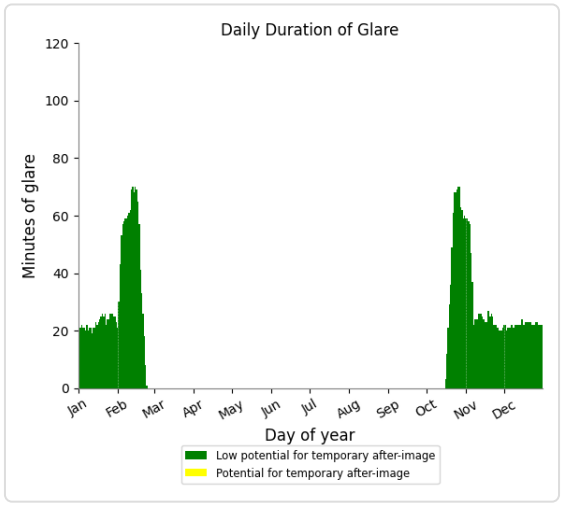


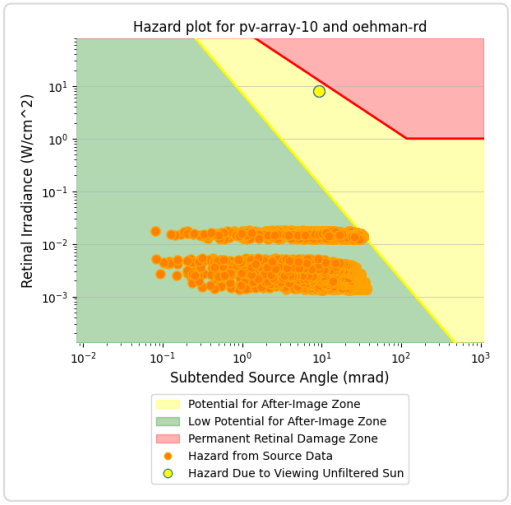
PV array 10 and Route: Oehman Rd

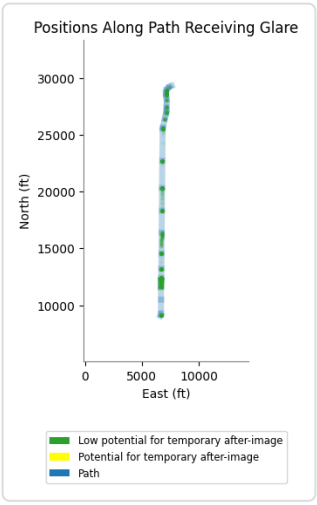
Yellow glare: none

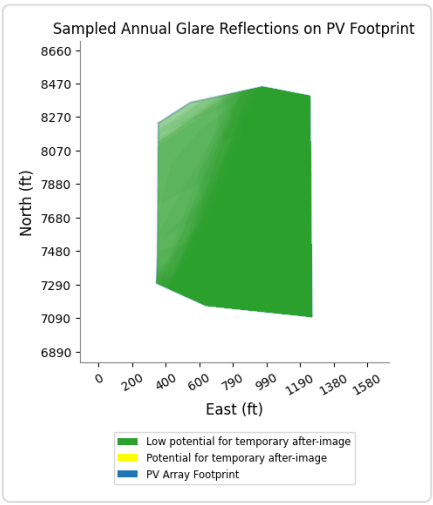
Green glare: 4,232 min.











PV array 10 and Route: Hwy 206

No glare found

PV array 10 and Route: I97

No glare found

PV array 10 and Route: Klondike Rd

No glare found

PV array 10 and Route: N Klondike Rd

No glare found

PV array 10 and Route: Old Wasco-Heppner Hwy

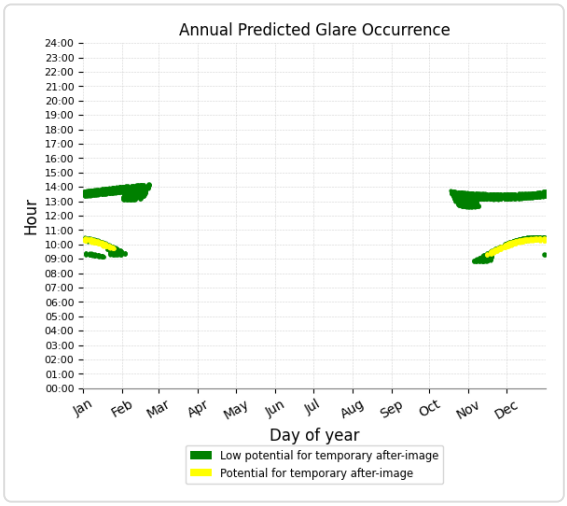
No glare found

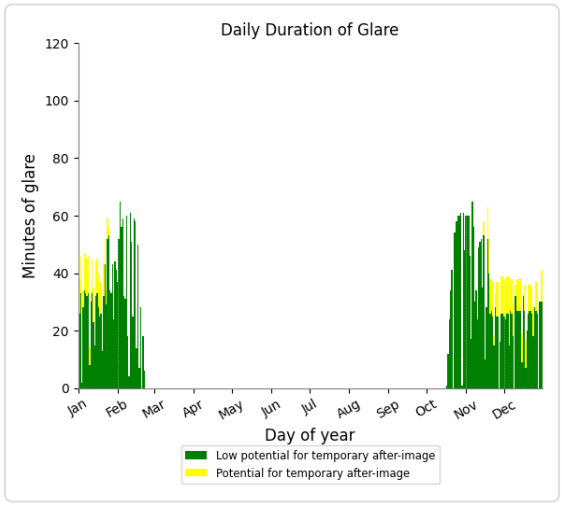
PV array 10 and Route: Webfoot Rd

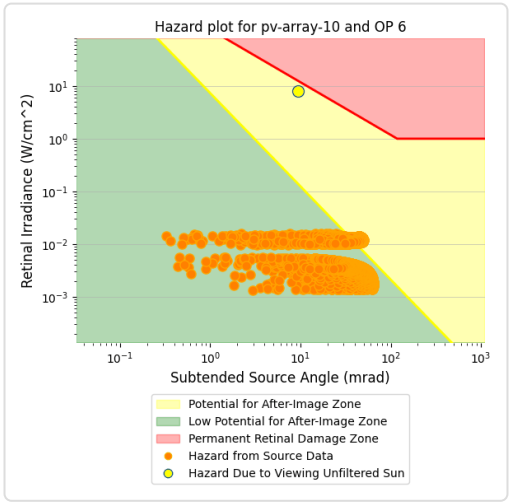
No glare found

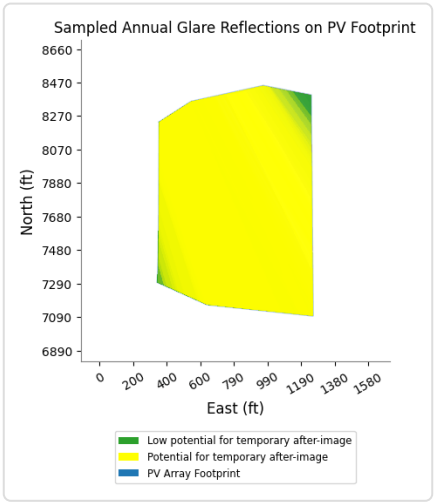
PV array 10 and OP 6

Yellow glare: 593 min.
Green glare: 4,073 min.





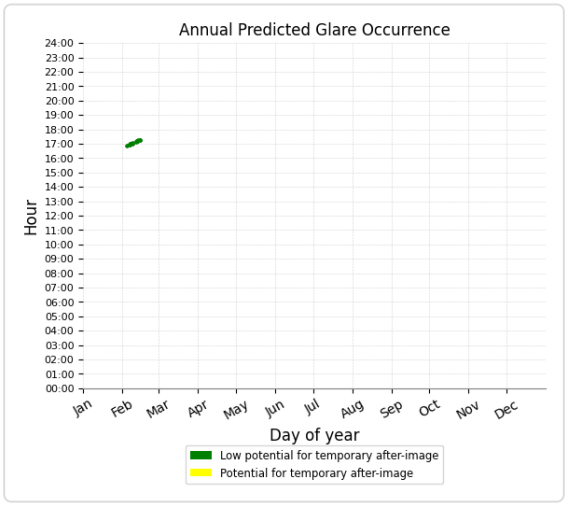


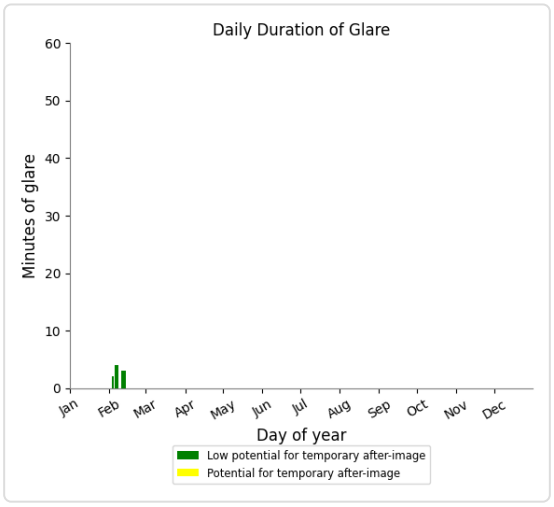


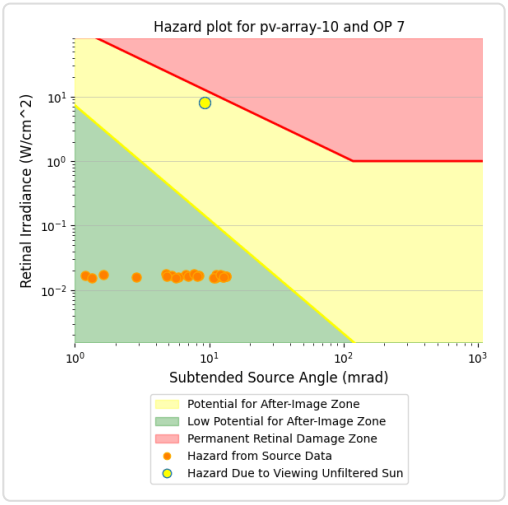
PV array 10 and OP 7

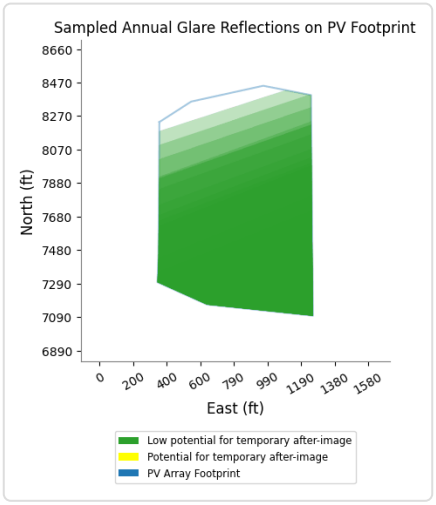
Yellow glare: none

Green glare: 26 min.





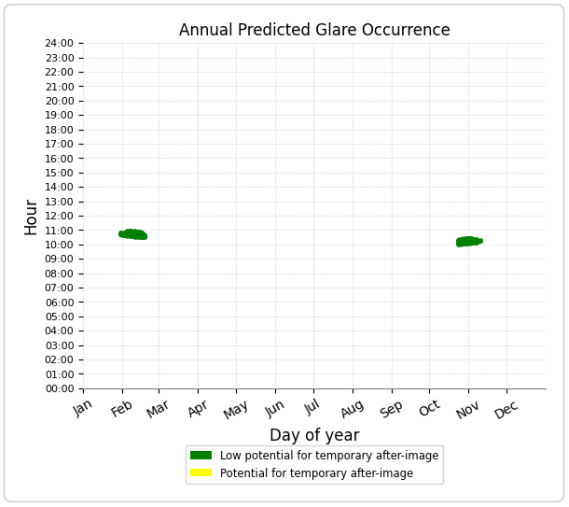


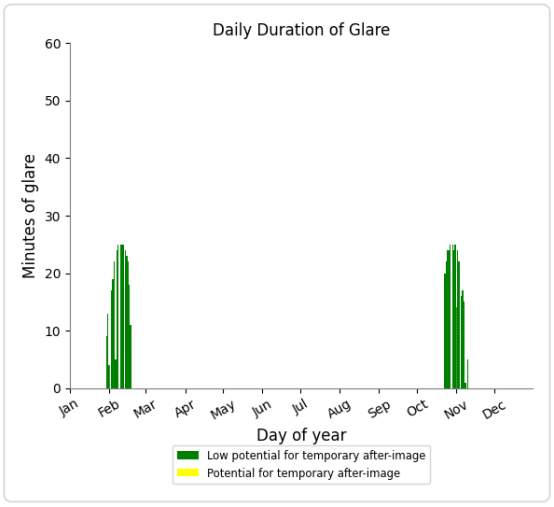


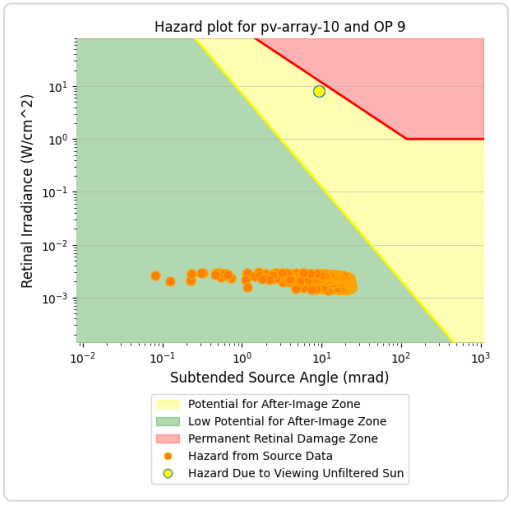
PV array 10 and OP 9

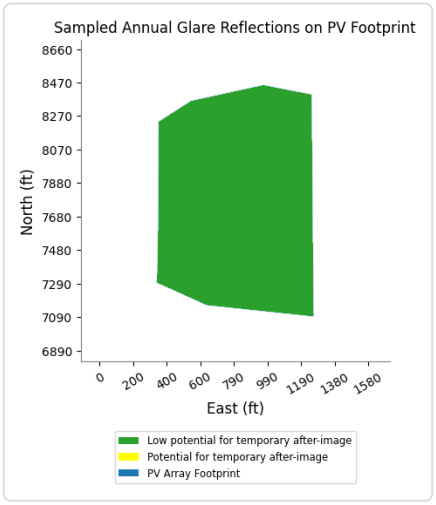
Yellow glare: none

Green glare: 614 min.





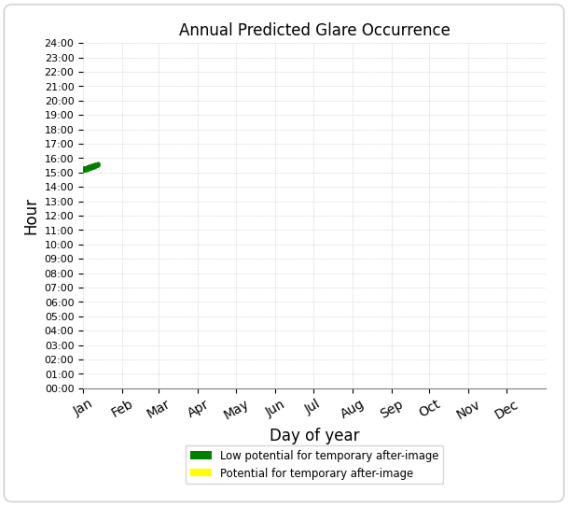


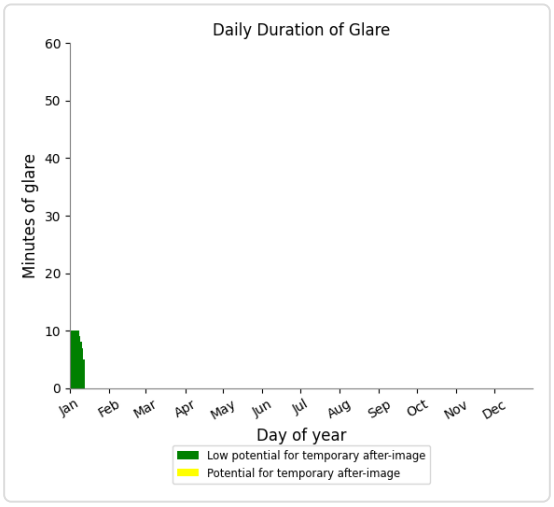


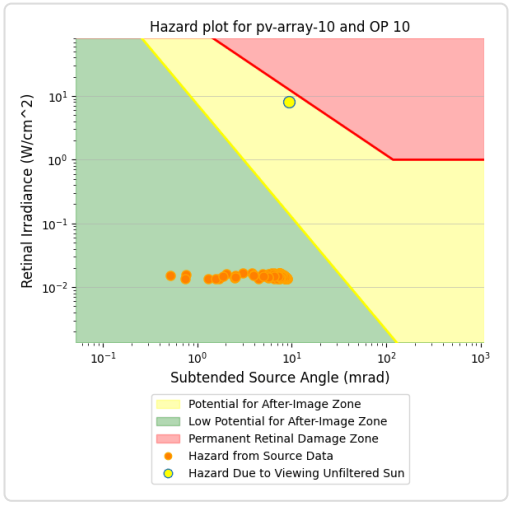
PV array 10 and OP 10

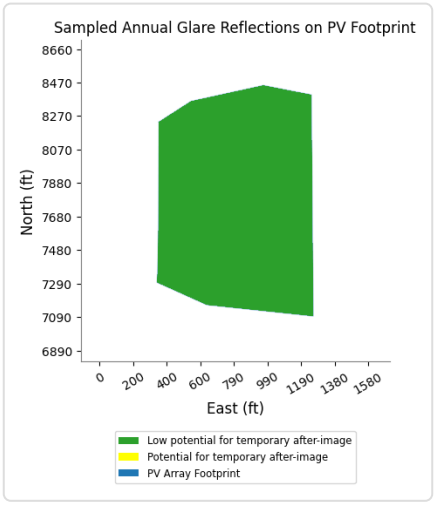
Yellow glare: none

Green glare: 109 min.



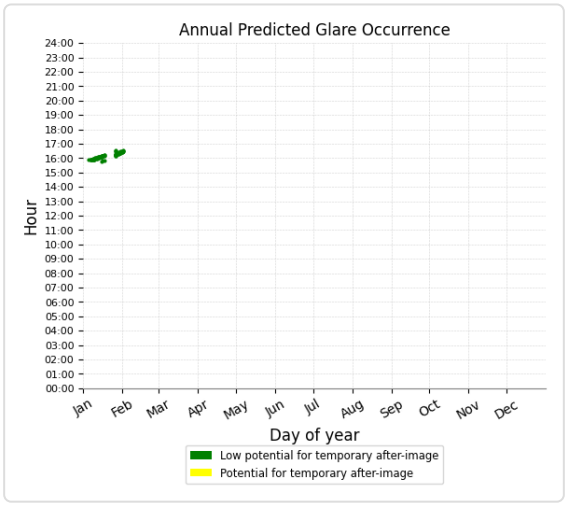


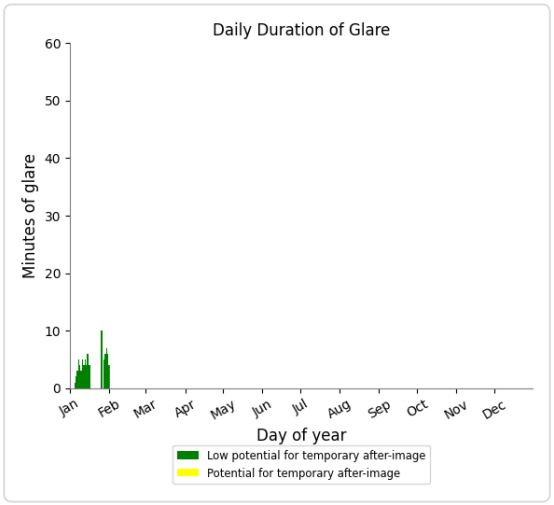


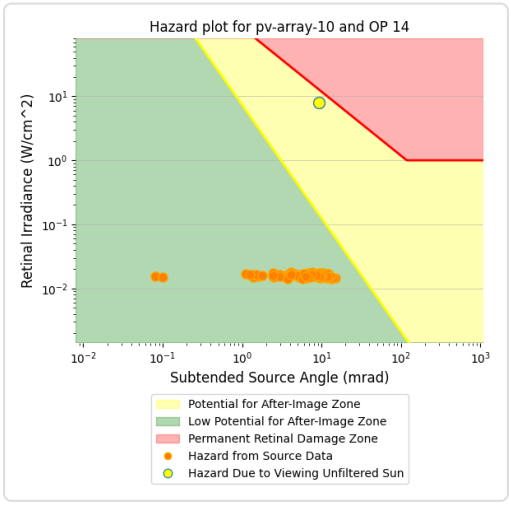


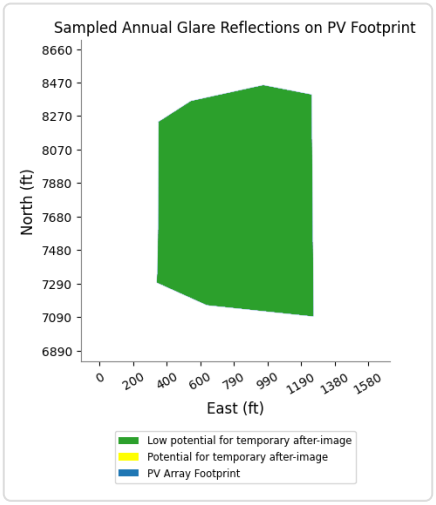
PV array 10 and OP 14

Yellow glare: none
Green glare: 88 min.









PV array 10 and OP 1

No glare found

PV array 10 and OP 2

No glare found

PV array 10 and OP 3

No glare found

PV array 10 and OP 4

No glare found

PV array 10 and OP 5

No glare found

PV array 10 and OP 8

No glare found

PV array 10 and OP 11

No glare found

PV array 10 and OP 12

No glare found

PV array 10 and OP 13

No glare found

PV array 10 and OP 15

No glare found

PV array 10 and OP 16

No glare found

PV array 10 and OP 17

No glare found

PV array 10 and OP 18

No glare found

PV array 10 and OP 19

No glare found

PV array 10 and OP 20

No glare found

PV array 10 and OP 21

No glare found

PV: PV array 11 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV array 11 and Route: Emigrant Springs Ln

No glare found

PV array 11 and Route: Herin Ln - 1

No glare found

PV array 11 and Route: Herin Ln - 2

No glare found

PV array 11 and Route: Hwy 206

No glare found

PV array 11 and Route: I97

No glare found

PV array 11 and Route: Klondike Rd

No glare found

PV array 11 and Route: Medler Ln

No glare found

PV array 11 and Route: N Klondike Rd

No glare found

PV array 11 and Route: Oehman Rd

No glare found

PV array 11 and Route: Old Wasco-Heppner Hwy

No glare found

PV array 11 and Route: Webfoot Rd

No glare found

PV array 11 and OP 1

No glare found

PV array 11 and OP 2

No glare found

PV array 11 and OP 3

No glare found

PV array 11 and OP 4

No glare found

PV array 11 and OP 5

No glare found

PV array 11 and OP 6

No glare found

PV array 11 and OP 7

No glare found

PV array 11 and OP 8

No glare found

PV array 11 and OP 9

No glare found

PV array 11 and OP 10

No glare found

PV array 11 and OP 11

No glare found

PV array 11 and OP 12

No glare found

PV array 11 and OP 13

No glare found

PV array 11 and OP 14

No glare found

PV array 11 and OP 15

No glare found

PV array 11 and OP 16

No glare found

PV array 11 and OP 17

No glare found

PV array 11 and OP 18

No glare found

PV array 11 and OP 19

No glare found

PV array 11 and OP 20

No glare found

PV array 11 and OP 21

No glare found

PV: PV array 12 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV array 12 and Route: Emigrant Springs Ln

No glare found

PV array 12 and Route: Herin Ln - 1

No glare found

PV array 12 and Route: Herin Ln - 2

No glare found

PV array 12 and Route: Hwy 206

No glare found

PV array 12 and Route: I97

No glare found

PV array 12 and Route: Klondike Rd

No glare found

PV array 12 and Route: Medler Ln

No glare found

PV array 12 and Route: N Klondike Rd

No glare found

PV array 12 and Route: Oehman Rd

No glare found

PV array 12 and Route: Old Wasco-Heppner Hwy

No glare found

PV array 12 and Route: Webfoot Rd

No glare found

PV array 12 and OP 1

No glare found

PV array 12 and OP 2

No glare found

PV array 12 and OP 3

No glare found

PV array 12 and OP 4

No glare found

PV array 12 and OP 5

No glare found

PV array 12 and OP 6

No glare found

PV array 12 and OP 7

No glare found

PV array 12 and OP 8

No glare found

PV array 12 and OP 9

No glare found

PV array 12 and OP 10

No glare found

PV array 12 and OP 11

No glare found

PV array 12 and OP 12

No glare found

PV array 12 and OP 13

No glare found

PV array 12 and OP 14

No glare found

PV array 12 and OP 15

No glare found

PV array 12 and OP 16

No glare found

PV array 12 and OP 17

No glare found

PV array 12 and OP 18

No glare found

PV array 12 and OP 19

No glare found

PV array 12 and OP 20

No glare found

PV array 12 and OP 21

No glare found

PV: PV array 13 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV array 13 and Route: Emigrant Springs Ln

No glare found

PV array 13 and Route: Herin Ln - 1

No glare found

PV array 13 and Route: Herin Ln - 2

No glare found

PV array 13 and Route: Hwy 206

No glare found

PV array 13 and Route: I97

No glare found

PV array 13 and Route: Klondike Rd

No glare found

PV array 13 and Route: Medler Ln

No glare found

PV array 13 and Route: N Klondike Rd

No glare found

PV array 13 and Route: Oehman Rd

No glare found

PV array 13 and Route: Old Wasco-Heppner Hwy

No glare found

PV array 13 and Route: Webfoot Rd

No glare found

PV array 13 and OP 1

No glare found

PV array 13 and OP 2

No glare found

PV array 13 and OP 3

No glare found

PV array 13 and OP 4

No glare found

PV array 13 and OP 5

No glare found

PV array 13 and OP 6

No glare found

PV array 13 and OP 7

No glare found

PV array 13 and OP 8

No glare found

PV array 13 and OP 9

No glare found

PV array 13 and OP 10

No glare found

PV array 13 and OP 11

No glare found

PV array 13 and OP 12

No glare found

PV array 13 and OP 13

No glare found

PV array 13 and OP 14

No glare found

PV array 13 and OP 15

No glare found

PV array 13 and OP 16

No glare found

PV array 13 and OP 17

No glare found

PV array 13 and OP 18

No glare found

PV array 13 and OP 19

No glare found

PV array 13 and OP 20

No glare found

PV array 13 and OP 21

No glare found

PV: PV array 14 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV array 14 and Route: Emigrant Springs Ln

No glare found

PV array 14 and Route: Herin Ln - 1

No glare found

PV array 14 and Route: Herin Ln - 2

No glare found

PV array 14 and Route: Hwy 206

No glare found

PV array 14 and Route: I97

No glare found

PV array 14 and Route: Klondike Rd

No glare found

PV array 14 and Route: Medler Ln

No glare found

PV array 14 and Route: N Klondike Rd

No glare found

PV array 14 and Route: Oehman Rd

No glare found

PV array 14 and Route: Old Wasco-Heppner Hwy

No glare found

PV array 14 and Route: Webfoot Rd

No glare found

PV array 14 and OP 1

No glare found

PV array 14 and OP 2

No glare found

PV array 14 and OP 3

No glare found

PV array 14 and OP 4

No glare found

PV array 14 and OP 5

No glare found

PV array 14 and OP 6

No glare found

PV array 14 and OP 7

No glare found

PV array 14 and OP 8

No glare found

PV array 14 and OP 9

No glare found

PV array 14 and OP 10

No glare found

PV array 14 and OP 11

No glare found

PV array 14 and OP 12

No glare found

PV array 14 and OP 13

No glare found

PV array 14 and OP 14

No glare found

PV array 14 and OP 15

No glare found

PV array 14 and OP 16

No glare found

PV array 14 and OP 17

No glare found

PV array 14 and OP 18

No glare found

PV array 14 and OP 19

No glare found

PV array 14 and OP 20

No glare found

PV array 14 and OP 21

No glare found

PV: PV array 15 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV array 15 and Route: Emigrant Springs Ln

No glare found

PV array 15 and Route: Herin Ln - 1

No glare found

PV array 15 and Route: Herin Ln - 2

No glare found

PV array 15 and Route: Hwy 206

No glare found

PV array 15 and Route: I97

No glare found

PV array 15 and Route: Klondike Rd

No glare found

PV array 15 and Route: Medler Ln

No glare found

PV array 15 and Route: N Klondike Rd

No glare found

PV array 15 and Route: Oehman Rd

No glare found

PV array 15 and Route: Old Wasco-Heppner Hwy

No glare found

PV array 15 and Route: Webfoot Rd

No glare found

PV array 15 and OP 1

No glare found

PV array 15 and OP 2

No glare found

PV array 15 and OP 3

No glare found

PV array 15 and OP 4

No glare found

PV array 15 and OP 5

No glare found

PV array 15 and OP 6

No glare found

PV array 15 and OP 7

No glare found

PV array 15 and OP 8

No glare found

PV array 15 and OP 9

No glare found

PV array 15 and OP 10

No glare found

PV array 15 and OP 11

No glare found

PV array 15 and OP 12

No glare found

PV array 15 and OP 13

No glare found

PV array 15 and OP 14

No glare found

PV array 15 and OP 15

No glare found

PV array 15 and OP 16

No glare found

PV array 15 and OP 17

No glare found

PV array 15 and OP 18

No glare found

PV array 15 and OP 19

No glare found

PV array 15 and OP 20

No glare found

PV array 15 and OP 21

No glare found

PV: PV array 16 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV array 16 and Route: Emigrant Springs Ln

No glare found

PV array 16 and Route: Herin Ln - 1

No glare found

PV array 16 and Route: Herin Ln - 2

No glare found

PV array 16 and Route: Hwy 206

No glare found

PV array 16 and Route: I97

No glare found

PV array 16 and Route: Klondike Rd

No glare found

PV array 16 and Route: Medler Ln

No glare found

PV array 16 and Route: N Klondike Rd

No glare found

PV array 16 and Route: Oehman Rd

No glare found

PV array 16 and Route: Old Wasco-Heppner Hwy

No glare found

PV array 16 and Route: Webfoot Rd

No glare found

PV array 16 and OP 1

No glare found

PV array 16 and OP 2

No glare found

PV array 16 and OP 3

No glare found

PV array 16 and OP 4

No glare found

PV array 16 and OP 5

No glare found

PV array 16 and OP 6

No glare found

PV array 16 and OP 7

No glare found

PV array 16 and OP 8

No glare found

PV array 16 and OP 9

No glare found

PV array 16 and OP 10

No glare found

PV array 16 and OP 11

No glare found

PV array 16 and OP 12

No glare found

PV array 16 and OP 13

No glare found

PV array 16 and OP 14

No glare found

PV array 16 and OP 15

No glare found

PV array 16 and OP 16

No glare found

PV array 16 and OP 17

No glare found

PV array 16 and OP 18

No glare found

PV array 16 and OP 19

No glare found

PV array 16 and OP 20

No glare found

PV array 16 and OP 21

No glare found

PV: PV array 17 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV array 17 and Route: Emigrant Springs Ln

No glare found

PV array 17 and Route: Herin Ln - 1

No glare found

PV array 17 and Route: Herin Ln - 2

No glare found

PV array 17 and Route: Hwy 206

No glare found

PV array 17 and Route: I97

No glare found

PV array 17 and Route: Klondike Rd

No glare found

PV array 17 and Route: Medler Ln

No glare found

PV array 17 and Route: N Klondike Rd

No glare found

PV array 17 and Route: Oehman Rd

No glare found

PV array 17 and Route: Old Wasco-Heppner Hwy

No glare found

PV array 17 and Route: Webfoot Rd

No glare found

PV array 17 and OP 1

No glare found

PV array 17 and OP 2

No glare found

PV array 17 and OP 3

No glare found

PV array 17 and OP 4

No glare found

PV array 17 and OP 5

No glare found

PV array 17 and OP 6

No glare found

PV array 17 and OP 7

No glare found

PV array 17 and OP 8

No glare found

PV array 17 and OP 9

No glare found

PV array 17 and OP 10

No glare found

PV array 17 and OP 11

No glare found

PV array 17 and OP 12

No glare found

PV array 17 and OP 13

No glare found

PV array 17 and OP 14

No glare found

PV array 17 and OP 15

No glare found

PV array 17 and OP 16

No glare found

PV array 17 and OP 17

No glare found

PV array 17 and OP 18

No glare found

PV array 17 and OP 19

No glare found

PV array 17 and OP 20

No glare found

PV array 17 and OP 21

No glare found

PV: PV array 18 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV array 18 and Route: Emigrant Springs Ln

No glare found

PV array 18 and Route: Herin Ln - 1

No glare found

PV array 18 and Route: Herin Ln - 2

No glare found

PV array 18 and Route: Hwy 206

No glare found

PV array 18 and Route: I97

No glare found

PV array 18 and Route: Klondike Rd

No glare found

PV array 18 and Route: Medler Ln

No glare found

PV array 18 and Route: N Klondike Rd

No glare found

PV array 18 and Route: Oehman Rd

No glare found

PV array 18 and Route: Old Wasco-Heppner Hwy

No glare found

PV array 18 and Route: Webfoot Rd

No glare found

PV array 18 and OP 1

No glare found

PV array 18 and OP 2

No glare found

PV array 18 and OP 3

No glare found

PV array 18 and OP 4

No glare found

PV array 18 and OP 5

No glare found

PV array 18 and OP 6

No glare found

PV array 18 and OP 7

No glare found

PV array 18 and OP 8

No glare found

PV array 18 and OP 9

No glare found

PV array 18 and OP 10

No glare found

PV array 18 and OP 11

No glare found

PV array 18 and OP 12

No glare found

PV array 18 and OP 13

No glare found

PV array 18 and OP 14

No glare found

PV array 18 and OP 15

No glare found

PV array 18 and OP 16

No glare found

PV array 18 and OP 17

No glare found

PV array 18 and OP 18

No glare found

PV array 18 and OP 19

No glare found

PV array 18 and OP 20

No glare found

PV array 18 and OP 21

No glare found

PV: PV array 19 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV array 19 and Route: Emigrant Springs Ln

No glare found

PV array 19 and Route: Herin Ln - 1

No glare found

PV array 19 and Route: Herin Ln - 2

No glare found

PV array 19 and Route: Hwy 206

No glare found

PV array 19 and Route: I97

No glare found

PV array 19 and Route: Klondike Rd

No glare found

PV array 19 and Route: Medler Ln

No glare found

PV array 19 and Route: N Klondike Rd

No glare found

PV array 19 and Route: Oehman Rd

No glare found

PV array 19 and Route: Old Wasco-Heppner Hwy

No glare found

PV array 19 and Route: Webfoot Rd

No glare found

PV array 19 and OP 1

No glare found

PV array 19 and OP 2

No glare found

PV array 19 and OP 3

No glare found

PV array 19 and OP 4

No glare found

PV array 19 and OP 5

No glare found

PV array 19 and OP 6

No glare found

PV array 19 and OP 7

No glare found

PV array 19 and OP 8

No glare found

PV array 19 and OP 9

No glare found

PV array 19 and OP 10

No glare found

PV array 19 and OP 11

No glare found

PV array 19 and OP 12

No glare found

PV array 19 and OP 13

No glare found

PV array 19 and OP 14

No glare found

PV array 19 and OP 15

No glare found

PV array 19 and OP 16

No glare found

PV array 19 and OP 17

No glare found

PV array 19 and OP 18

No glare found

PV array 19 and OP 19

No glare found

PV array 19 and OP 20

No glare found

PV array 19 and OP 21

No glare found

PV: PV array 2 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV array 2 and Route: Emigrant Springs Ln

No glare found

PV array 2 and Route: Herin Ln - 1

No glare found

PV array 2 and Route: Herin Ln - 2

No glare found

PV array 2 and Route: Hwy 206

No glare found

PV array 2 and Route: I97

No glare found

PV array 2 and Route: Klondike Rd

No glare found

PV array 2 and Route: Medler Ln

No glare found

PV array 2 and Route: N Klondike Rd

No glare found

PV array 2 and Route: Oehman Rd

No glare found

PV array 2 and Route: Old Wasco-Heppner Hwy

No glare found

PV array 2 and Route: Webfoot Rd

No glare found

PV array 2 and OP 1

No glare found

PV array 2 and OP 2

No glare found

PV array 2 and OP 3

No glare found

PV array 2 and OP 4

No glare found

PV array 2 and OP 5

No glare found

PV array 2 and OP 6

No glare found

PV array 2 and OP 7

No glare found

PV array 2 and OP 8

No glare found

PV array 2 and OP 9

No glare found

PV array 2 and OP 10

No glare found

PV array 2 and OP 11

No glare found

PV array 2 and OP 12

No glare found

PV array 2 and OP 13

No glare found

PV array 2 and OP 14

No glare found

PV array 2 and OP 15

No glare found

PV array 2 and OP 16

No glare found

PV array 2 and OP 17

No glare found

PV array 2 and OP 18

No glare found

PV array 2 and OP 19

No glare found

PV array 2 and OP 20

No glare found

PV array 2 and OP 21

No glare found

PV: PV array 20 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV array 20 and Route: Emigrant Springs Ln

No glare found

PV array 20 and Route: Herin Ln - 1

No glare found

PV array 20 and Route: Herin Ln - 2

No glare found

PV array 20 and Route: Hwy 206

No glare found

PV array 20 and Route: I97

No glare found

PV array 20 and Route: Klondike Rd

No glare found

PV array 20 and Route: Medler Ln

No glare found

PV array 20 and Route: N Klondike Rd

No glare found

PV array 20 and Route: Oehman Rd

No glare found

PV array 20 and Route: Old Wasco-Heppner Hwy

No glare found

PV array 20 and Route: Webfoot Rd

No glare found

PV array 20 and OP 1

No glare found

PV array 20 and OP 2

No glare found

PV array 20 and OP 3

No glare found

PV array 20 and OP 4

No glare found

PV array 20 and OP 5

No glare found

PV array 20 and OP 6

No glare found

PV array 20 and OP 7

No glare found

PV array 20 and OP 8

No glare found

PV array 20 and OP 9

No glare found

PV array 20 and OP 10

No glare found

PV array 20 and OP 11

No glare found

PV array 20 and OP 12

No glare found

PV array 20 and OP 13

No glare found

PV array 20 and OP 14

No glare found

PV array 20 and OP 15

No glare found

PV array 20 and OP 16

No glare found

PV array 20 and OP 17

No glare found

PV array 20 and OP 18

No glare found

PV array 20 and OP 19

No glare found

PV array 20 and OP 20

No glare found

PV array 20 and OP 21

No glare found

PV: PV array 3 potential temporary after-image

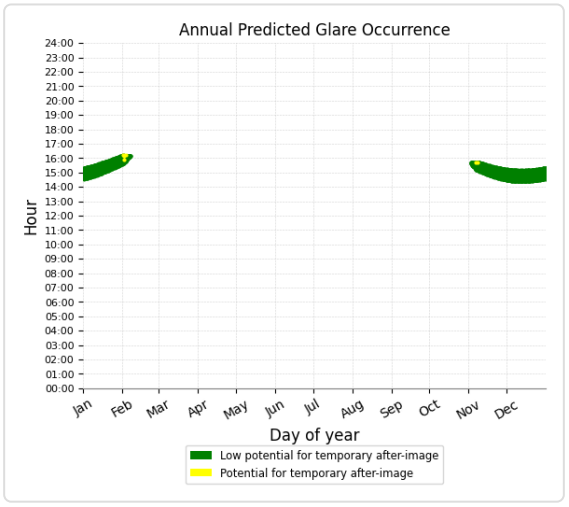
Receptor results ordered by category of glare

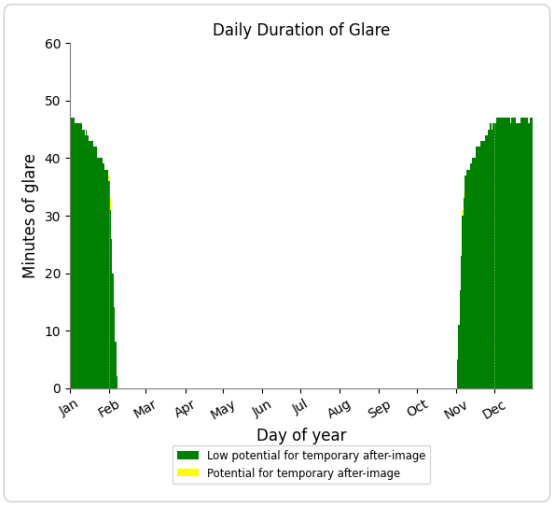
Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
N Klondike Rd	4,004	66.7	6	0.1
Emigrant Springs Ln	3,350	55.8	0	0.0
Herin Ln - 1	4,510	75.2	0	0.0
Herin Ln - 2	2,585	43.1	0	0.0
Medler Ln	4,941	82.3	0	0.0
Oehman Rd	8,717	145.3	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 5	308	5.1	0	0.0
OP 6	5,705	95.1	0	0.0
OP 7	812	13.5	0	0.0
OP 8	1,424	23.7	0	0.0
OP 9	2,085	34.8	0	0.0
OP 10	252	4.2	0	0.0
OP 11	177	3.0	0	0.0
OP 14	555	9.2	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

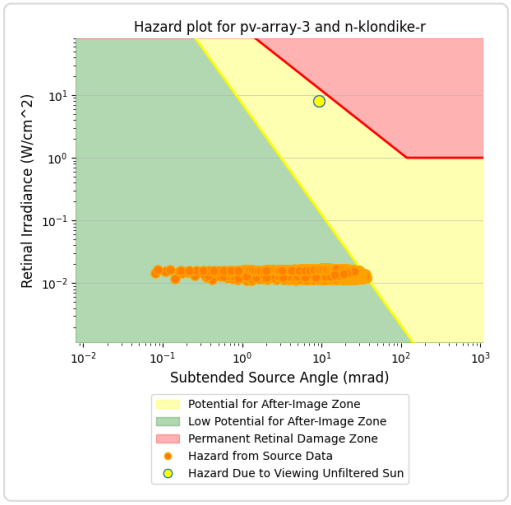
PV array 3 and Route: N Klondike Rd

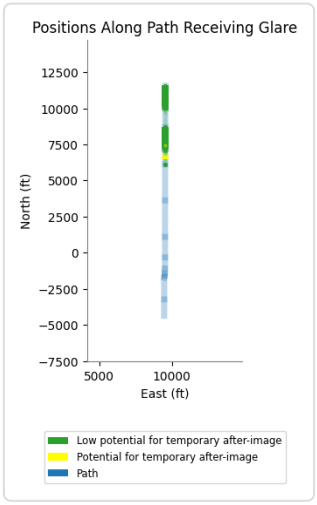
Yellow glare: 6 min.

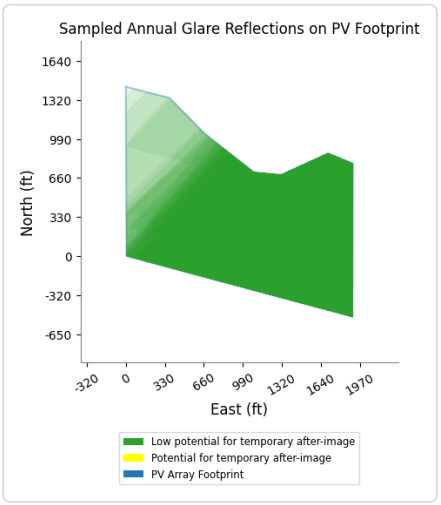
Green glare: 4,004 min.







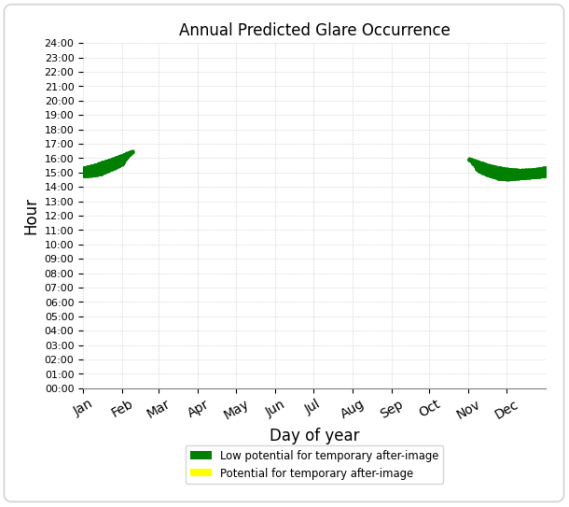


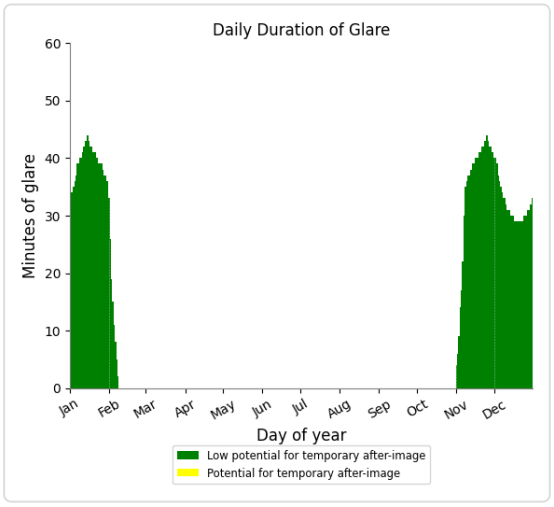


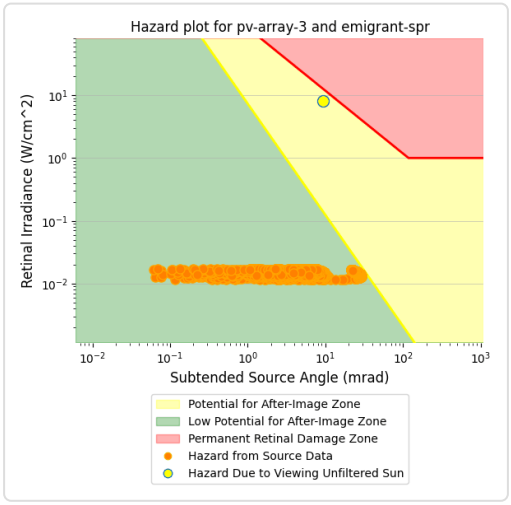
PV array 3 and Route: Emigrant Springs Ln

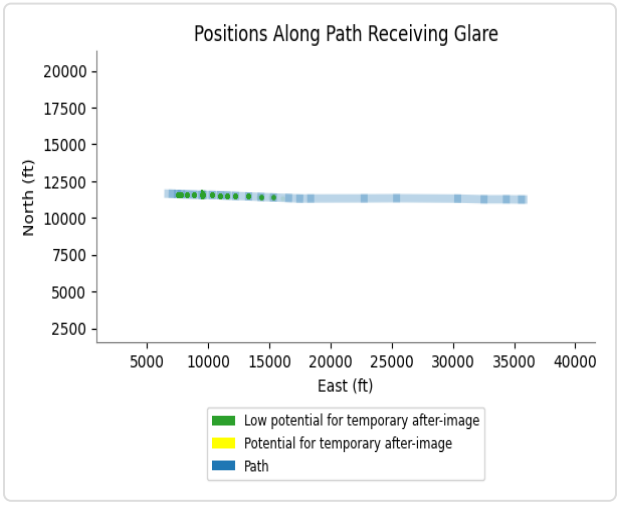
Yellow glare: none

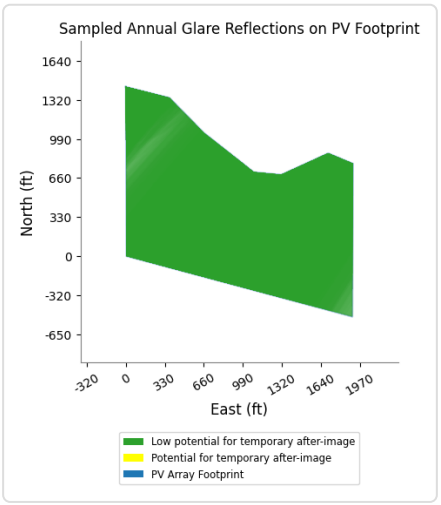
Green glare: 3,350 min.







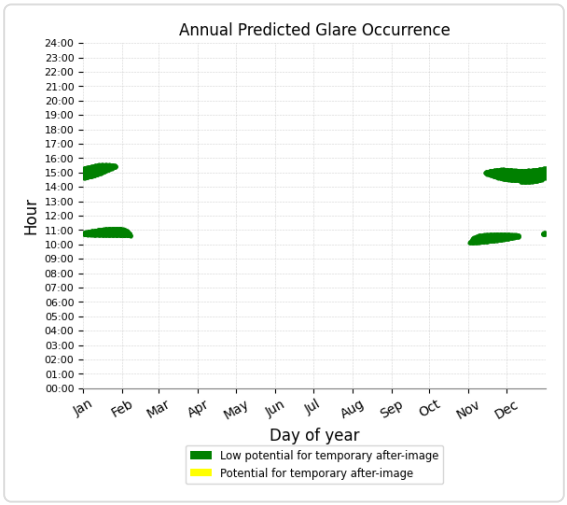


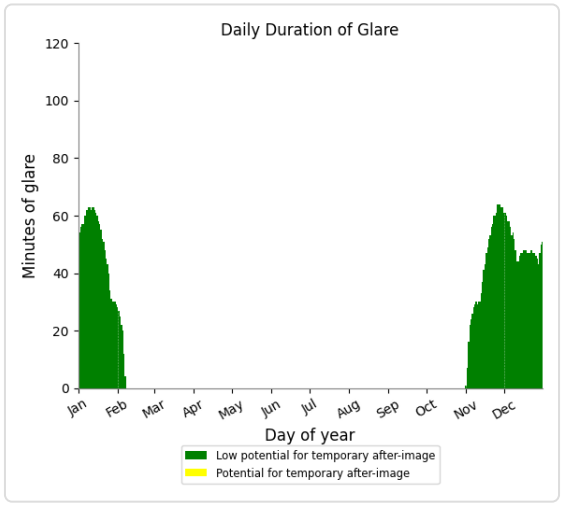


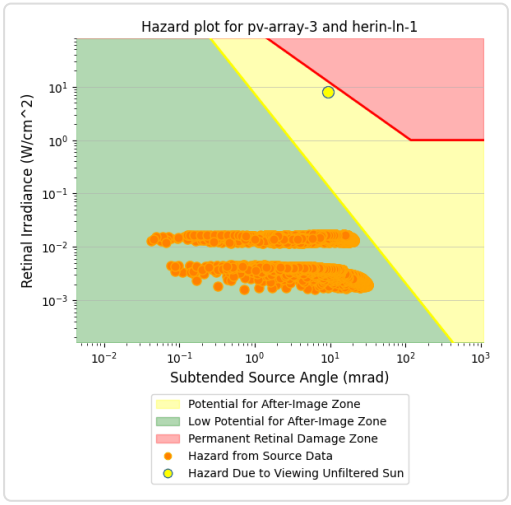
PV array 3 and Route: Herin Ln - 1

Yellow glare: none

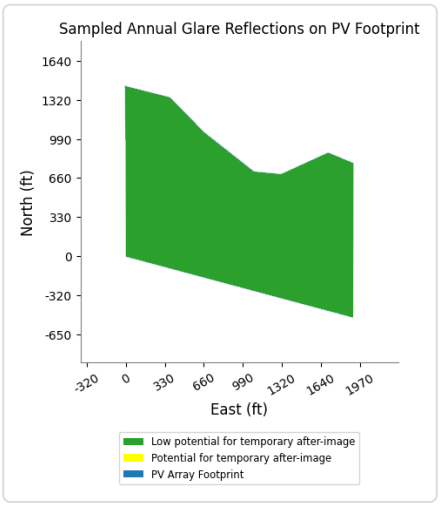
Green glare: 4,510 min.







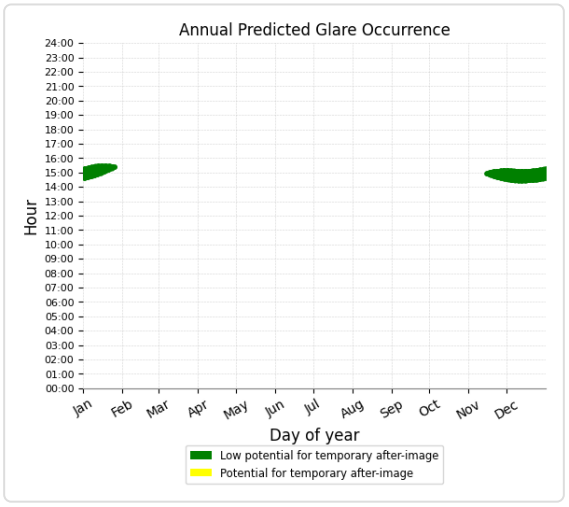


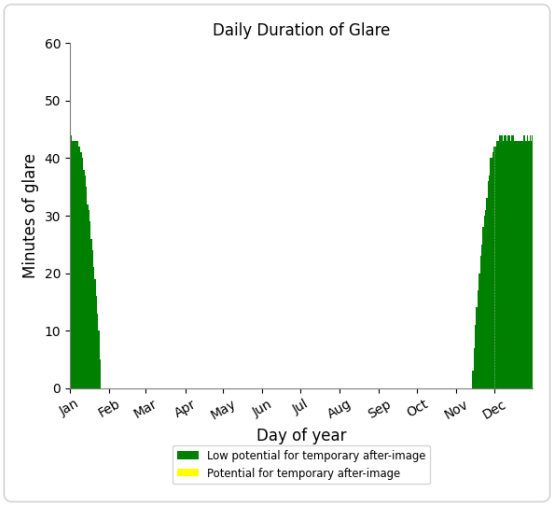


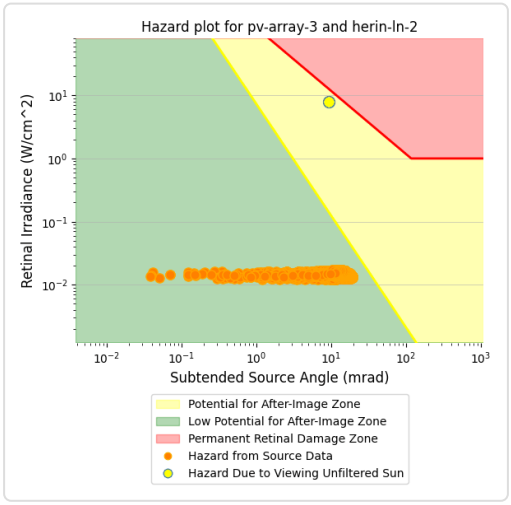
PV array 3 and Route: Herin Ln - 2

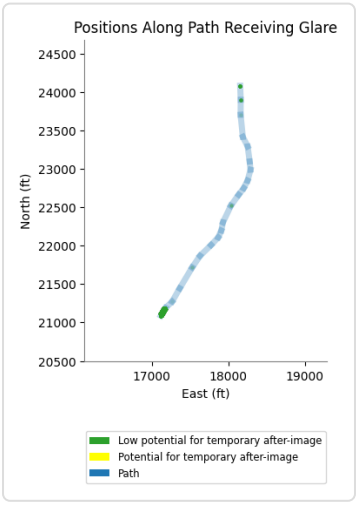
Yellow glare: none

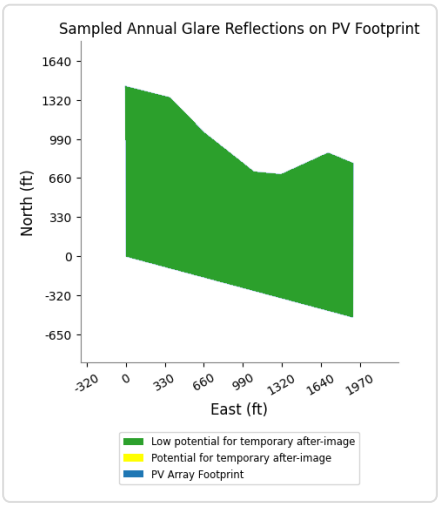
Green glare: 2,585 min.







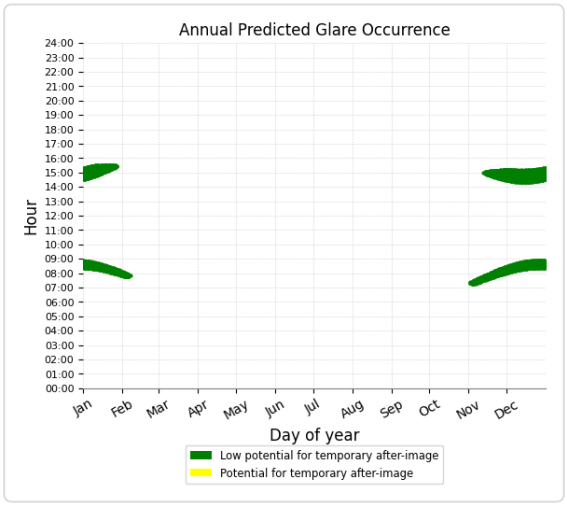


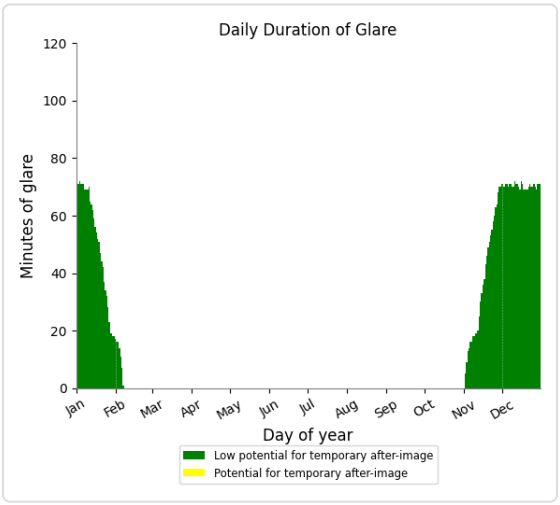


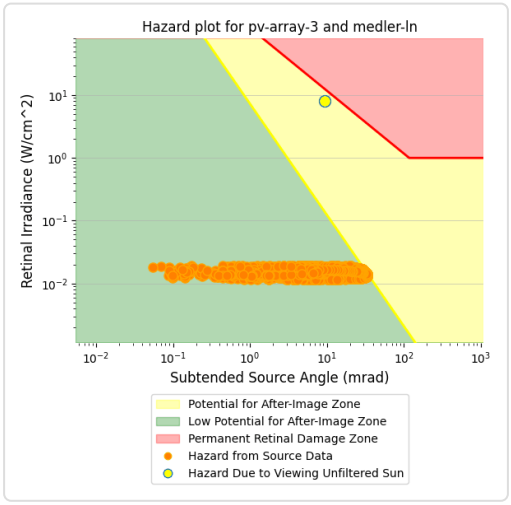
PV array 3 and Route: Medler Ln

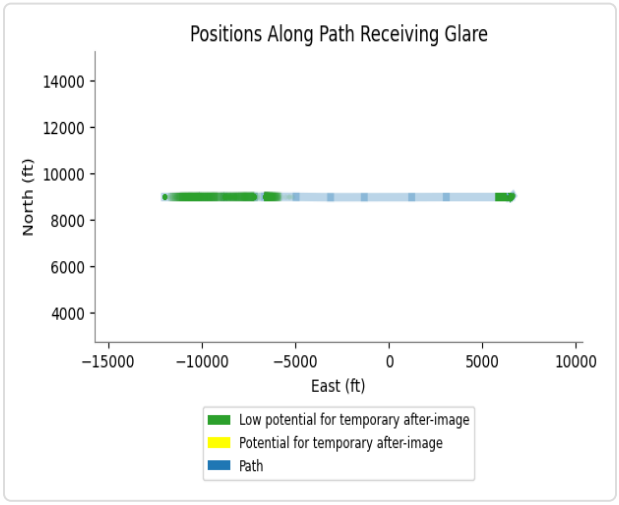
Yellow glare: none

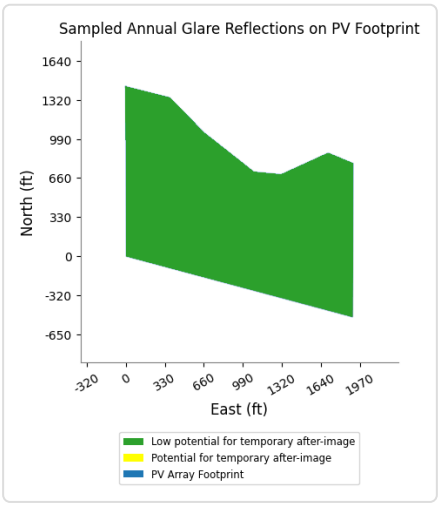
Green glare: 4,941 min.







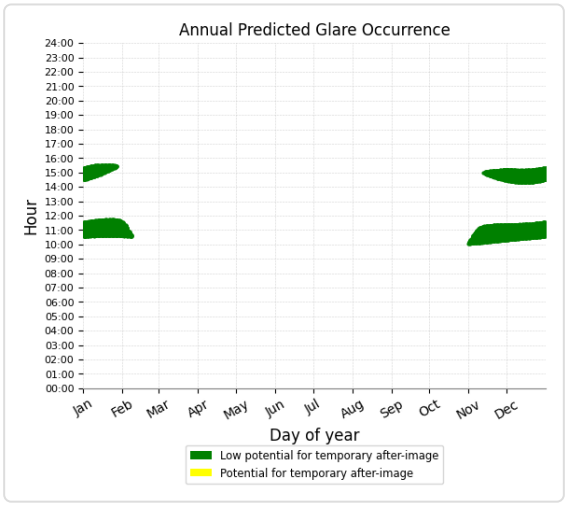


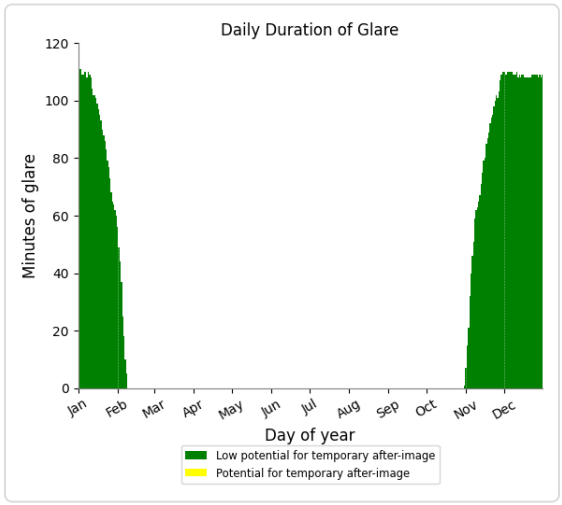


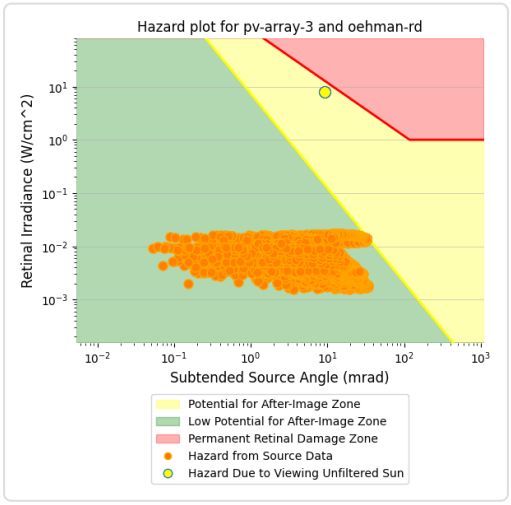
PV array 3 and Route: Oehman Rd

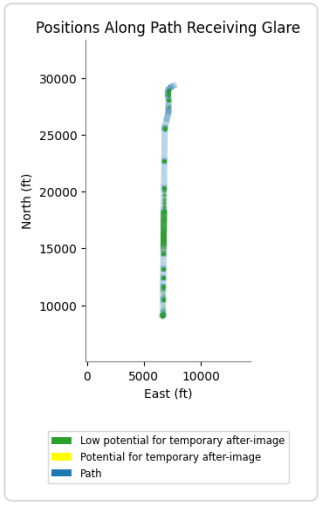
Yellow glare: none

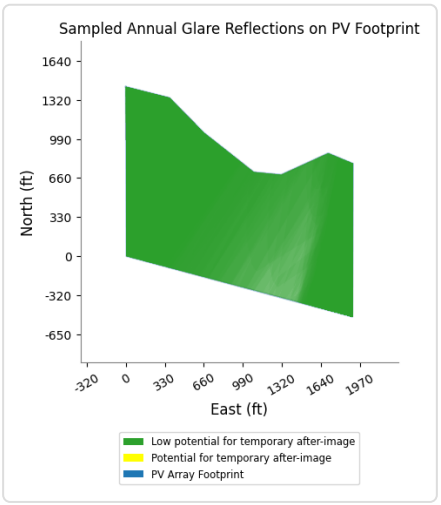
Green glare: 8,717 min.











PV array 3 and Route: Hwy 206

No glare found

PV array 3 and Route: I97

No glare found

PV array 3 and Route: Klondike Rd

No glare found

PV array 3 and Route: Old Wasco-Heppner Hwy

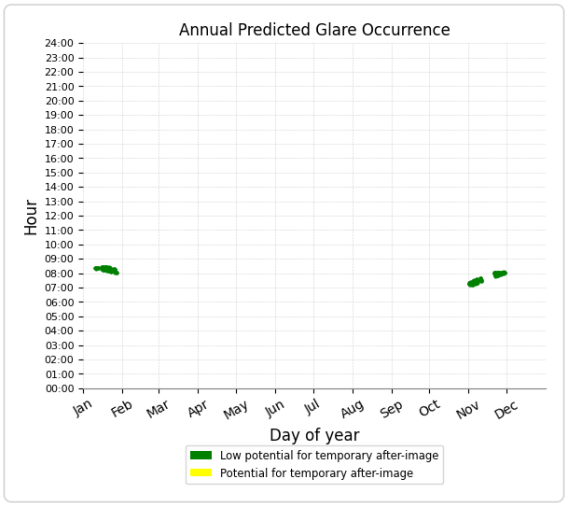
No glare found

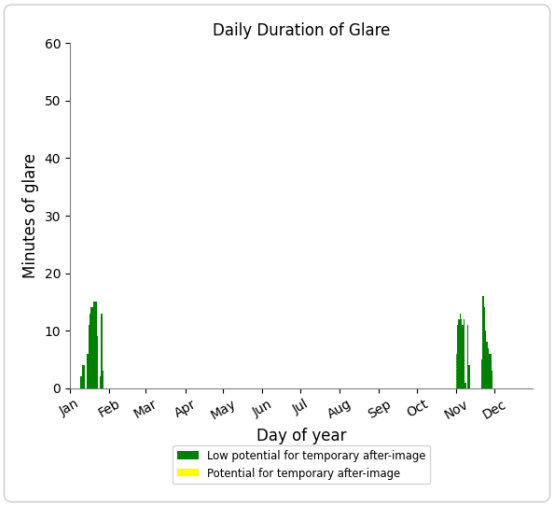
PV array 3 and Route: Webfoot Rd

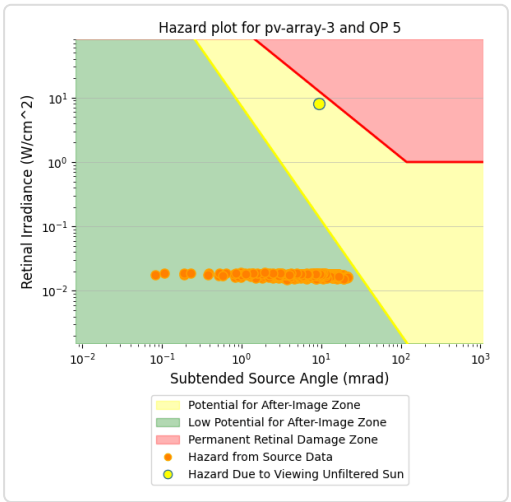
No glare found

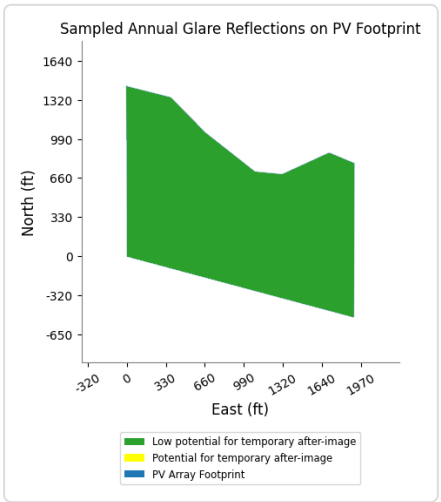
PV array 3 and OP 5

Yellow glare: none
Green glare: 308 min.





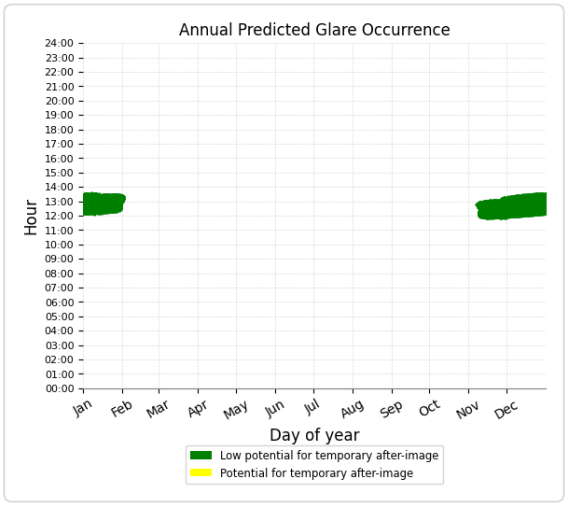


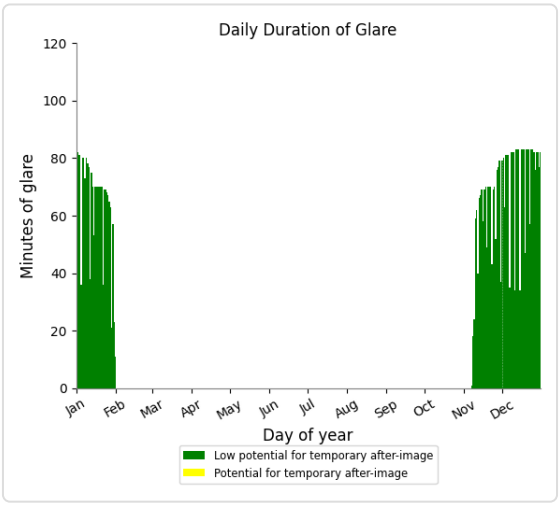


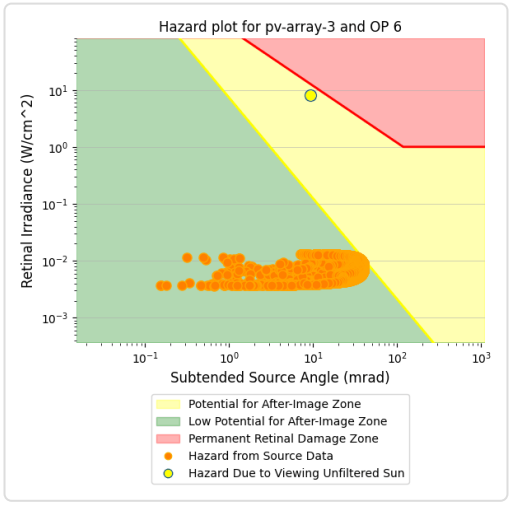
PV array 3 and OP 6

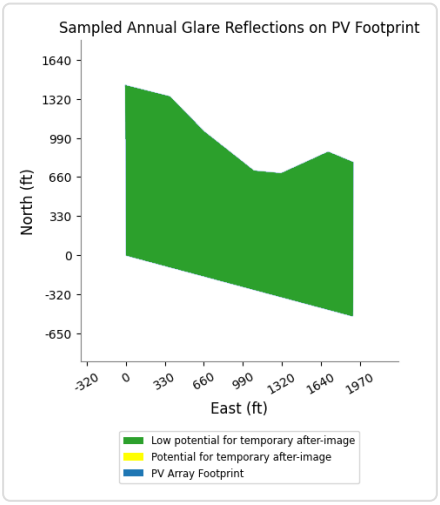
Yellow glare: none

Green glare: 5,705 min.





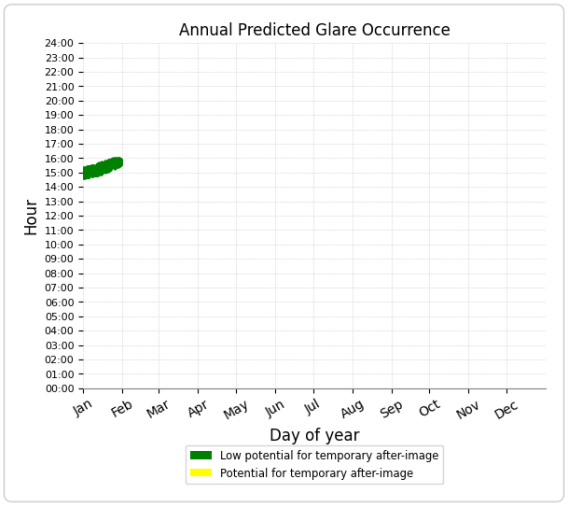


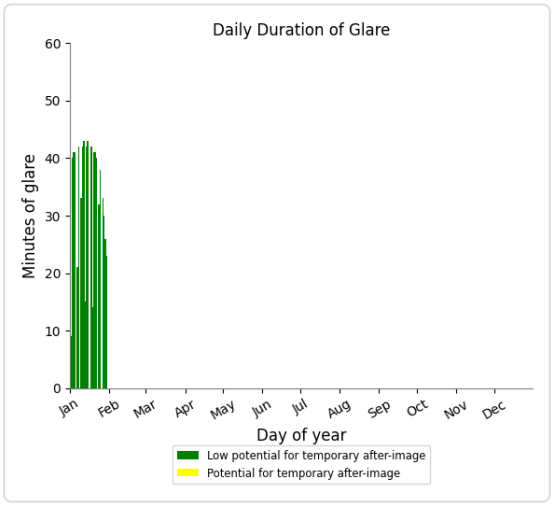


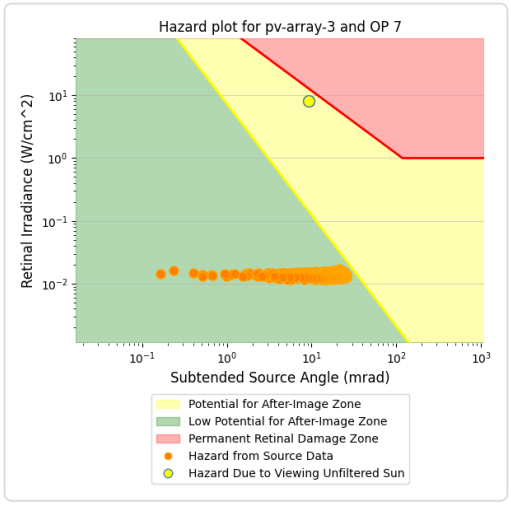
PV array 3 and OP 7

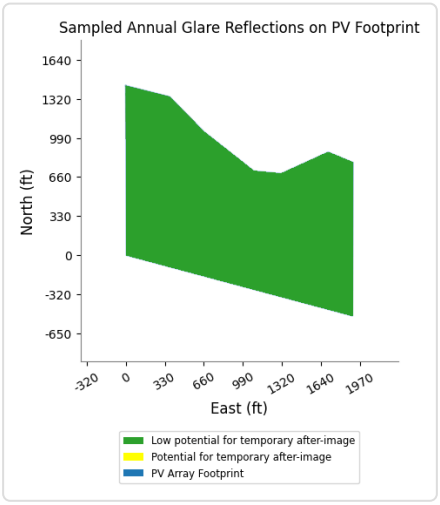
Yellow glare: none

Green glare: 812 min.





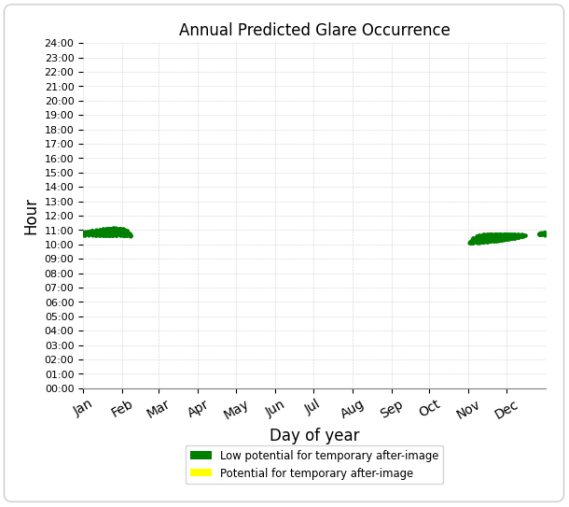


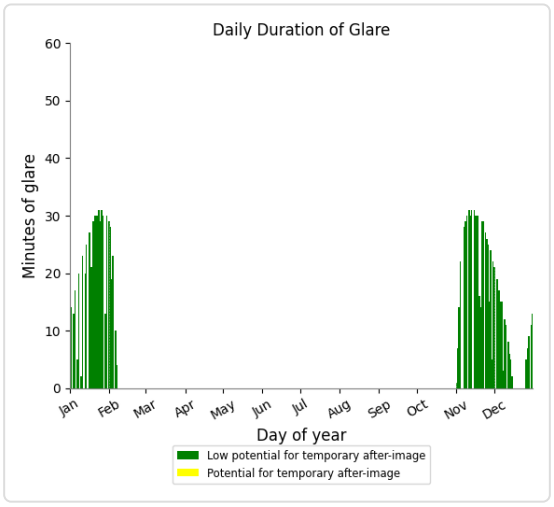


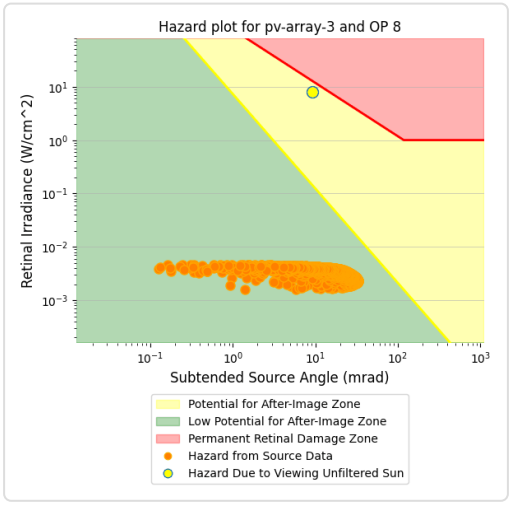
PV array 3 and OP 8

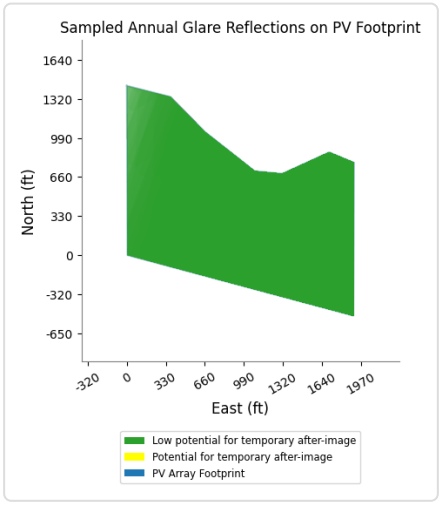
Yellow glare: none

Green glare: 1,424 min.





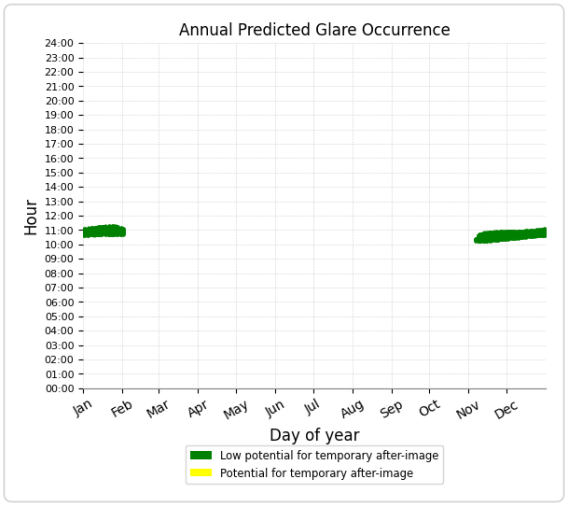


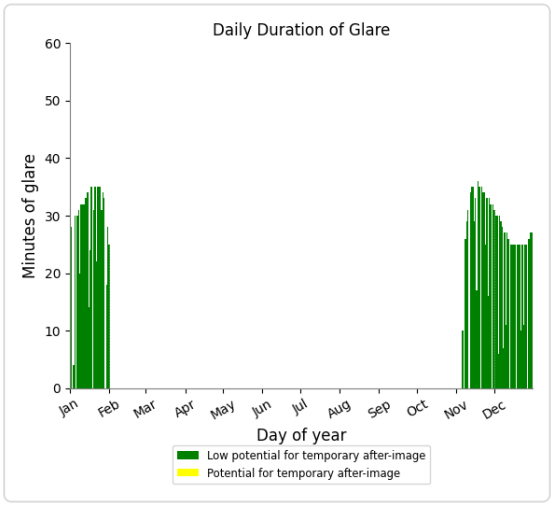


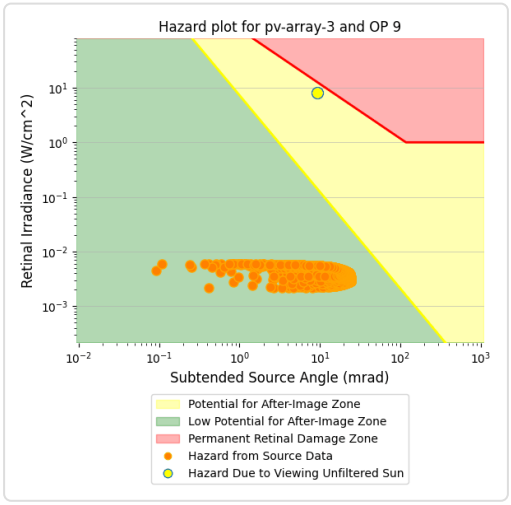
PV array 3 and OP 9

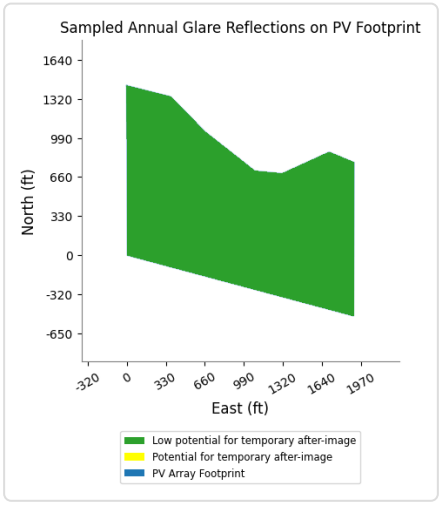
Yellow glare: none

Green glare: 2,085 min.





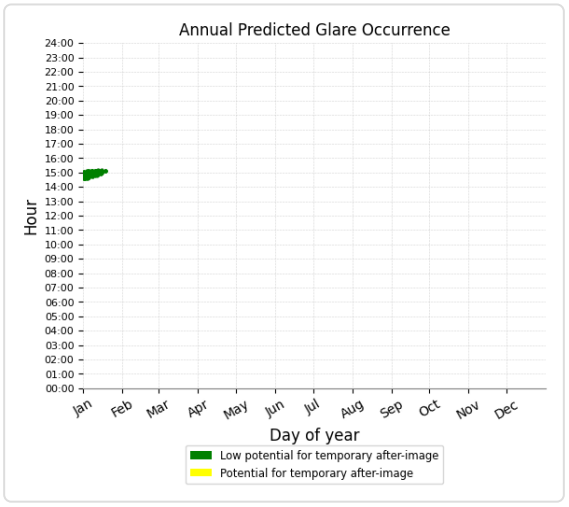


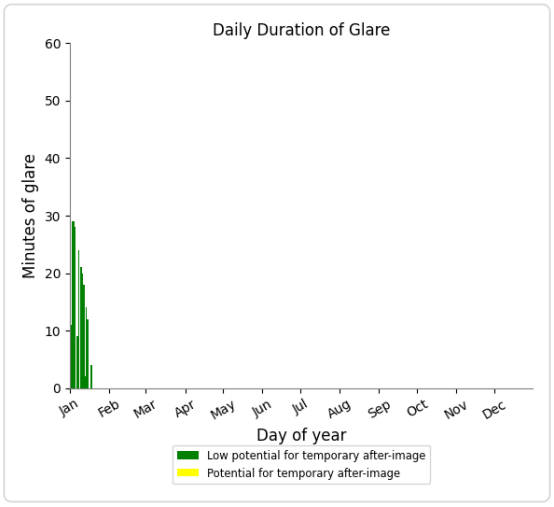


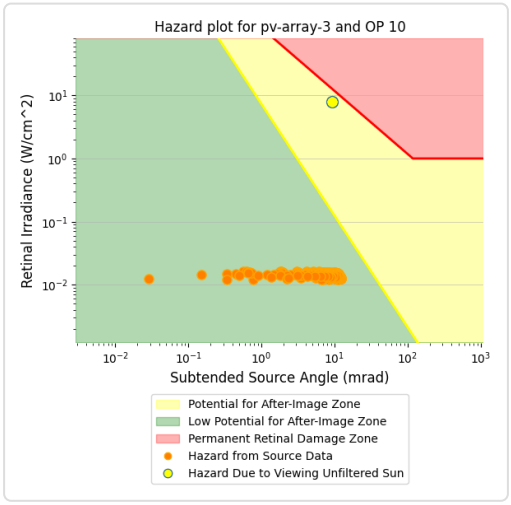
PV array 3 and OP 10

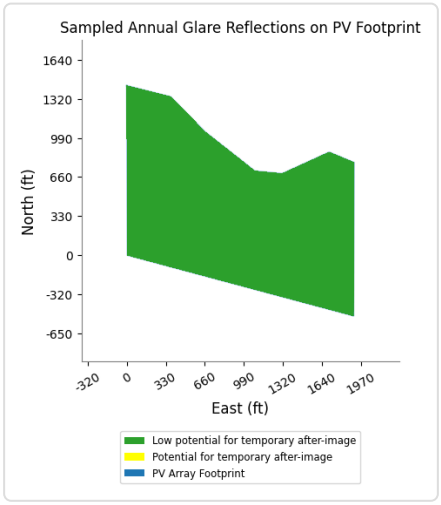
Yellow glare: none

Green glare: 252 min.





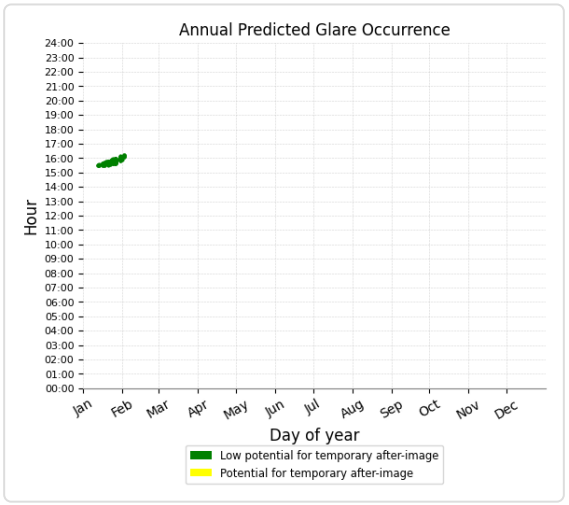


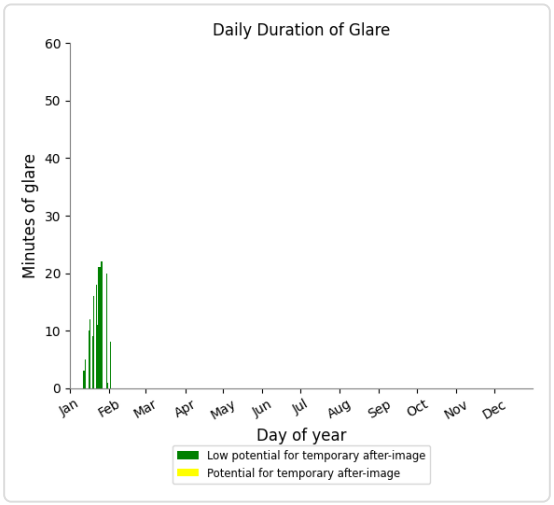


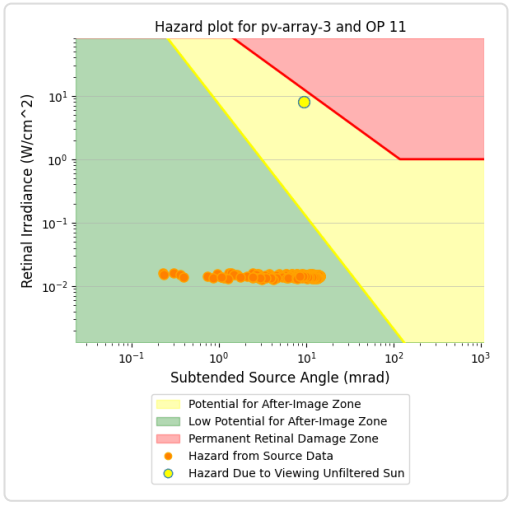
PV array 3 and OP 11

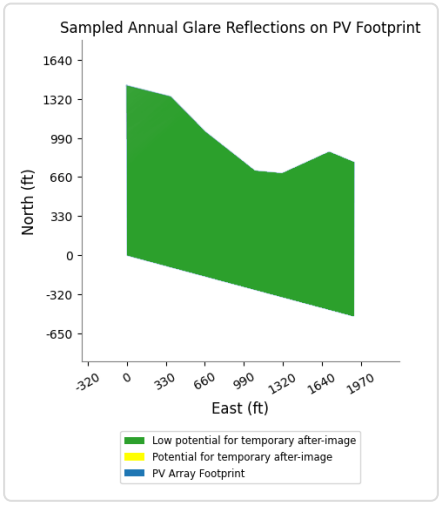
Yellow glare: none

Green glare: 177 min.





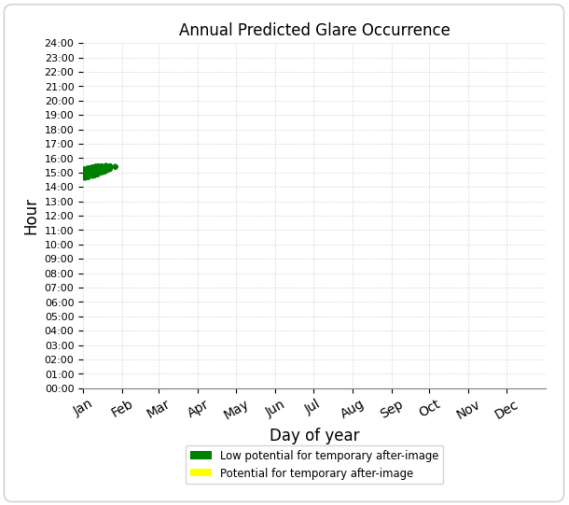


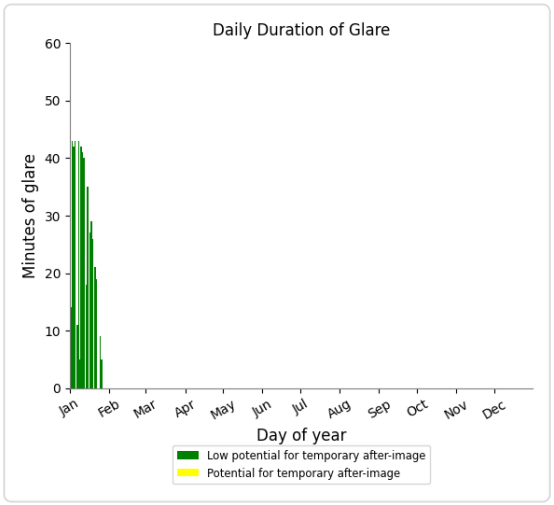


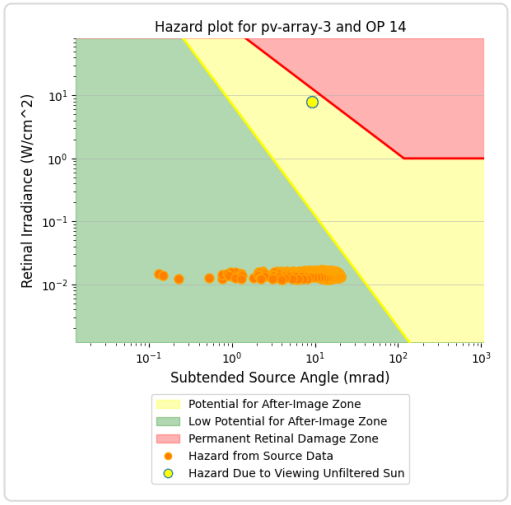
PV array 3 and OP 14

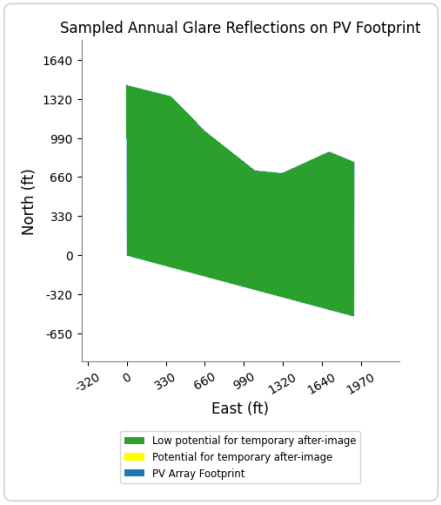
Yellow glare: none

Green glare: 555 min.









PV array 3 and OP 1

No glare found

PV array 3 and OP 2

No glare found

PV array 3 and OP 3

No glare found

PV array 3 and OP 4

No glare found

PV array 3 and OP 12

No glare found

PV array 3 and OP 13

No glare found

PV array 3 and OP 15

No glare found

PV array 3 and OP 16

No glare found

PV array 3 and OP 17

No glare found

PV array 3 and OP 18

No glare found

PV array 3 and OP 19

No glare found

PV array 3 and OP 20

No glare found

PV array 3 and OP 21

No glare found

PV: PV array 4 potential temporary after-image

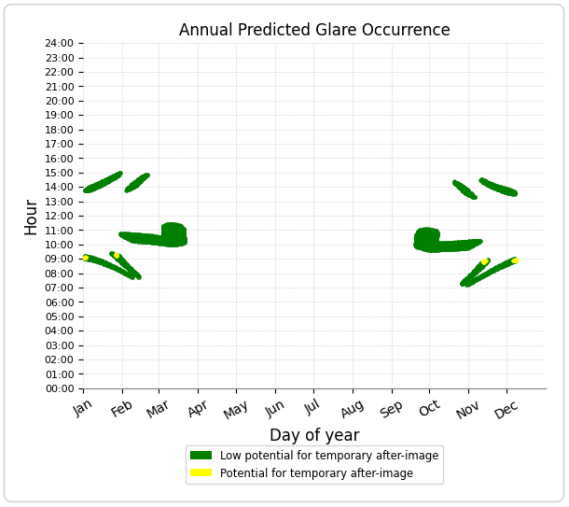
Receptor results ordered by category of glare

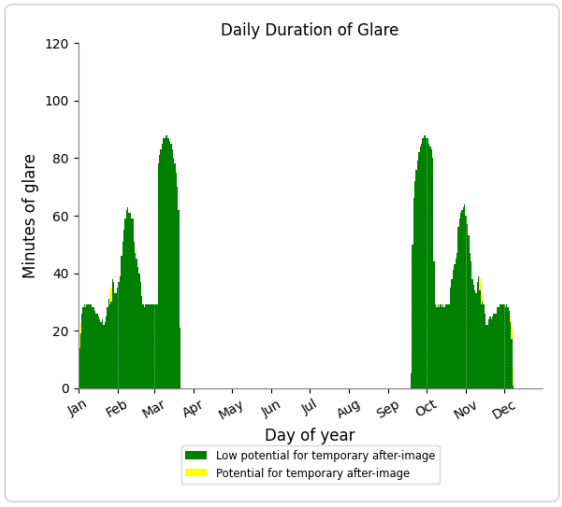
Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Medler Ln	7,093	118.2	44	0.7
N Klondike Rd	4,932	82.2	206	3.4
Webfoot Rd	1,284	21.4	32	0.5
Emigrant Springs Ln	2,438	40.6	0	0.0
Herin Ln - 1	5,380	89.7	0	0.0
Herin Ln - 2	1,378	23.0	0	0.0
Oehman Rd	8,286	138.1	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
OP 4	17	0.3	0	0.0
OP 5	52	0.9	0	0.0
OP 6	2,014	33.6	0	0.0
OP 7	1,283	21.4	0	0.0
OP 8	2,431	40.5	0	0.0
OP 9	2,034	33.9	0	0.0
OP 10	725	12.1	0	0.0
OP 11	839	14.0	0	0.0
OP 14	890	14.8	0	0.0
OP 15	218	3.6	0	0.0
OP 16	56	0.9	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

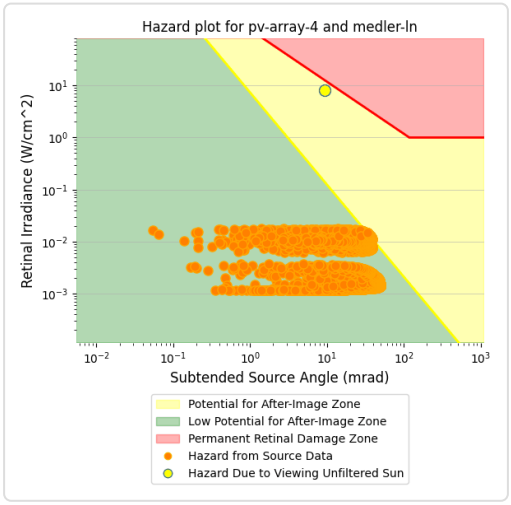
PV array 4 and Route: Medler Ln

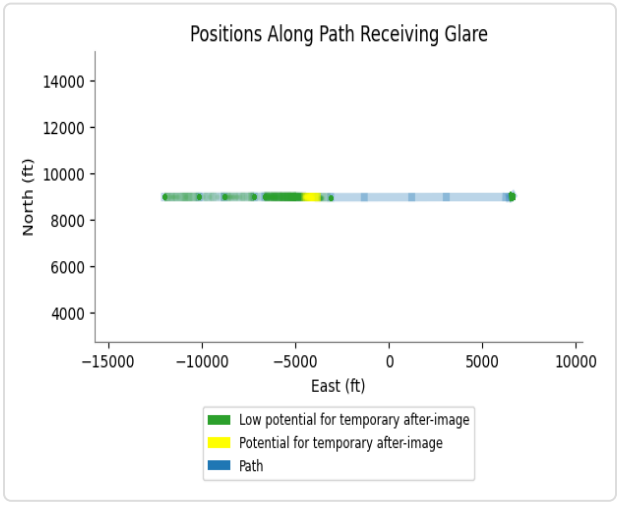
Yellow glare: 44 min.

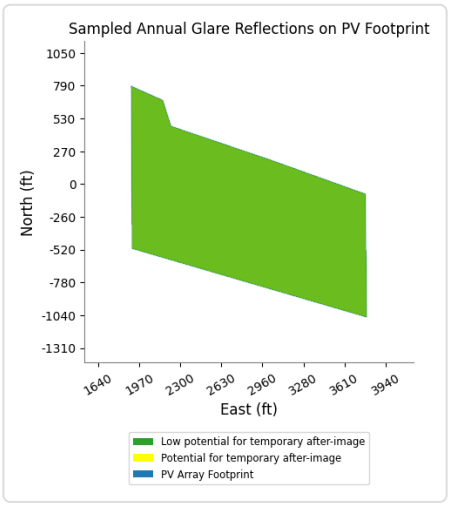
Green glare: 7,093 min.







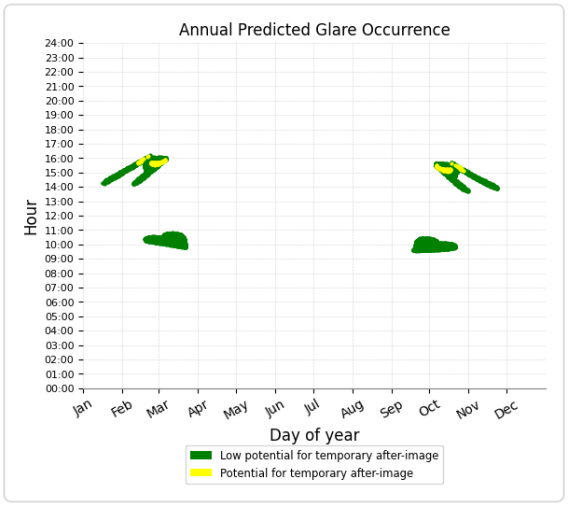


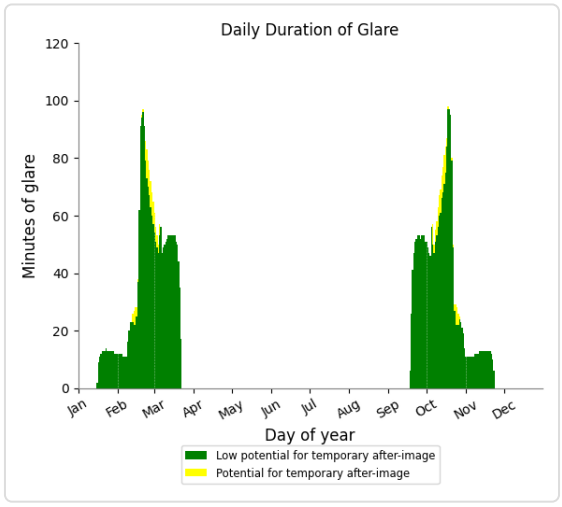


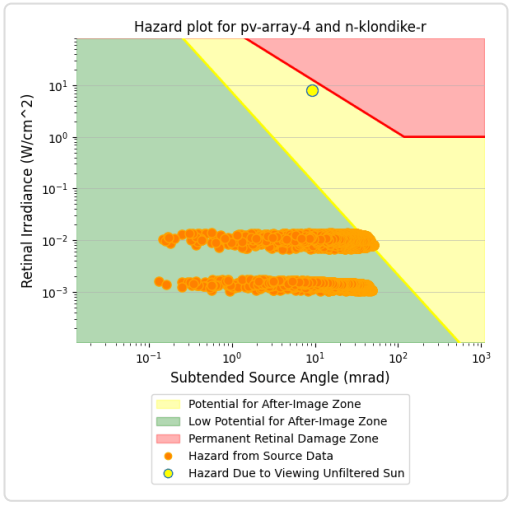
PV array 4 and Route: N Klondike Rd

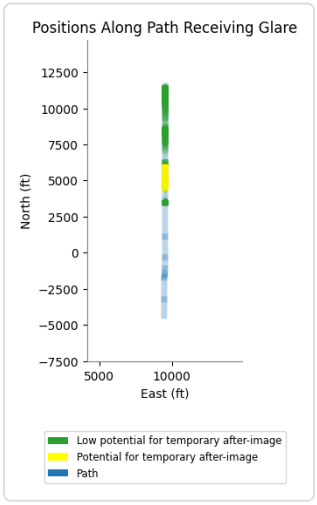
Yellow glare: 206 min.

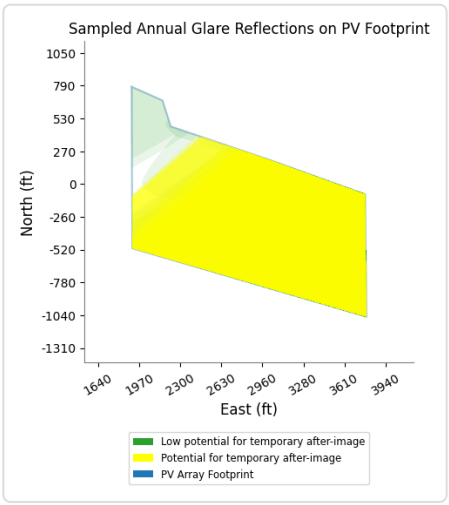
Green glare: 4,932 min.







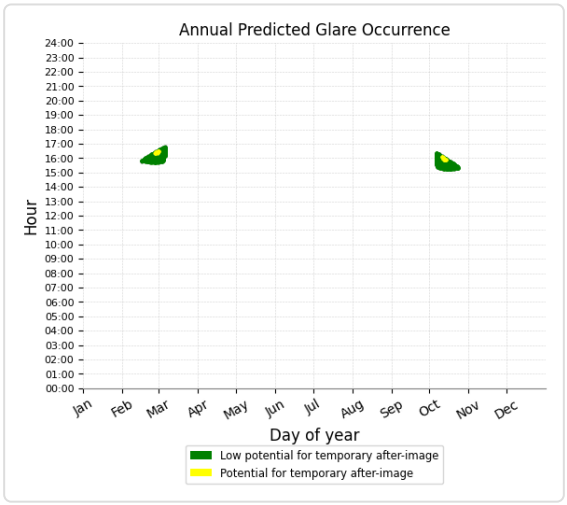


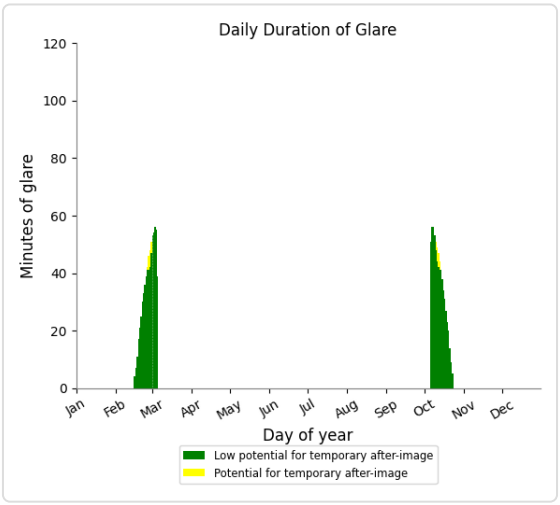


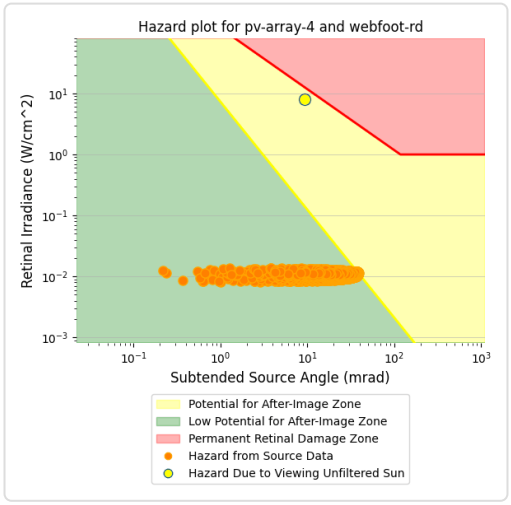
PV array 4 and Route: Webfoot Rd

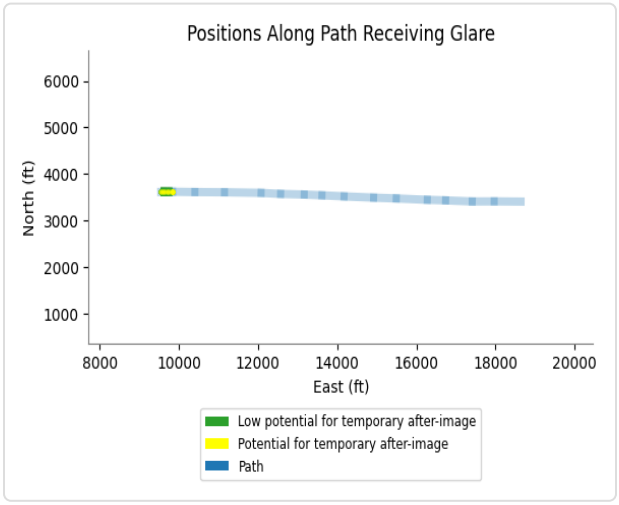
Yellow glare: 32 min.

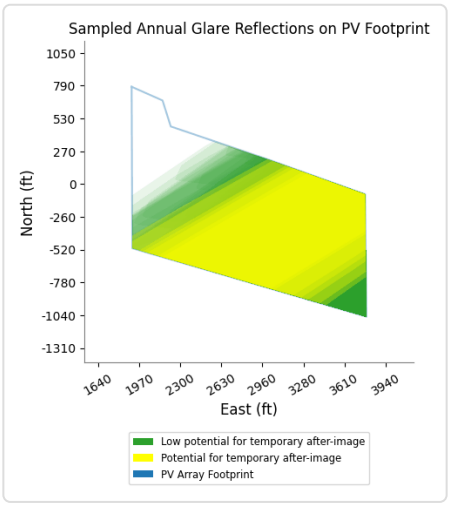
Green glare: 1,284 min.







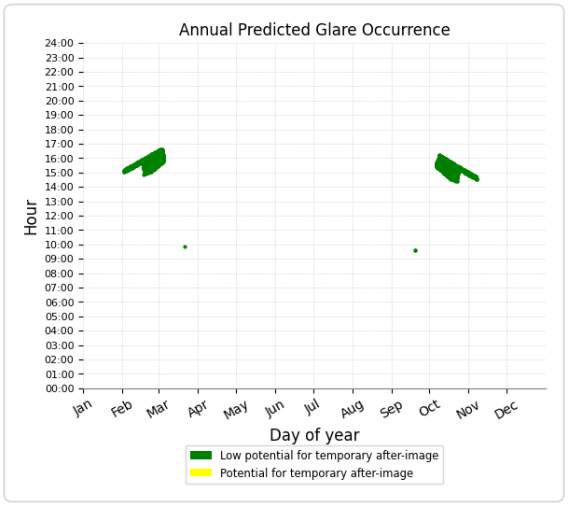


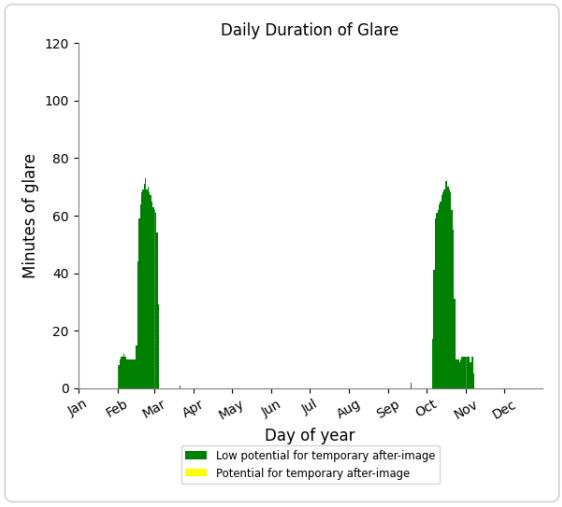


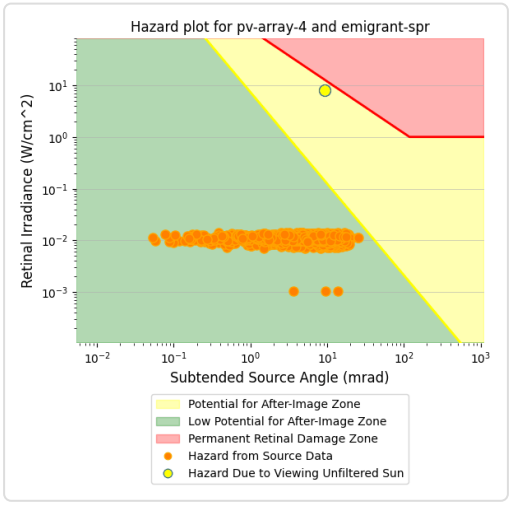
PV array 4 and Route: Emigrant Springs Ln

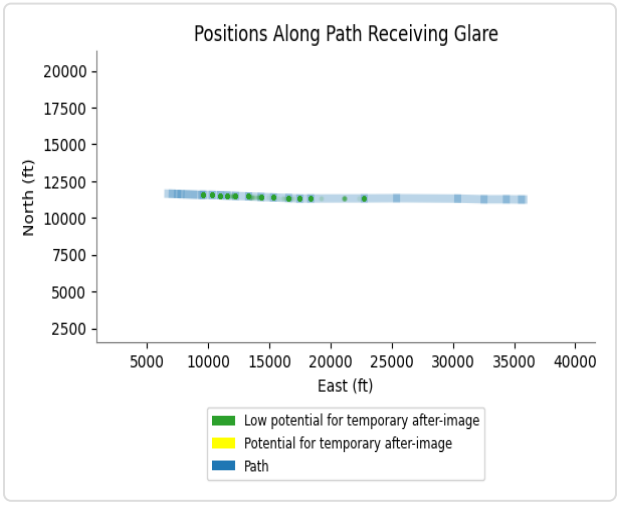
Yellow glare: none

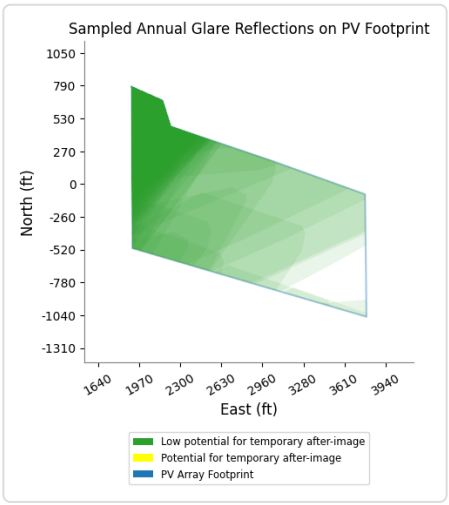
Green glare: 2,438 min.







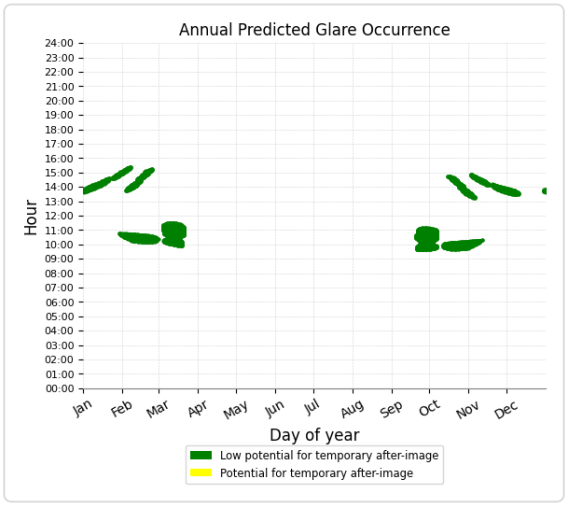


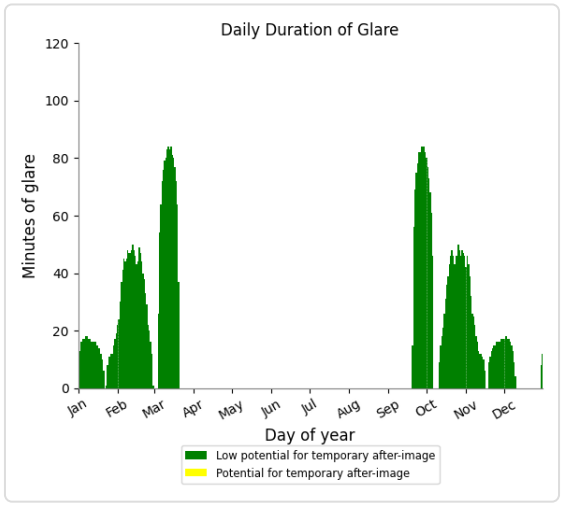


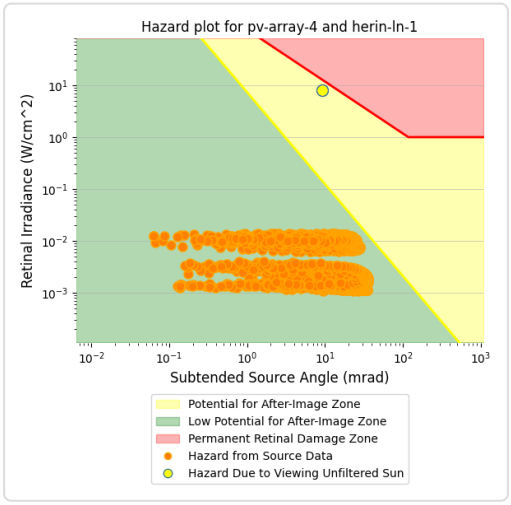
PV array 4 and Route: Herin Ln - 1

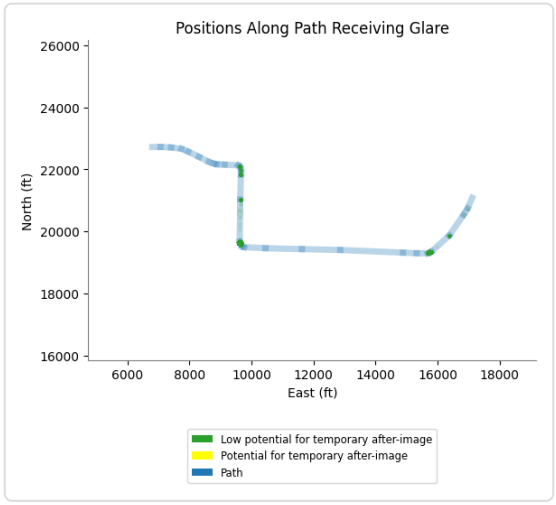
Yellow glare: none

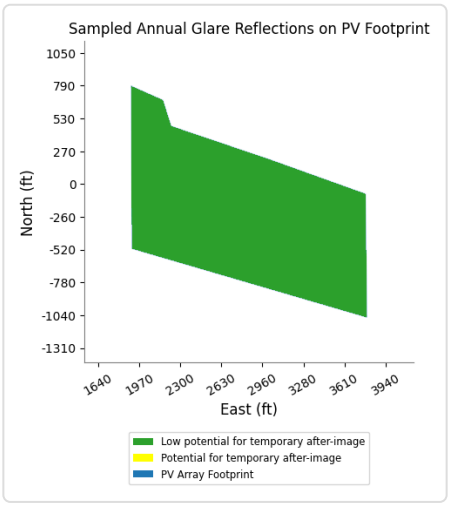
Green glare: 5,380 min.







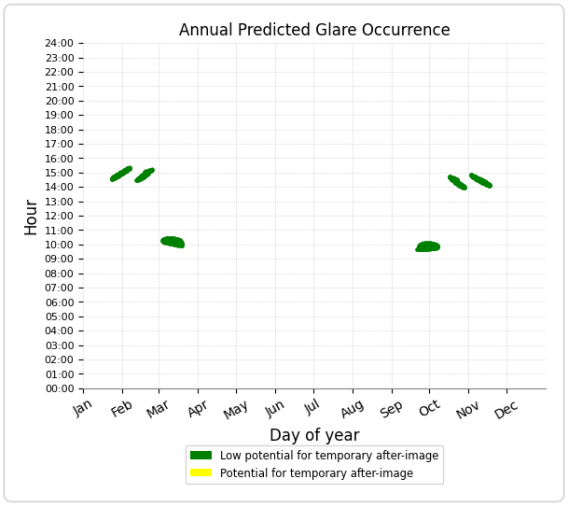


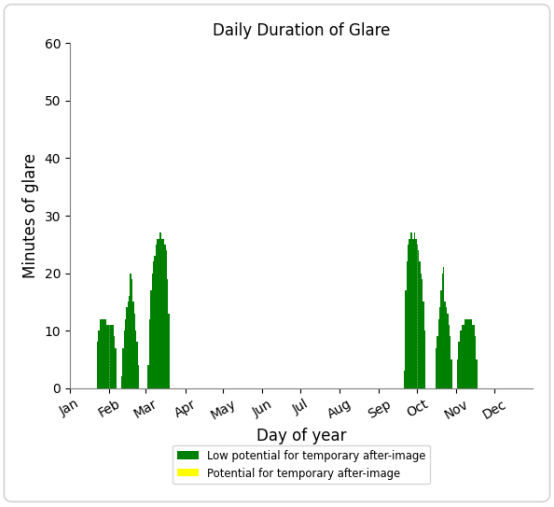


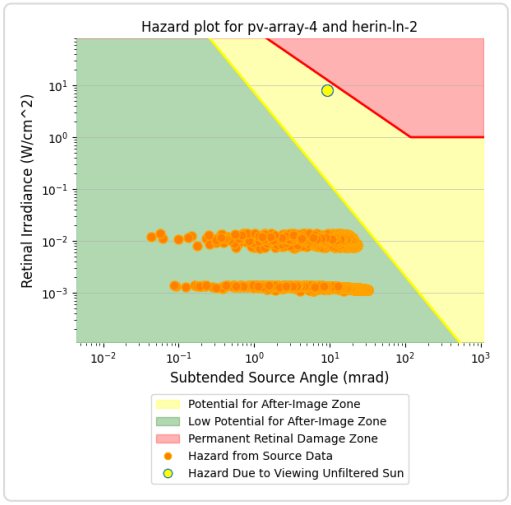
PV array 4 and Route: Herin Ln - 2

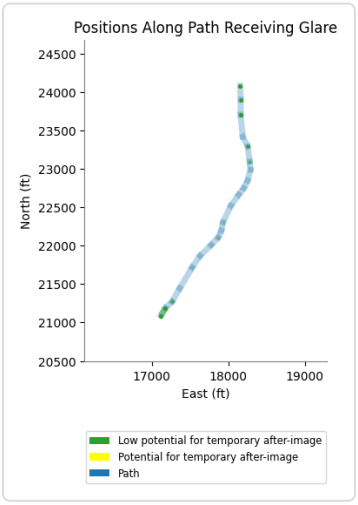
Yellow glare: none

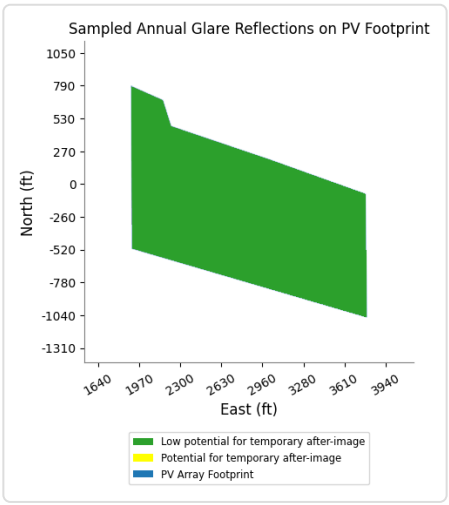
Green glare: 1,378 min.







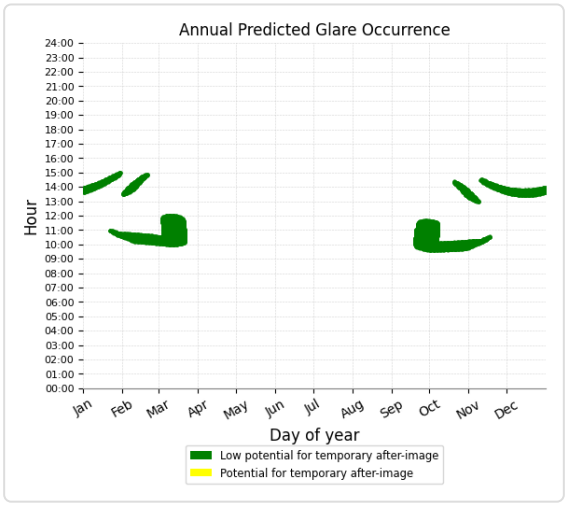


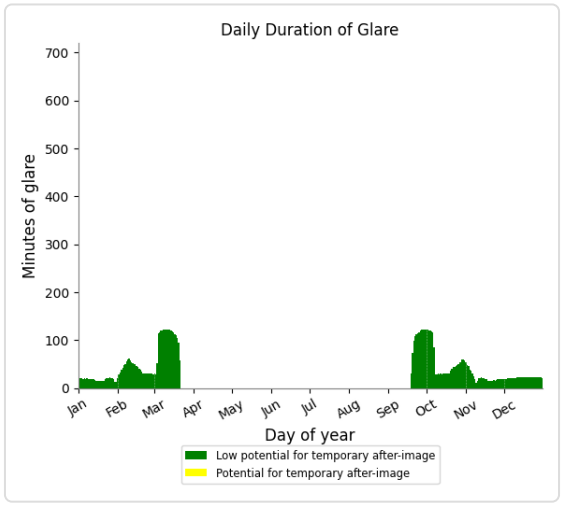


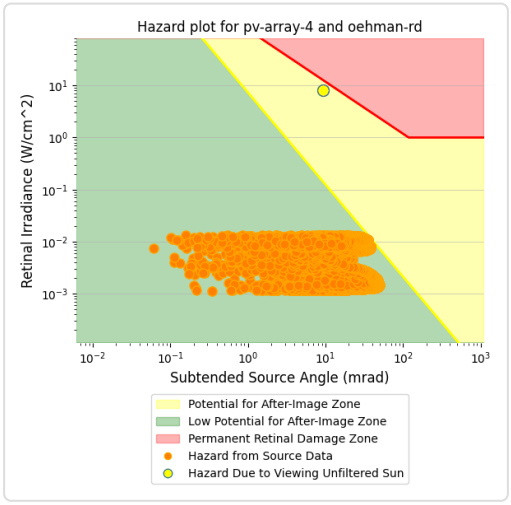
PV array 4 and Route: Oehman Rd

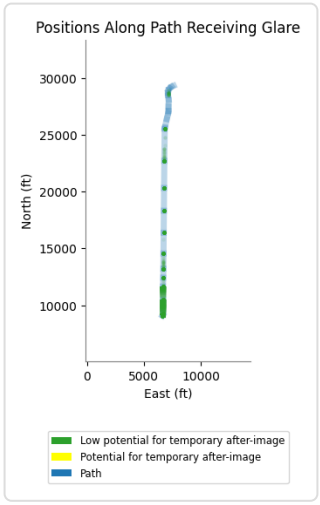
Yellow glare: none

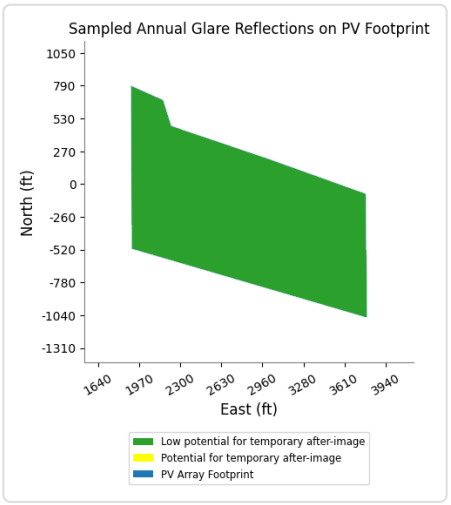
Green glare: 8,286 min.











PV array 4 and Route: Hwy 206

No glare found

PV array 4 and Route: I97

No glare found

PV array 4 and Route: Klondike Rd

No glare found

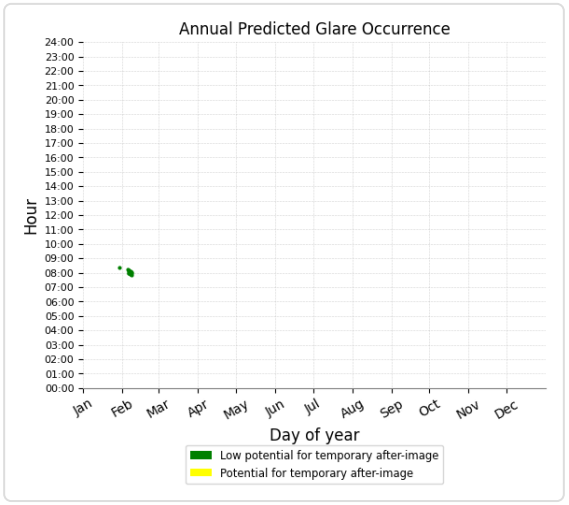
PV array 4 and Route: Old Wasco-Heppner Hwy

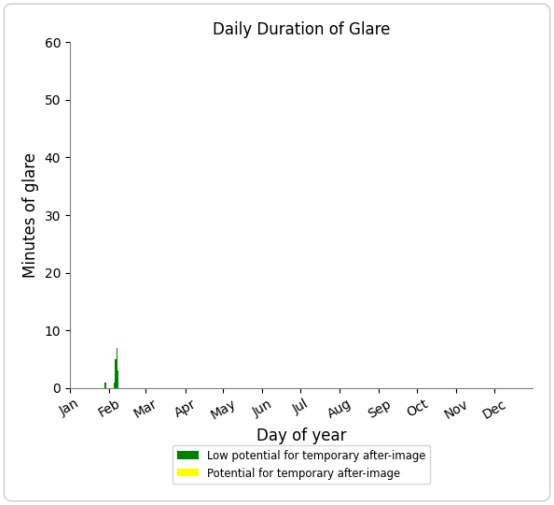
No glare found

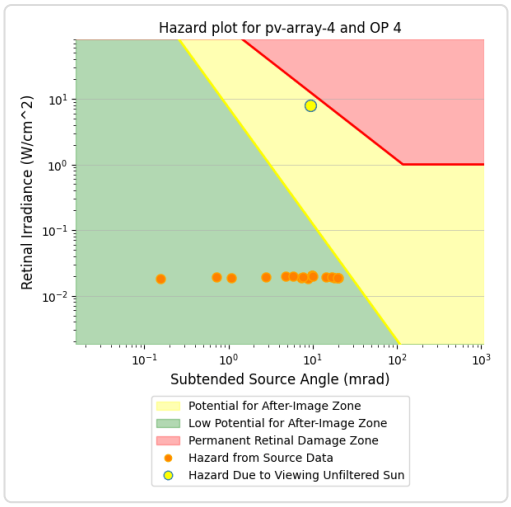
PV array 4 and OP 4

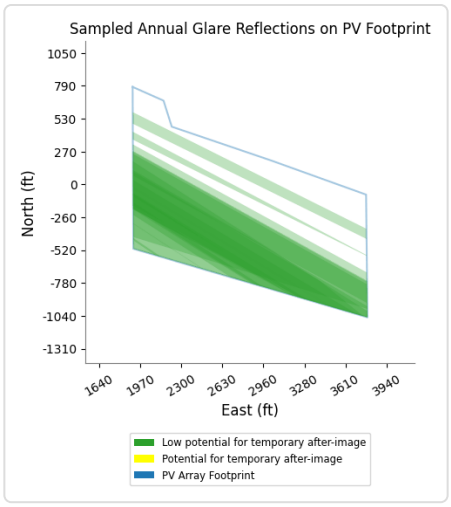
Yellow glare: none

Green glare: 17 min.





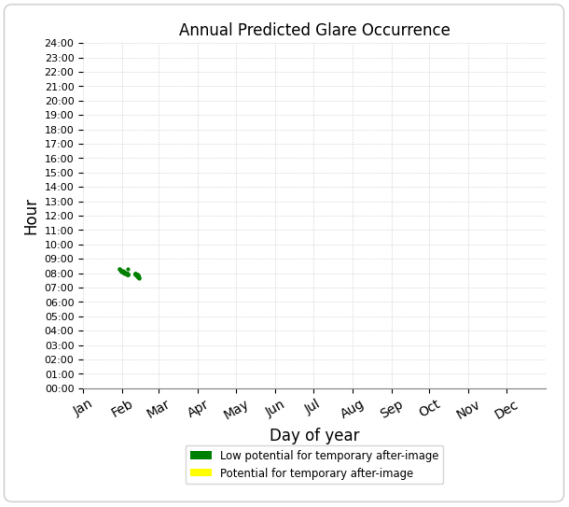


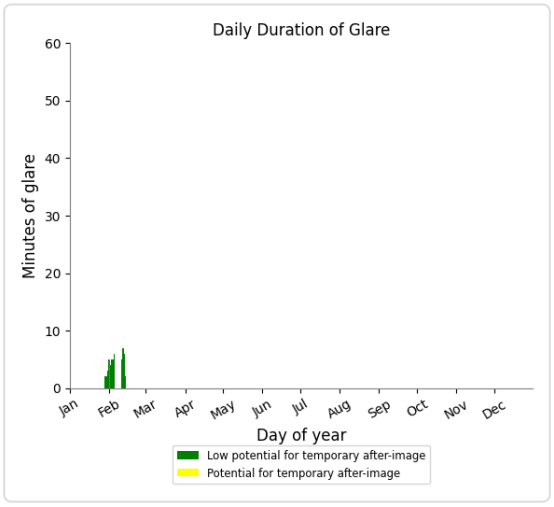


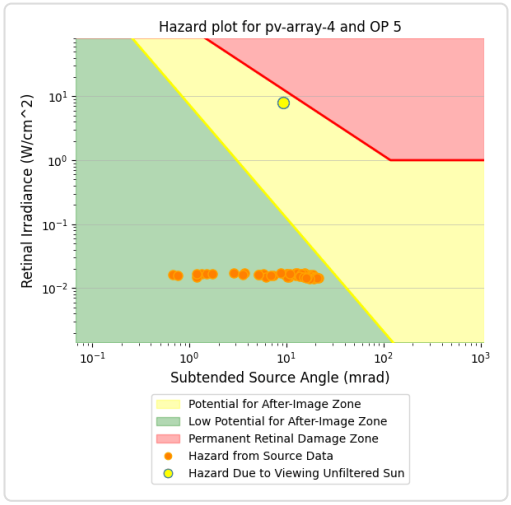
PV array 4 and OP 5

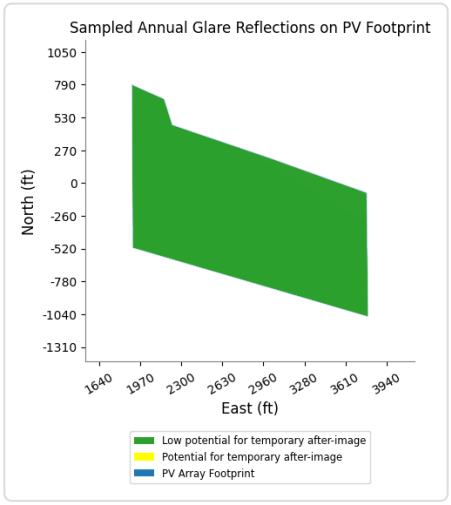
Yellow glare: none

Green glare: 52 min.





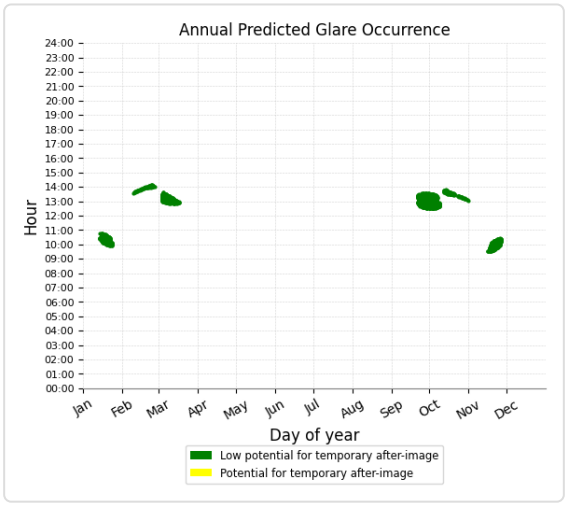


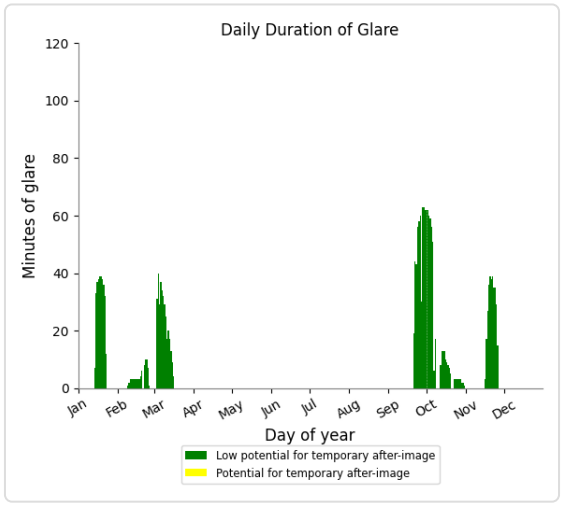


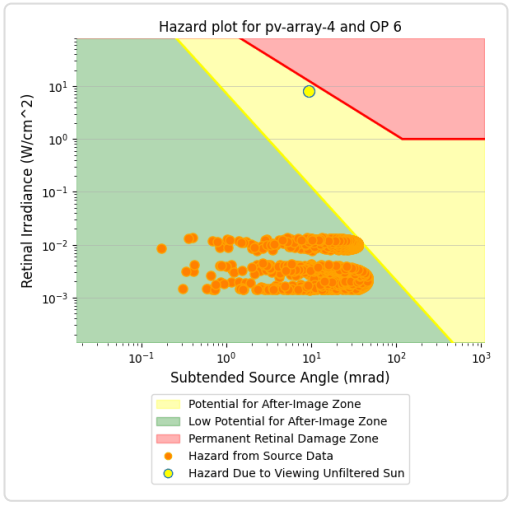
PV array 4 and OP 6

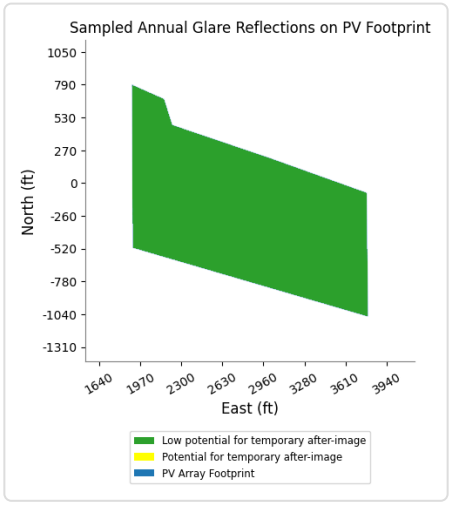
Yellow glare: none

Green glare: 2,014 min.





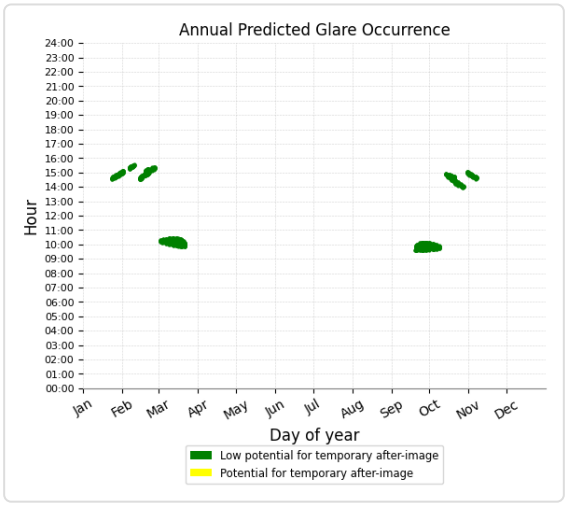


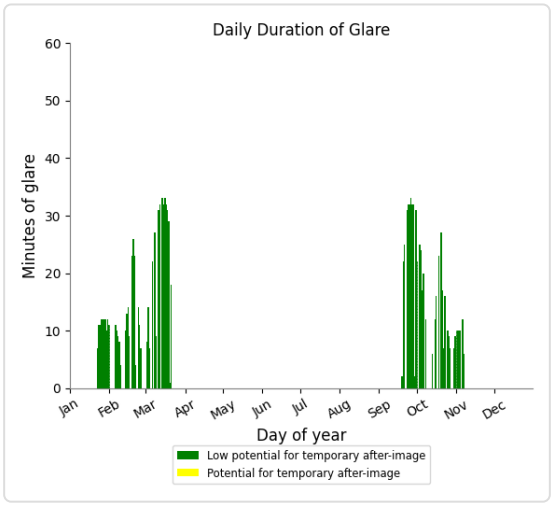


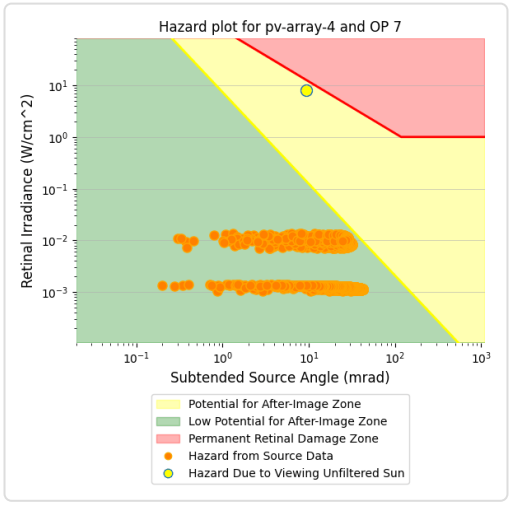
PV array 4 and OP 7

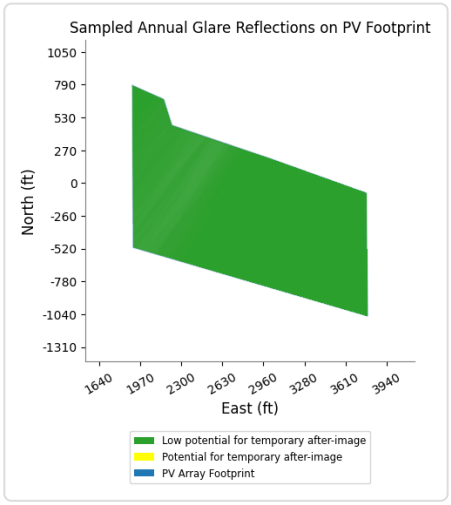
Yellow glare: none

Green glare: 1,283 min.





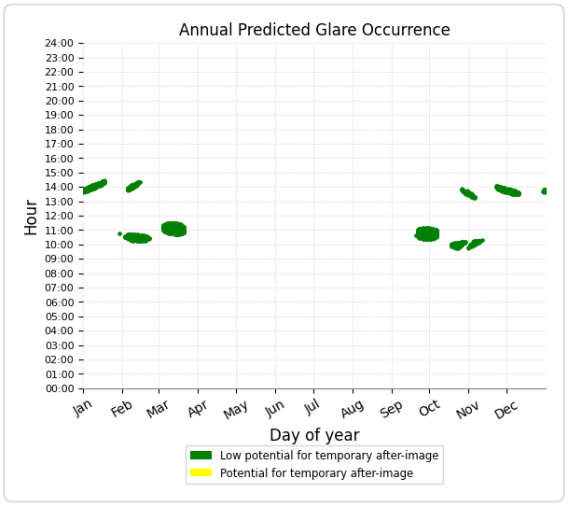


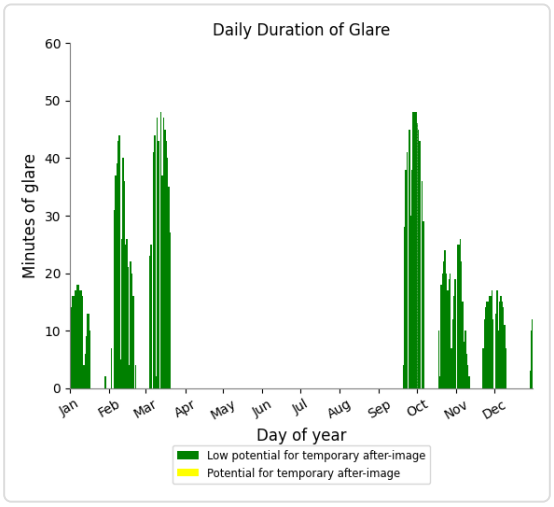


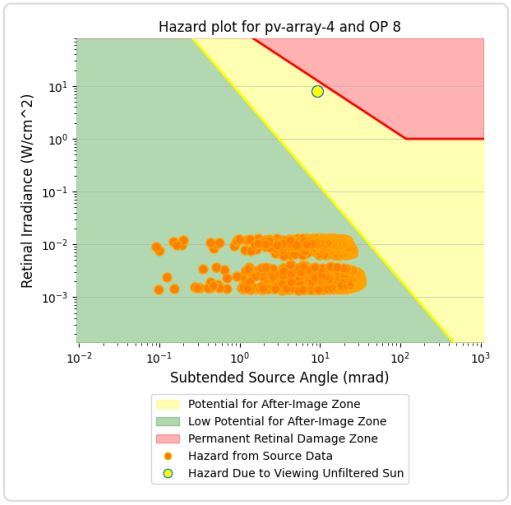
PV array 4 and OP 8

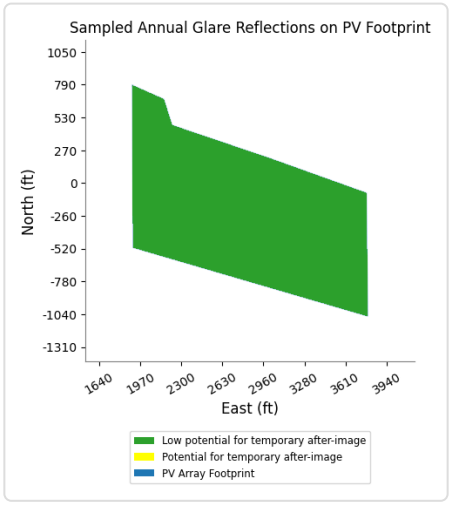
Yellow glare: none

Green glare: 2,431 min.





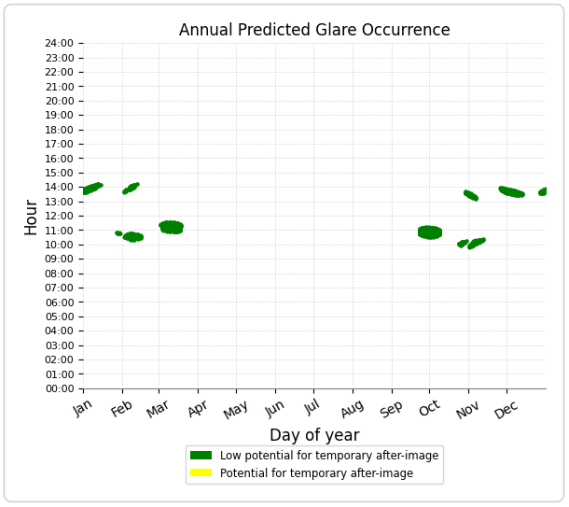


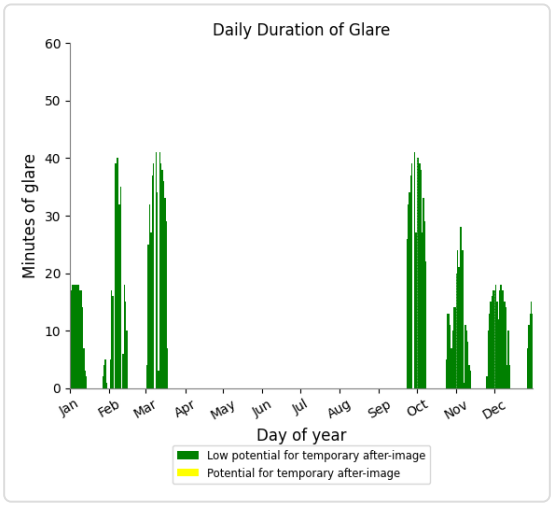


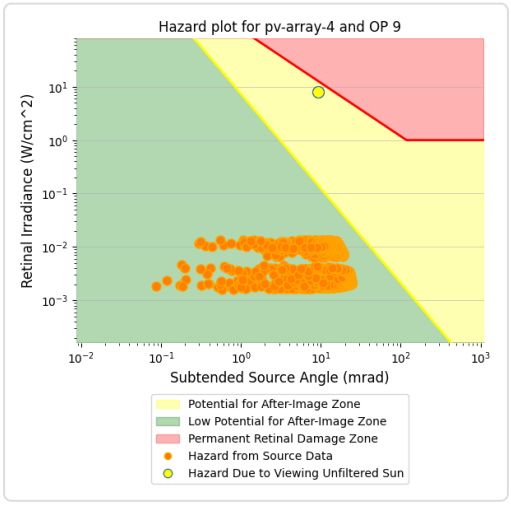
PV array 4 and OP 9

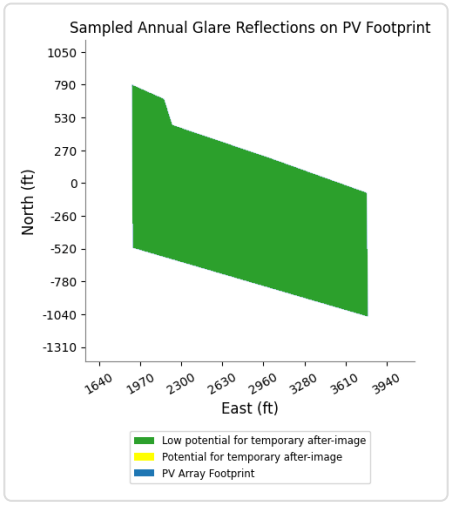
Yellow glare: none

Green glare: 2,034 min.





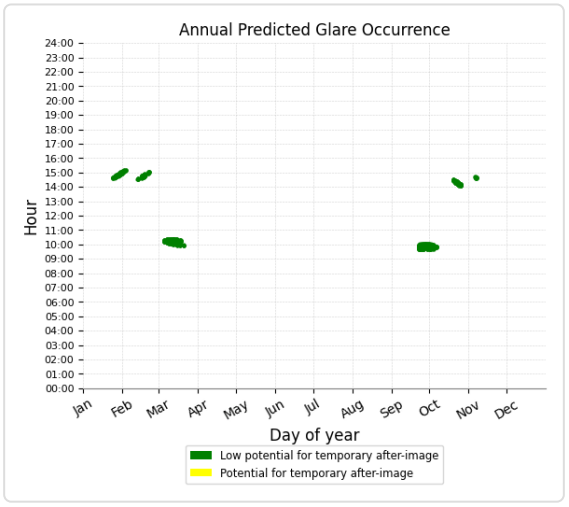


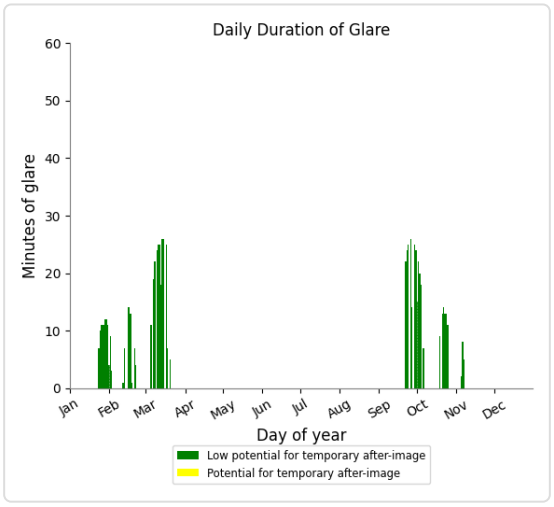


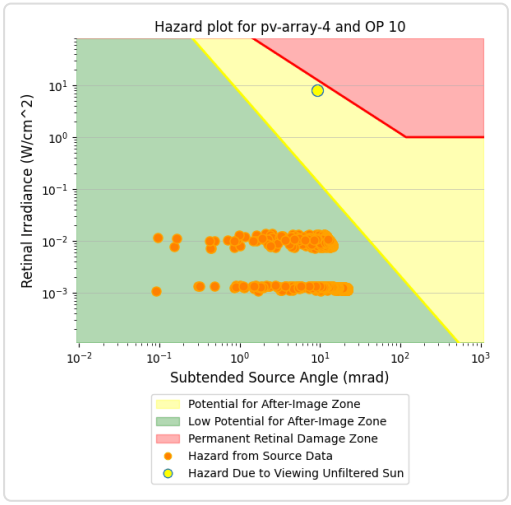
PV array 4 and OP 10

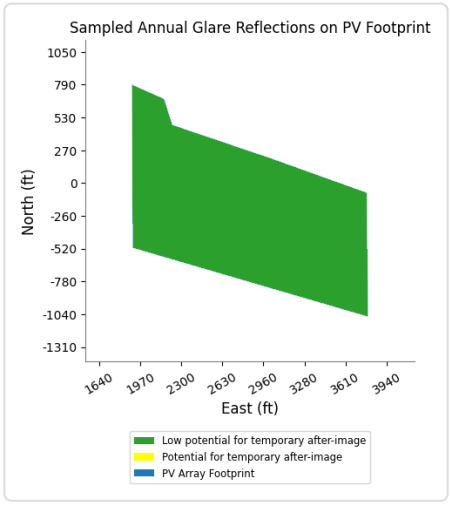
Yellow glare: none

Green glare: 725 min.





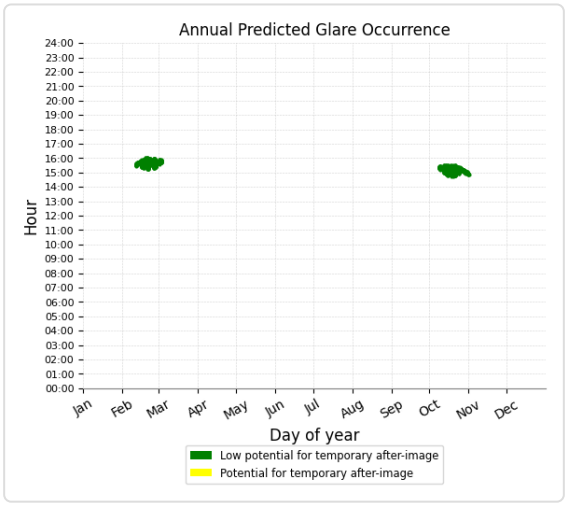


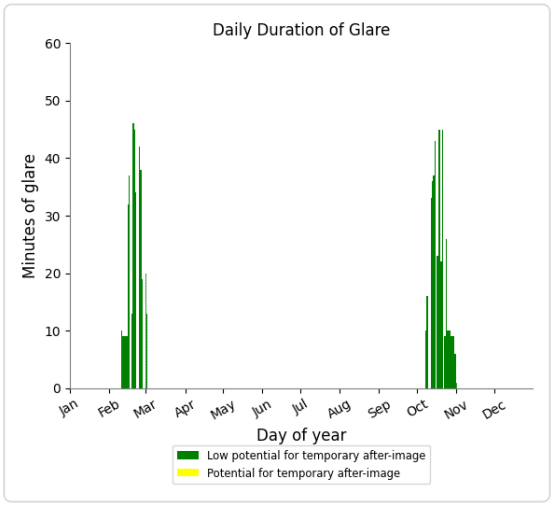


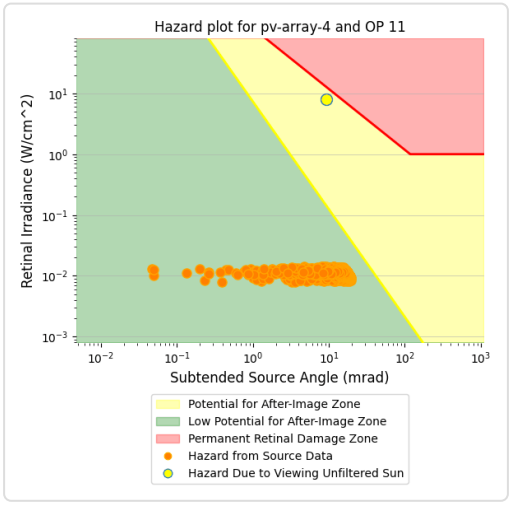
PV array 4 and OP 11

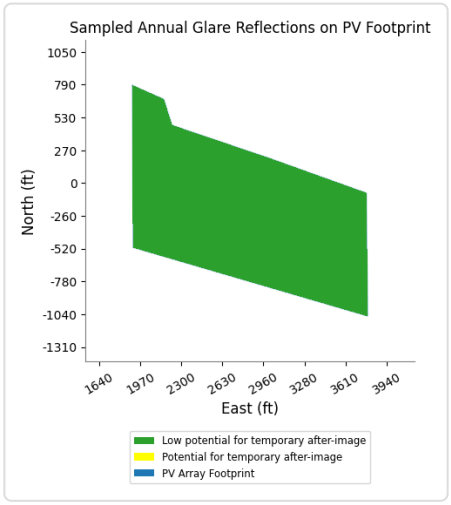
Yellow glare: none

Green glare: 839 min.





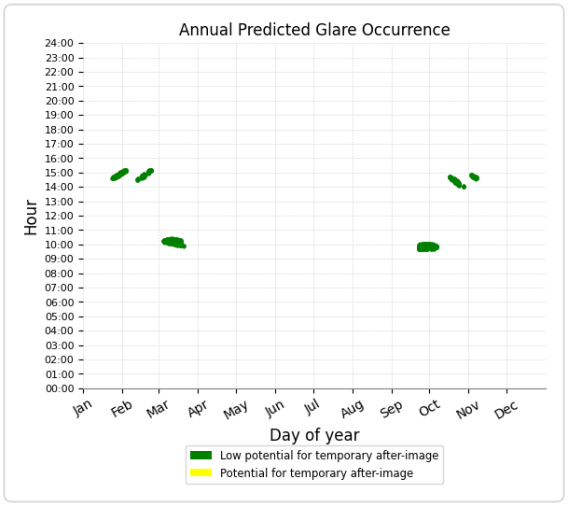


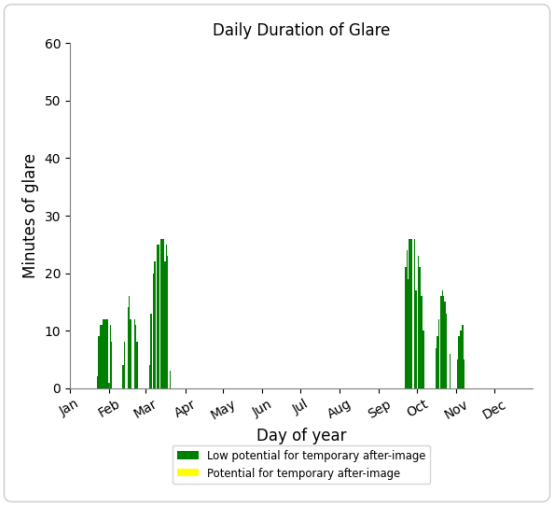


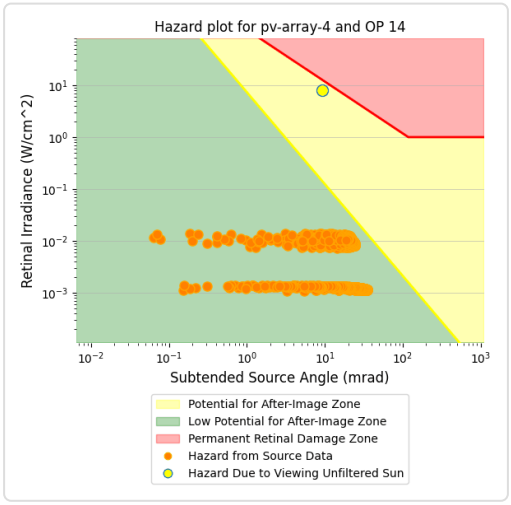
PV array 4 and OP 14

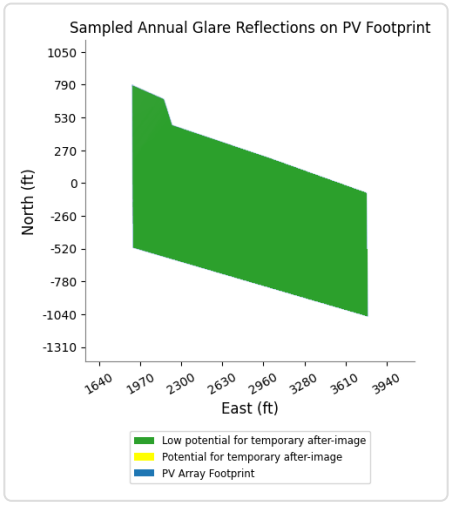
Yellow glare: none

Green glare: 890 min.





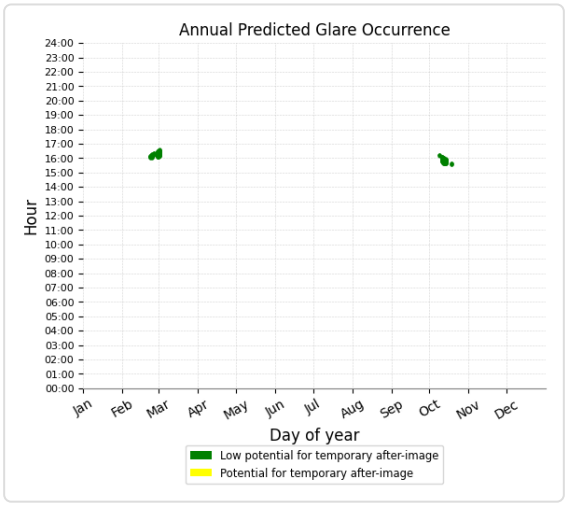


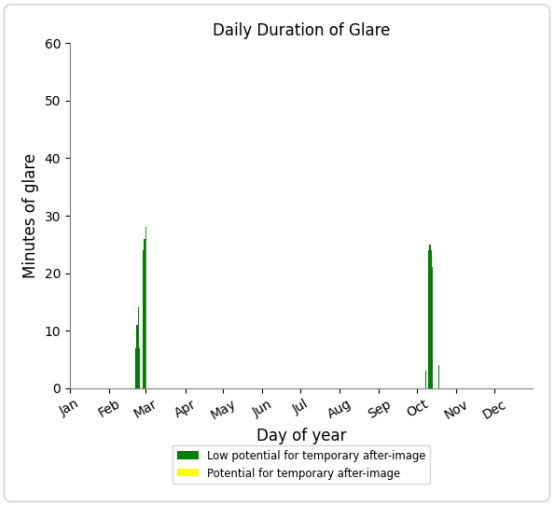


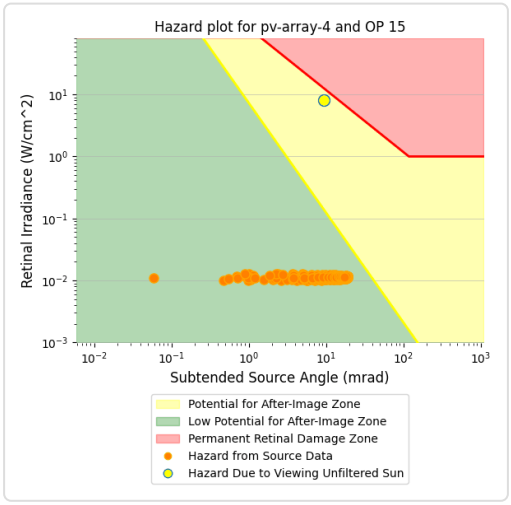
PV array 4 and OP 15

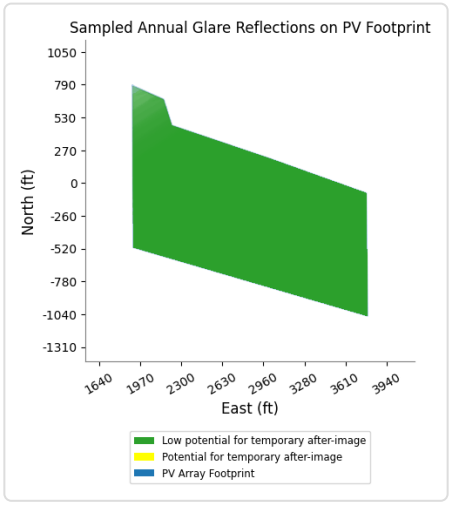
Yellow glare: none

Green glare: 218 min.



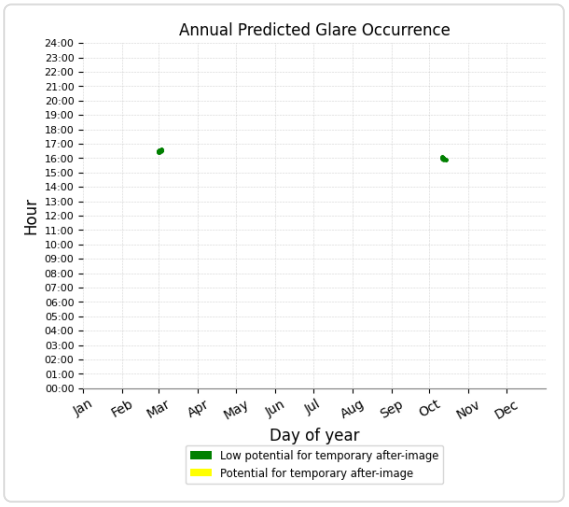


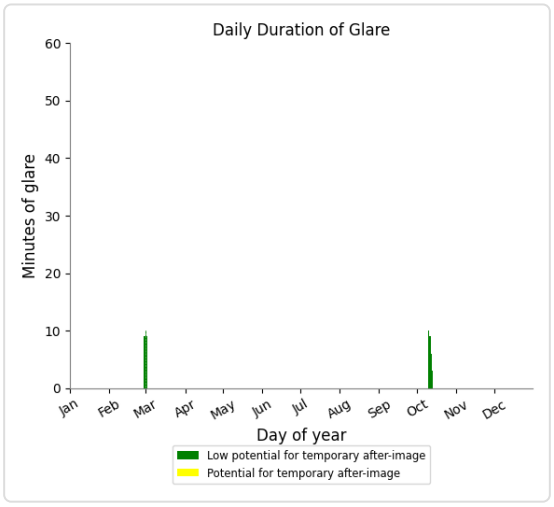


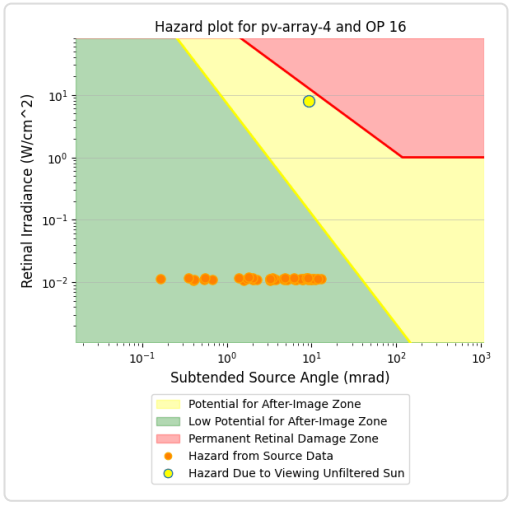


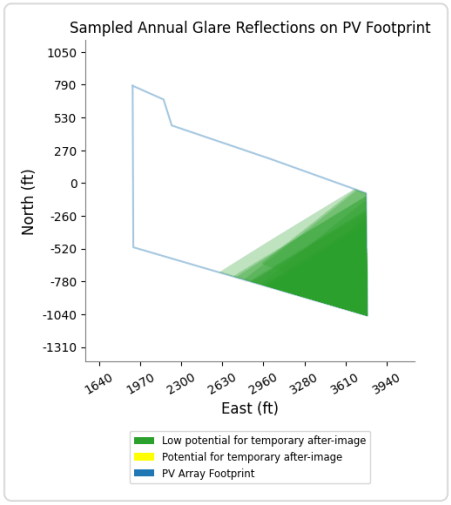
PV array 4 and OP 16

Yellow glare: none
Green glare: 56 min.









PV array 4 and OP 1

No glare found

PV array 4 and OP 2

No glare found

PV array 4 and OP 3

No glare found

PV array 4 and OP 12

No glare found

PV array 4 and OP 13

No glare found

PV array 4 and OP 17

No glare found

PV array 4 and OP 18

No glare found

PV array 4 and OP 19

No glare found

PV array 4 and OP 20

No glare found

PV array 4 and OP 21

No glare found

PV: PV array 5 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV array 5 and Route: Emigrant Springs Ln

No glare found

PV array 5 and Route: Herin Ln - 1

No glare found

PV array 5 and Route: Herin Ln - 2

No glare found

PV array 5 and Route: Hwy 206

No glare found

PV array 5 and Route: I97

No glare found

PV array 5 and Route: Klondike Rd

No glare found

PV array 5 and Route: Medler Ln

No glare found

PV array 5 and Route: N Klondike Rd

No glare found

PV array 5 and Route: Oehman Rd

No glare found

PV array 5 and Route: Old Wasco-Heppner Hwy

No glare found

PV array 5 and Route: Webfoot Rd

No glare found

PV array 5 and OP 1

No glare found

PV array 5 and OP 2

No glare found

PV array 5 and OP 3

No glare found

PV array 5 and OP 4

No glare found

PV array 5 and OP 5

No glare found

PV array 5 and OP 6

No glare found

PV array 5 and OP 7

No glare found

PV array 5 and OP 8

No glare found

PV array 5 and OP 9

No glare found

PV array 5 and OP 10

No glare found

PV array 5 and OP 11

No glare found

PV array 5 and OP 12

No glare found

PV array 5 and OP 13

No glare found

PV array 5 and OP 14

No glare found

PV array 5 and OP 15

No glare found

PV array 5 and OP 16

No glare found

PV array 5 and OP 17

No glare found

PV array 5 and OP 18

No glare found

PV array 5 and OP 19

No glare found

PV array 5 and OP 20

No glare found

PV array 5 and OP 21

No glare found

PV: PV array 6 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV array 6 and Route: Emigrant Springs Ln

No glare found

PV array 6 and Route: Herin Ln - 1

No glare found

PV array 6 and Route: Herin Ln - 2

No glare found

PV array 6 and Route: Hwy 206

No glare found

PV array 6 and Route: I97

No glare found

PV array 6 and Route: Klondike Rd

No glare found

PV array 6 and Route: Medler Ln

No glare found

PV array 6 and Route: N Klondike Rd

No glare found

PV array 6 and Route: Oehman Rd

No glare found

PV array 6 and Route: Old Wasco-Heppner Hwy

No glare found

PV array 6 and Route: Webfoot Rd

No glare found

PV array 6 and OP 1

No glare found

PV array 6 and OP 2

No glare found

PV array 6 and OP 3

No glare found

PV array 6 and OP 4

No glare found

PV array 6 and OP 5

No glare found

PV array 6 and OP 6

No glare found

PV array 6 and OP 7

No glare found

PV array 6 and OP 8

No glare found

PV array 6 and OP 9

No glare found

PV array 6 and OP 10

No glare found

PV array 6 and OP 11

No glare found

PV array 6 and OP 12

No glare found

PV array 6 and OP 13

No glare found

PV array 6 and OP 14

No glare found

PV array 6 and OP 15

No glare found

PV array 6 and OP 16

No glare found

PV array 6 and OP 17

No glare found

PV array 6 and OP 18

No glare found

PV array 6 and OP 19

No glare found

PV array 6 and OP 20

No glare found

PV array 6 and OP 21

No glare found

PV: PV array 7 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV array 7 and Route: Emigrant Springs Ln

No glare found

PV array 7 and Route: Herin Ln - 1

No glare found

PV array 7 and Route: Herin Ln - 2

No glare found

PV array 7 and Route: Hwy 206

No glare found

PV array 7 and Route: I97

No glare found

PV array 7 and Route: Klondike Rd

No glare found

PV array 7 and Route: Medler Ln

No glare found

PV array 7 and Route: N Klondike Rd

No glare found

PV array 7 and Route: Oehman Rd

No glare found

PV array 7 and Route: Old Wasco-Heppner Hwy

No glare found

PV array 7 and Route: Webfoot Rd

No glare found

PV array 7 and OP 1

No glare found

PV array 7 and OP 2

No glare found

PV array 7 and OP 3

No glare found

PV array 7 and OP 4

No glare found

PV array 7 and OP 5

No glare found

PV array 7 and OP 6

No glare found

PV array 7 and OP 7

No glare found

PV array 7 and OP 8

No glare found

PV array 7 and OP 9

No glare found

PV array 7 and OP 10

No glare found

PV array 7 and OP 11

No glare found

PV array 7 and OP 12

No glare found

PV array 7 and OP 13

No glare found

PV array 7 and OP 14

No glare found

PV array 7 and OP 15

No glare found

PV array 7 and OP 16

No glare found

PV array 7 and OP 17

No glare found

PV array 7 and OP 18

No glare found

PV array 7 and OP 19

No glare found

PV array 7 and OP 20

No glare found

PV array 7 and OP 21

No glare found

PV: PV array 8 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV array 8 and Route: Emigrant Springs Ln

No glare found

PV array 8 and Route: Herin Ln - 1

No glare found

PV array 8 and Route: Herin Ln - 2

No glare found

PV array 8 and Route: Hwy 206

No glare found

PV array 8 and Route: I97

No glare found

PV array 8 and Route: Klondike Rd

No glare found

PV array 8 and Route: Medler Ln

No glare found

PV array 8 and Route: N Klondike Rd

No glare found

PV array 8 and Route: Oehman Rd

No glare found

PV array 8 and Route: Old Wasco-Heppner Hwy

No glare found

PV array 8 and Route: Webfoot Rd

No glare found

PV array 8 and OP 1

No glare found

PV array 8 and OP 2

No glare found

PV array 8 and OP 3

No glare found

PV array 8 and OP 4

No glare found

PV array 8 and OP 5

No glare found

PV array 8 and OP 6

No glare found

PV array 8 and OP 7

No glare found

PV array 8 and OP 8

No glare found

PV array 8 and OP 9

No glare found

PV array 8 and OP 10

No glare found

PV array 8 and OP 11

No glare found

PV array 8 and OP 12

No glare found

PV array 8 and OP 13

No glare found

PV array 8 and OP 14

No glare found

PV array 8 and OP 15

No glare found

PV array 8 and OP 16

No glare found

PV array 8 and OP 17

No glare found

PV array 8 and OP 18

No glare found

PV array 8 and OP 19

No glare found

PV array 8 and OP 20

No glare found

PV array 8 and OP 21

No glare found

PV: PV array 9 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV array 9 and Route: Emigrant Springs Ln

No glare found

PV array 9 and Route: Herin Ln - 1

No glare found

PV array 9 and Route: Herin Ln - 2

No glare found

PV array 9 and Route: Hwy 206

No glare found

PV array 9 and Route: I97

No glare found

PV array 9 and Route: Klondike Rd

No glare found

PV array 9 and Route: Medler Ln

No glare found

PV array 9 and Route: N Klondike Rd

No glare found

PV array 9 and Route: Oehman Rd

No glare found

PV array 9 and Route: Old Wasco-Heppner Hwy

No glare found

PV array 9 and Route: Webfoot Rd

No glare found

PV array 9 and OP 1

No glare found

PV array 9 and OP 2

No glare found

PV array 9 and OP 3

No glare found

PV array 9 and OP 4

No glare found

PV array 9 and OP 5

No glare found

PV array 9 and OP 6

No glare found

PV array 9 and OP 7

No glare found

PV array 9 and OP 8

No glare found

PV array 9 and OP 9

No glare found

PV array 9 and OP 10

No glare found

PV array 9 and OP 11

No glare found

PV array 9 and OP 12

No glare found

PV array 9 and OP 13

No glare found

PV array 9 and OP 14

No glare found

PV array 9 and OP 15

No glare found

PV array 9 and OP 16

No glare found

PV array 9 and OP 17

No glare found

PV array 9 and OP 18

No glare found

PV array 9 and OP 19

No glare found

PV array 9 and OP 20

No glare found

PV array 9 and OP 21

No glare found

Assumptions

"Green" glare is glare with low potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.
"Yellow" glare is glare with potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.
Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.
The algorithm does not rigorously represent the detailed geometry of a system; detailed features such as gaps between modules, variable height of the PV array, and support structures may impact actual glare results. However, we have validated our models against several systems, including a PV array causing glare to the air-traffic control tower at Manchester-Boston Regional Airport and several sites in Albuquerque, and the tool accurately predicted the occurrence and intensity of glare at different times and days of the year.
Several V1 calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for large PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare. This primarily affects V1 analyses of path receptors.
Random number computations are utilized by various steps of the annual hazard analysis algorithm. Predicted minutes of glare can vary between runs as a result. This limitation primarily affects analyses of Observation Point receptors, including ATCTs. Note that the SGHAT/ ForgeSolar methodology has always relied on an analytical, qualitative approach to accurately determine the overall hazard (i.e. green vs. yellow) of expected glare on an annual basis.
The analysis does not automatically consider obstacles (either man-made or natural) between the observation points and the prescribed solar installation that may obstruct observed glare, such as trees, hills, buildings, etc.
The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)
The variable direct normal irradiance (DNI) feature (if selected) scales the user-prescribed peak DNI using a typical clear-day irradiance profile. This profile has a lower DNI in the mornings and evenings and a maximum at solar noon. The scaling uses a clear-day irradiance profile based on a normalized time relative to sunrise, solar noon, and sunset, which are prescribed by a sun-position algorithm and the latitude and longitude obtained from Google maps. The actual DNI on any given day can be affected by cloud cover, atmospheric attenuation, and other environmental factors.
The ocular hazard predicted by the tool depends on a number of environmental, optical, and human factors, which can be uncertain. We provide input fields and typical ranges of values for these factors so that the user can vary these parameters to see if they have an impact on the results. The speed of SGHAT allows expedited sensitivity and parametric analyses.
The system output calculation is a DNI-based approximation that assumes clear, sunny skies year-round. It should not be used in place of more rigorous modeling methods.
Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid based on aggregated research data. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.
Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.
Refer to the Help page at **www.forgesolar.com/help/** for assumptions and limitations not listed here.

Default glare analysis parameters and observer eye characteristics (for reference only):

- Analysis time interval: 1 minute
- Ocular transmission coefficient: 0.5
- Pupil diameter: 0.002 meters
- Eye focal length: 0.017 meters
- Sun subtended angle: 9.3 milliradians

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FORGESOLAR GLARE ANALYSIS

Project: **Biglow Canyon Solar**
Site configuration: **South Arrays Analysis 2 - 2nd Story Receptors**

Created 09 Aug, 2024
Updated 09 Aug, 2024
Time-step 1 minute
Timezone offset UTC-8
Minimum sun altitude 0.0 deg
DNI peaks at 1,000.0 W/m^2
Category 100 MW to 1 GW
Site ID 126496.21638

Ocular transmission coefficient 0.5
Pupil diameter 0.002 m
Eye focal length 0.017 m
Sun subtended angle 9.3 mrad
PV analysis methodology V2

Summary of Results

Glare with potential for temporary after-image predicted

PV Array	Tilt	Orient	Annual Green Glare		Annual Yellow Glare		Energy
	°	°	min	hr	min	hr	kWh
PV array 1	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 10	SA tracking	SA tracking	13,187	219.8	5,344	89.1	-
PV array 11	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 12	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 13	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 14	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 15	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 16	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 17	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 18	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 19	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 2	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 20	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 3	SA tracking	SA tracking	39,731	662.2	7	0.1	-
PV array 4	SA tracking	SA tracking	41,262	687.7	278	4.6	-
PV array 5	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 6	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 7	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 8	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 9	SA tracking	SA tracking	0	0.0	0	0.0	-

Total glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

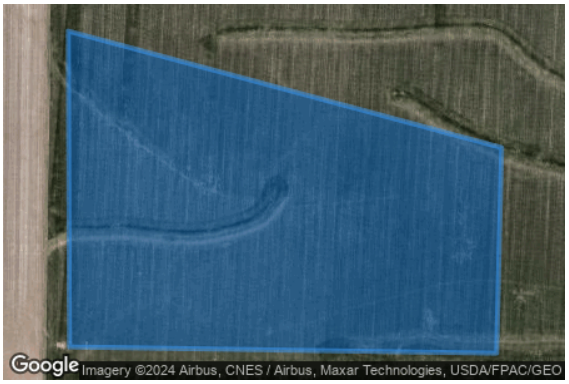
Emigrant Springs Ln	7,036	117.3	0	0.0
Herin Ln - 1	11,257	187.6	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Herin Ln - 2	4,329	72.2	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	12,880	214.7	4,772	79.5
N Klondike Rd	8,907	148.4	210	3.5
Oehman Rd	21,371	356.2	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	1,290	21.5	31	0.5
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	207	3.5	0	0.0
OP 5	401	6.7	0	0.0
OP 6	11,805	196.8	616	10.3
OP 7	2,085	34.8	0	0.0
OP 8	3,884	64.7	0	0.0
OP 9	4,776	79.6	0	0.0
OP 10	1,114	18.6	0	0.0
OP 11	1,060	17.7	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	1,471	24.5	0	0.0
OP 15	250	4.2	0	0.0
OP 16	57	0.9	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

Component Data

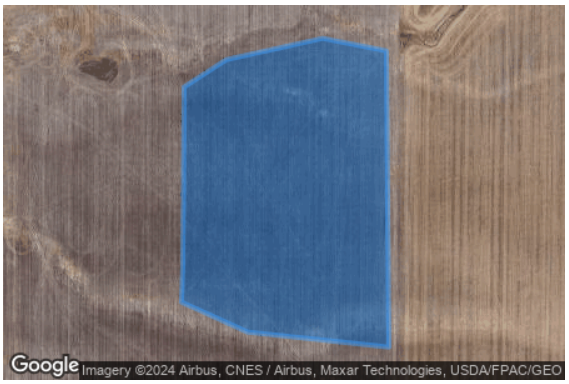
PV Arrays

Name: PV array 1
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



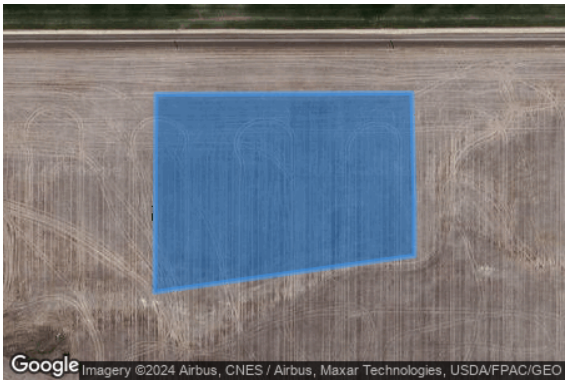
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.596127	-120.650423	1508.33	8.00	1516.33
2	45.592343	-120.650401	1563.44	8.00	1571.44
3	45.592268	-120.643063	1563.27	8.00	1571.27
4	45.594730	-120.642977	1557.76	8.00	1565.76

Name: PV array 10
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.618702	-120.649056	1399.15	8.00	1407.15
2	45.619032	-120.648326	1401.39	8.00	1409.39
3	45.619287	-120.646674	1410.94	8.00	1418.94
4	45.619137	-120.645580	1418.85	8.00	1426.85
5	45.615580	-120.645537	1455.74	8.00	1463.74
6	45.615760	-120.647961	1442.12	8.00	1450.12
7	45.616120	-120.649099	1451.62	8.00	1459.62
8	45.616533	-120.649077	1455.10	8.00	1463.10
9	45.617396	-120.649066	1424.50	8.00	1432.50

Name: PV array 11
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.620443	-120.649453	1423.69	8.00	1431.69
2	45.620450	-120.647253	1436.64	8.00	1444.64
3	45.619790	-120.647232	1411.61	8.00	1419.61
4	45.619475	-120.647232	1406.21	8.00	1414.21
5	45.619257	-120.649463	1404.46	8.00	1412.46

Name: PV array 12
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.620443	-120.647253	1436.24	8.00	1444.24
2	45.620450	-120.645708	1429.27	8.00	1437.27
3	45.619812	-120.645665	1427.74	8.00	1435.74
4	45.619797	-120.647232	1411.85	8.00	1419.85

Name: PV array 13
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



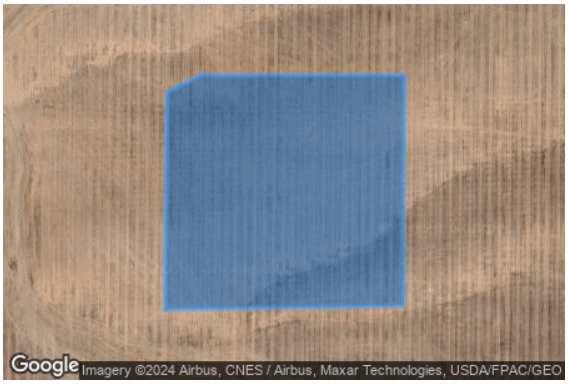
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.620398	-120.659709	1354.98	8.00	1362.98
2	45.620428	-120.657424	1371.94	8.00	1379.94
3	45.617666	-120.657381	1367.55	8.00	1375.55
4	45.617447	-120.658143	1364.98	8.00	1372.98
5	45.616960	-120.659055	1359.33	8.00	1367.33
6	45.616967	-120.659699	1359.39	8.00	1367.39

Name: PV array 14
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



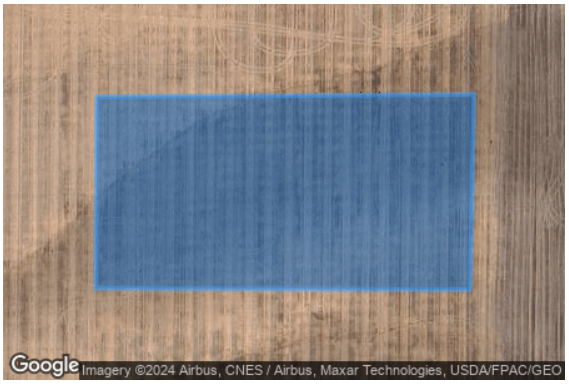
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.620427	-120.657424	1371.94	8.00	1379.94
2	45.620479	-120.653294	1410.82	8.00	1418.82
3	45.619774	-120.653304	1398.01	8.00	1406.01
4	45.619316	-120.654141	1391.14	8.00	1399.14
5	45.618423	-120.656416	1384.46	8.00	1392.46
6	45.617913	-120.656652	1373.10	8.00	1381.10
7	45.617673	-120.657381	1367.55	8.00	1375.55

Name: PV array 15
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



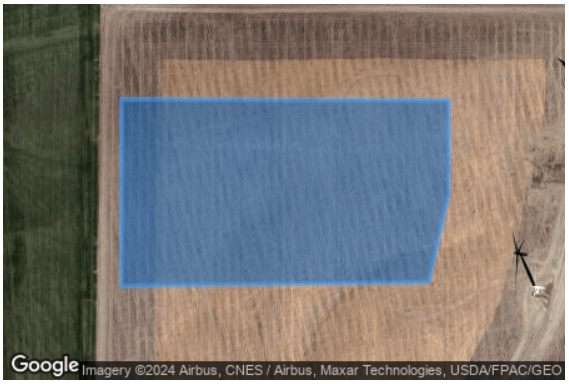
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.615114	-120.632150	1481.51	8.00	1489.51
2	45.617718	-120.632117	1488.60	8.00	1496.60
3	45.617921	-120.631527	1497.82	8.00	1505.82
4	45.617921	-120.628030	1557.55	8.00	1565.55
5	45.616847	-120.628051	1525.53	8.00	1533.53
6	45.615159	-120.628051	1488.26	8.00	1496.26

Name: PV array 16
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



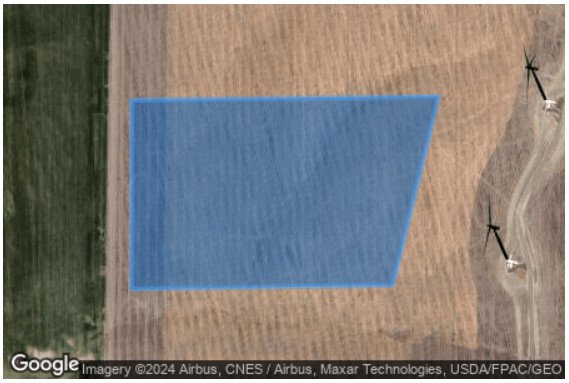
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.616847	-120.628051	1525.53	8.00	1533.53
2	45.616862	-120.624811	1530.67	8.00	1538.67
3	45.615692	-120.624843	1516.76	8.00	1524.76
4	45.615699	-120.628062	1507.12	8.00	1515.12

Name: PV array 17
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.626952	-120.634357	1507.07	8.00	1515.07
2	45.626937	-120.628735	1548.34	8.00	1556.34
3	45.625812	-120.628735	1523.30	8.00	1531.30
4	45.624762	-120.629078	1505.07	8.00	1513.07
5	45.624717	-120.634357	1504.69	8.00	1512.69

Name: PV array 18
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.624717	-120.634378	1504.52	8.00	1512.52
2	45.622450	-120.634378	1456.44	8.00	1464.44
3	45.622496	-120.629894	1463.00	8.00	1471.00
4	45.624762	-120.629100	1504.95	8.00	1512.95

Name: PV array 19
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.602191	-120.621856	1566.69	8.00	1574.69
2	45.602172	-120.619614	1566.27	8.00	1574.27
3	45.613114	-120.619496	1574.44	8.00	1582.44
4	45.613204	-120.622795	1558.28	8.00	1566.28
5	45.603473	-120.622752	1562.98	8.00	1570.98
6	45.603465	-120.621835	1572.30	8.00	1580.30

Name: PV array 2
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.594715	-120.642955	1557.88	8.00	1565.88
2	45.592238	-120.643084	1562.38	8.00	1570.38
3	45.592208	-120.636239	1578.45	8.00	1586.45
4	45.591923	-120.636239	1578.25	8.00	1586.25
5	45.591923	-120.635531	1581.92	8.00	1589.92
6	45.593229	-120.635638	1551.20	8.00	1559.20

Name: PV array 20
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.612665	-120.615036	1570.28	8.00	1578.28
2	45.612661	-120.613942	1560.55	8.00	1568.55
3	45.595340	-120.614075	1552.10	8.00	1560.10
4	45.594484	-120.616880	1564.42	8.00	1572.42
5	45.594496	-120.617873	1563.21	8.00	1571.21
6	45.601078	-120.617626	1572.92	8.00	1580.92
7	45.601067	-120.615437	1578.24	8.00	1586.24
8	45.602763	-120.615185	1586.03	8.00	1594.03

Name: PV array 3
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



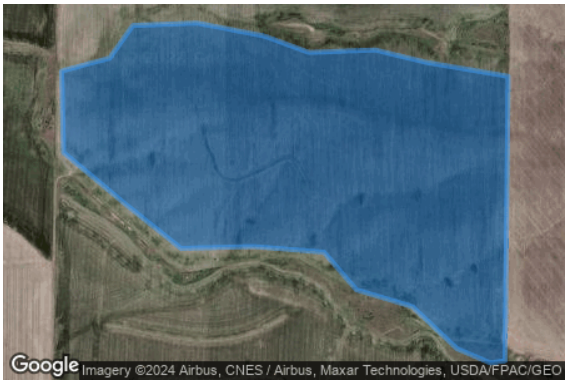
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.600030	-120.650423	1466.80	8.00	1474.80
2	45.596127	-120.650401	1508.72	8.00	1516.72
3	45.594730	-120.642977	1557.76	8.00	1565.76
4	45.598259	-120.642955	1462.53	8.00	1470.53
5	45.598499	-120.643771	1453.23	8.00	1461.23
6	45.598003	-120.645316	1461.02	8.00	1469.02
7	45.598064	-120.646217	1449.24	8.00	1457.24
8	45.598964	-120.647848	1444.02	8.00	1452.02
9	45.599775	-120.648985	1434.58	8.00	1442.58

Name: PV array 4
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.598259	-120.642977	1462.50	8.00	1470.50
2	45.594715	-120.642955	1557.88	8.00	1565.88
3	45.593214	-120.635638	1551.88	8.00	1559.88
4	45.595902	-120.635681	1504.96	8.00	1512.96
5	45.596652	-120.638664	1489.52	8.00	1497.52
6	45.597388	-120.641754	1507.15	8.00	1515.15
7	45.597958	-120.642011	1479.39	8.00	1487.39

Name: PV array 5
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



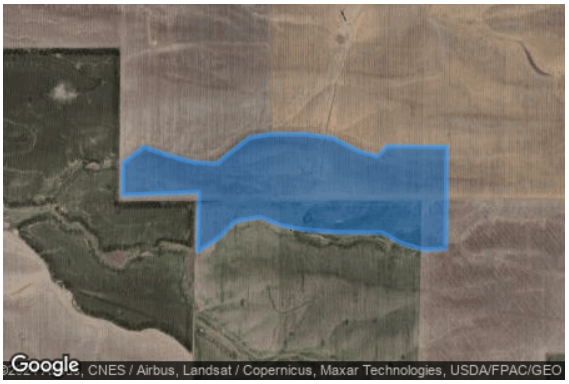
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.603409	-120.650462	1413.57	8.00	1421.57
2	45.601457	-120.650397	1437.97	8.00	1445.97
3	45.600211	-120.648252	1458.19	8.00	1466.19
4	45.599160	-120.646363	1466.44	8.00	1474.44
5	45.599205	-120.643853	1464.09	8.00	1472.09
6	45.599070	-120.641450	1483.76	8.00	1491.76
7	45.598169	-120.640334	1487.17	8.00	1495.17
8	45.597764	-120.638403	1502.84	8.00	1510.84
9	45.596758	-120.636879	1501.21	8.00	1509.21
10	45.596413	-120.635720	1507.98	8.00	1515.98
11	45.596473	-120.635227	1517.91	8.00	1525.91
12	45.603284	-120.635119	1507.67	8.00	1515.67
13	45.603614	-120.637909	1490.22	8.00	1498.22
14	45.603914	-120.639690	1473.96	8.00	1481.96
15	45.603854	-120.641964	1469.22	8.00	1477.22
16	45.604245	-120.643488	1448.93	8.00	1456.93
17	45.604560	-120.645805	1434.05	8.00	1442.05
18	45.604500	-120.648016	1420.90	8.00	1428.90
19	45.603719	-120.648809	1419.97	8.00	1427.97

Name: PV array 6
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.603314	-120.635141	1506.82	8.00	1514.82
2	45.596453	-120.635248	1516.68	8.00	1524.68
3	45.596723	-120.633896	1543.42	8.00	1551.42
4	45.596588	-120.632587	1535.84	8.00	1543.84
5	45.597474	-120.630163	1543.86	8.00	1551.86
6	45.598014	-120.627459	1562.18	8.00	1570.18
7	45.598119	-120.626730	1565.99	8.00	1573.99
8	45.599080	-120.626772	1591.27	8.00	1599.27
9	45.599065	-120.624927	1591.31	8.00	1599.31
10	45.601993	-120.624949	1576.04	8.00	1584.04
11	45.602008	-120.622781	1571.98	8.00	1579.98
12	45.602954	-120.622803	1566.75	8.00	1574.75
13	45.604109	-120.624133	1556.69	8.00	1564.69
14	45.604695	-120.625850	1540.01	8.00	1548.01
15	45.604920	-120.628038	1526.56	8.00	1534.56
16	45.604995	-120.630184	1513.18	8.00	1521.18
17	45.604140	-120.631665	1518.22	8.00	1526.22
18	45.603479	-120.632781	1518.13	8.00	1526.13

Name: PV array 7
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.608005	-120.655579	1402.85	8.00	1410.85
2	45.606474	-120.655622	1419.25	8.00	1427.25
3	45.606609	-120.650365	1455.42	8.00	1463.42
4	45.603757	-120.650451	1415.49	8.00	1423.49
5	45.604432	-120.648992	1424.68	8.00	1432.68
6	45.605213	-120.647876	1434.03	8.00	1442.03
7	45.605423	-120.646181	1434.30	8.00	1442.30
8	45.605048	-120.644786	1443.82	8.00	1451.82
9	45.604823	-120.643327	1450.31	8.00	1458.31
10	45.604687	-120.640902	1463.71	8.00	1471.71
11	45.604672	-120.637770	1492.83	8.00	1500.83
12	45.604162	-120.636439	1480.03	8.00	1488.03
13	45.603847	-120.634916	1499.38	8.00	1507.38
14	45.603907	-120.633414	1503.53	8.00	1511.53
15	45.608786	-120.633328	1529.09	8.00	1537.09
16	45.608816	-120.637448	1521.39	8.00	1529.39
17	45.608320	-120.638070	1506.48	8.00	1514.48
18	45.608575	-120.639400	1503.71	8.00	1511.71
19	45.609221	-120.641224	1483.57	8.00	1491.57
20	45.609386	-120.643027	1468.35	8.00	1476.35
21	45.609401	-120.645430	1452.74	8.00	1460.74
22	45.609236	-120.646846	1442.44	8.00	1450.44
23	45.608590	-120.648048	1434.69	8.00	1442.69
24	45.607975	-120.649121	1427.36	8.00	1435.36
25	45.608050	-120.650751	1418.24	8.00	1426.24
26	45.608440	-120.652726	1414.44	8.00	1422.44
27	45.608786	-120.654142	1407.67	8.00	1415.67

Name: PV array 8
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.617136	-120.655390	1378.51	8.00	1386.51
2	45.608948	-120.655551	1426.44	8.00	1434.44
3	45.608970	-120.654446	1410.07	8.00	1418.07
4	45.608880	-120.652558	1424.45	8.00	1432.45
5	45.608955	-120.648738	1430.89	8.00	1438.89
6	45.609676	-120.647000	1440.81	8.00	1448.81
7	45.609766	-120.645477	1448.97	8.00	1456.97
8	45.614659	-120.645434	1454.19	8.00	1462.19
9	45.615049	-120.647258	1448.61	8.00	1456.61
10	45.615635	-120.649854	1436.16	8.00	1444.16
11	45.616160	-120.651335	1421.75	8.00	1429.75
12	45.616745	-120.652214	1411.00	8.00	1419.00
13	45.617406	-120.654425	1379.39	8.00	1387.39
14	45.617695	-120.654425	1374.70	8.00	1382.70
15	45.617691	-120.655390	1367.82	8.00	1375.82

Name: PV array 9
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.612267	-120.645451	1519.38	8.00	1527.38
2	45.609736	-120.645451	1448.30	8.00	1456.30
3	45.609736	-120.641460	1483.70	8.00	1491.70
4	45.608820	-120.637405	1521.81	8.00	1529.81
5	45.608700	-120.622792	1552.00	8.00	1560.00
6	45.613203	-120.622792	1558.21	8.00	1566.21
7	45.613218	-120.625024	1555.55	8.00	1563.55
8	45.614730	-120.624981	1517.30	8.00	1525.30
9	45.614276	-120.632137	1468.75	8.00	1476.75
10	45.612119	-120.632191	1498.24	8.00	1506.24

Route Receptors

Name: Emigrant Springs Ln
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.628064	-120.624308	1541.49	9.00	1550.49
2	45.628045	-120.622929	1540.08	9.00	1549.08
3	45.628004	-120.621191	1509.88	9.00	1518.88
4	45.627981	-120.620113	1489.17	9.00	1498.17
5	45.627941	-120.618214	1484.01	9.00	1493.01
6	45.627893	-120.615987	1466.25	9.00	1475.25
7	45.627841	-120.613552	1478.52	9.00	1487.52
8	45.627852	-120.613037	1478.80	9.00	1487.80
9	45.627826	-120.610135	1480.73	9.00	1489.73
10	45.627772	-120.607501	1466.57	9.00	1475.57
11	45.627720	-120.605382	1446.79	9.00	1455.79
12	45.627653	-120.602690	1415.15	9.00	1424.15
13	45.627565	-120.598500	1406.79	9.00	1415.79
14	45.627463	-120.594560	1408.28	9.00	1417.28
15	45.627372	-120.590566	1440.09	9.00	1449.09
16	45.627267	-120.585705	1426.12	9.00	1435.12
17	45.627177	-120.582168	1397.45	9.00	1406.45
18	45.627188	-120.578665	1371.04	9.00	1380.04
19	45.627220	-120.561601	1229.74	9.00	1238.74
20	45.627258	-120.551237	1281.45	9.00	1290.45
21	45.627204	-120.531722	1227.46	9.00	1236.46
22	45.627078	-120.523316	1179.87	9.00	1188.87
23	45.627085	-120.516182	1190.51	9.00	1199.51
24	45.627055	-120.511354	1187.31	9.00	1196.31
25	45.627055	-120.510592	1182.51	9.00	1191.51

Name: Herin Ln - 1
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.658436	-120.623865	1385.99	9.00	1394.99
2	45.658443	-120.622814	1388.47	9.00	1397.47
3	45.658394	-120.621473	1390.29	9.00	1399.29
4	45.658278	-120.620180	1402.67	9.00	1411.67
5	45.658031	-120.619338	1414.61	9.00	1423.61
6	45.657569	-120.617986	1427.97	9.00	1436.97
7	45.657123	-120.616715	1438.57	9.00	1447.57
8	45.656962	-120.616044	1445.21	9.00	1454.21
9	45.656913	-120.615712	1449.51	9.00	1458.51
10	45.656880	-120.614757	1458.20	9.00	1467.20
11	45.656822	-120.613051	1457.99	9.00	1466.99
12	45.656695	-120.612826	1458.36	9.00	1467.36
13	45.656444	-120.612707	1459.27	9.00	1468.27
14	45.655990	-120.612702	1465.20	9.00	1474.20
15	45.653803	-120.612783	1471.23	9.00	1480.23
16	45.650107	-120.612851	1463.68	9.00	1472.68
17	45.649822	-120.612723	1467.66	9.00	1476.66
18	45.649645	-120.612529	1467.37	9.00	1476.37
19	45.649578	-120.612256	1465.35	9.00	1474.35
20	45.649489	-120.609604	1441.66	9.00	1450.66
21	45.649406	-120.605018	1380.39	9.00	1389.39
22	45.649335	-120.600190	1317.71	9.00	1326.71
23	45.649103	-120.592288	1263.80	9.00	1272.80
24	45.649050	-120.590577	1233.28	9.00	1242.28
25	45.649043	-120.589187	1213.85	9.00	1222.85
26	45.649200	-120.588688	1205.75	9.00	1214.75
27	45.650634	-120.586455	1185.89	9.00	1194.89
28	45.652457	-120.584663	1154.45	9.00	1163.45
29	45.653023	-120.584154	1141.16	9.00	1150.16
30	45.653961	-120.583574	1128.93	9.00	1137.93

Name: Herin Ln - 2
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.653976	-120.583548	1128.21	9.00	1137.21
2	45.654253	-120.583312	1124.44	9.00	1133.44
3	45.654482	-120.582974	1116.19	9.00	1125.19
4	45.654954	-120.582587	1105.36	9.00	1114.36
5	45.655700	-120.581954	1086.29	9.00	1095.29
6	45.656117	-120.581552	1079.31	9.00	1088.31
7	45.656503	-120.580989	1063.26	9.00	1072.26
8	45.656776	-120.580624	1051.61	9.00	1060.61
9	45.657020	-120.580468	1046.20	9.00	1055.20
10	45.657313	-120.580383	1042.87	9.00	1051.87
11	45.657909	-120.579980	1035.95	9.00	1044.95
12	45.658299	-120.579583	1038.66	9.00	1047.66
13	45.658535	-120.579326	1040.49	9.00	1049.49
14	45.658805	-120.579130	1032.81	9.00	1041.81
15	45.659195	-120.578980	1020.96	9.00	1029.96
16	45.659487	-120.579023	1011.00	9.00	1020.00
17	45.660023	-120.579125	1004.48	9.00	1013.48
18	45.660368	-120.579372	997.32	9.00	1006.32
19	45.661157	-120.579484	983.67	9.00	992.67
20	45.661693	-120.579479	972.06	9.00	981.06
21	45.662192	-120.579506	961.06	9.00	970.06

Name: Hwy 206
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.546018	-120.625806	1460.09	9.00	1469.09
2	45.547416	-120.626600	1493.85	9.00	1502.85
3	45.548498	-120.627801	1510.43	9.00	1519.43
4	45.549279	-120.629024	1528.34	9.00	1537.34
5	45.552480	-120.635011	1606.64	9.00	1615.64
6	45.554118	-120.638058	1640.01	9.00	1649.01
7	45.555350	-120.640161	1652.20	9.00	1661.20
8	45.556777	-120.641835	1648.54	9.00	1657.54
9	45.562862	-120.648615	1631.47	9.00	1640.47
10	45.564815	-120.650933	1622.37	9.00	1631.37
11	45.567030	-120.654392	1588.72	9.00	1597.72
12	45.571506	-120.661688	1504.25	9.00	1513.25
13	45.577124	-120.670657	1401.09	9.00	1410.09
14	45.583417	-120.680871	1331.55	9.00	1340.55
15	45.584288	-120.682566	1324.17	9.00	1333.17
16	45.586570	-120.687888	1312.58	9.00	1321.58
17	45.588823	-120.693596	1297.49	9.00	1306.49
18	45.589694	-120.695849	1283.65	9.00	1292.65
19	45.590565	-120.697694	1271.57	9.00	1280.57

Name: I97
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.574282	-120.697086	1427.12	9.00	1436.12
2	45.581972	-120.707815	1382.08	9.00	1391.08
3	45.584630	-120.711591	1344.05	9.00	1353.05
4	45.585621	-120.712557	1331.23	9.00	1340.23
5	45.586162	-120.713029	1325.46	9.00	1334.46
6	45.587003	-120.713437	1312.12	9.00	1321.12
7	45.588294	-120.713716	1297.60	9.00	1306.60
8	45.589751	-120.714080	1281.87	9.00	1290.87
9	45.590862	-120.714424	1272.18	9.00	1281.18
10	45.592018	-120.715089	1267.57	9.00	1276.57
11	45.593204	-120.715969	1264.39	9.00	1273.39
12	45.594509	-120.717201	1253.01	9.00	1262.01
13	45.595935	-120.718703	1239.00	9.00	1248.00
14	45.598037	-120.720892	1231.26	9.00	1240.26
15	45.598623	-120.721342	1221.82	9.00	1230.82
16	45.599313	-120.721750	1208.83	9.00	1217.83
17	45.600217	-120.722052	1196.11	9.00	1205.11
18	45.601058	-120.722052	1184.32	9.00	1193.32
19	45.602409	-120.721945	1170.59	9.00	1179.59
20	45.604555	-120.721645	1147.65	9.00	1156.65
21	45.605591	-120.721795	1139.41	9.00	1148.41
22	45.606537	-120.722224	1134.15	9.00	1143.15
23	45.607528	-120.722975	1127.09	9.00	1136.09
24	45.608909	-120.724777	1116.54	9.00	1125.54
25	45.612151	-120.729498	1083.76	9.00	1092.76
26	45.612871	-120.730871	1076.24	9.00	1085.24
27	45.613457	-120.732459	1069.29	9.00	1078.29
28	45.614027	-120.733961	1062.97	9.00	1071.97
29	45.614688	-120.735206	1057.85	9.00	1066.85
30	45.615363	-120.735978	1051.50	9.00	1060.50

Name: Klondike Rd
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.584323	-120.682296	1326.46	9.00	1335.46
2	45.584443	-120.681695	1330.63	9.00	1339.63
3	45.584398	-120.675472	1397.73	9.00	1406.73
4	45.584383	-120.664668	1434.05	9.00	1443.05
5	45.584353	-120.653587	1427.20	9.00	1436.20
6	45.584353	-120.644970	1531.04	9.00	1540.04
7	45.584338	-120.633806	1535.49	9.00	1544.49
8	45.584263	-120.621228	1559.65	9.00	1568.65
9	45.584158	-120.613439	1547.07	9.00	1556.07
10	45.583872	-120.602796	1521.85	9.00	1530.85
11	45.583932	-120.597432	1513.73	9.00	1522.73
12	45.583992	-120.582132	1450.76	9.00	1459.76
13	45.584068	-120.576344	1439.69	9.00	1448.69
14	45.584113	-120.569950	1451.99	9.00	1460.99
15	45.584068	-120.557118	1382.33	9.00	1391.33
16	45.583799	-120.534859	1381.21	9.00	1390.21
17	45.583717	-120.523039	1316.55	9.00	1325.55
18	45.583717	-120.520910	1304.04	9.00	1313.04

Name: Medler Ln
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.620780	-120.697244	1233.12	9.00	1242.12
2	45.620789	-120.690002	1288.50	9.00	1297.50
3	45.620797	-120.684799	1318.08	9.00	1327.08
4	45.620798	-120.678539	1315.93	9.00	1324.93
5	45.620806	-120.676363	1308.62	9.00	1317.62
6	45.620786	-120.669762	1370.16	9.00	1379.16
7	45.620736	-120.662578	1340.41	9.00	1349.41
8	45.620740	-120.655545	1381.77	9.00	1390.77
9	45.620748	-120.645646	1434.94	9.00	1443.94
10	45.620763	-120.638432	1442.39	9.00	1451.39
11	45.620763	-120.626023	1488.70	9.00	1497.70
12	45.620733	-120.625325	1492.99	9.00	1501.99
13	45.620785	-120.624875	1492.03	9.00	1501.03
14	45.620961	-120.624537	1490.44	9.00	1499.44

Name: N Klondike Rd
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.584163	-120.613405	1547.02	9.00	1556.02
2	45.587263	-120.613393	1575.34	9.00	1584.34
3	45.591409	-120.613389	1562.57	9.00	1571.57
4	45.591800	-120.613271	1546.56	9.00	1555.56
5	45.592197	-120.613249	1552.21	9.00	1561.21
6	45.593140	-120.613195	1552.07	9.00	1561.07
7	45.595257	-120.613163	1551.95	9.00	1560.95
8	45.599148	-120.613170	1582.46	9.00	1591.46
9	45.606076	-120.613159	1539.49	9.00	1548.49
10	45.612918	-120.613143	1557.94	9.00	1566.94
11	45.620015	-120.613108	1561.39	9.00	1570.39
12	45.627848	-120.613076	1478.68	9.00	1487.68

Name: Oehman Rd
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.621007	-120.624496	1490.30	9.00	1499.30
2	45.621195	-120.624325	1492.27	9.00	1501.27
3	45.621562	-120.624314	1498.44	9.00	1507.44
4	45.624900	-120.624282	1514.15	9.00	1523.15
5	45.628062	-120.624321	1541.48	9.00	1550.48
6	45.630213	-120.624226	1503.96	9.00	1512.96
7	45.632395	-120.624172	1500.53	9.00	1509.53
8	45.636064	-120.624129	1462.24	9.00	1471.24
9	45.641060	-120.624078	1507.68	9.00	1516.68
10	45.646394	-120.624000	1512.22	9.00	1521.22
11	45.651890	-120.623940	1482.43	9.00	1491.43
12	45.658455	-120.623849	1385.82	9.00	1394.82
13	45.666166	-120.623727	1305.45	9.00	1314.45
14	45.666518	-120.623652	1302.99	9.00	1311.99
15	45.668559	-120.623008	1295.11	9.00	1304.11
16	45.670052	-120.622507	1288.40	9.00	1297.40
17	45.670479	-120.622443	1288.30	9.00	1297.30
18	45.671560	-120.622410	1287.75	9.00	1296.75
19	45.673173	-120.622357	1284.89	9.00	1293.89
20	45.674328	-120.622582	1293.17	9.00	1302.17
21	45.674792	-120.622571	1301.48	9.00	1310.48
22	45.675487	-120.622464	1321.40	9.00	1330.40
23	45.675989	-120.621971	1337.57	9.00	1346.57
24	45.676364	-120.621316	1353.14	9.00	1362.14
25	45.676589	-120.620629	1351.37	9.00	1360.37

Name: Old Wasco-Heppner Hwy
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.591737	-120.695232	1307.41	9.00	1316.41
2	45.591715	-120.686340	1424.99	9.00	1433.99
3	45.591698	-120.677285	1485.92	9.00	1494.92
4	45.591683	-120.664594	1475.54	9.00	1484.54
5	45.591645	-120.649788	1555.43	9.00	1564.43
6	45.591608	-120.635203	1581.67	9.00	1590.67
7	45.591608	-120.626383	1567.53	9.00	1576.53
8	45.591473	-120.615718	1574.34	9.00	1583.34
9	45.591408	-120.613407	1562.47	9.00	1571.47

Name: Webfoot Rd
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.606047	-120.613135	1539.49	9.00	1548.49
2	45.606062	-120.611965	1536.82	9.00	1545.82
3	45.606043	-120.609766	1524.28	9.00	1533.28
4	45.606032	-120.606848	1523.10	9.00	1532.10
5	45.605998	-120.603238	1513.69	9.00	1522.69
6	45.605938	-120.601312	1506.35	9.00	1515.35
7	45.605902	-120.598984	1479.16	9.00	1488.16
8	45.605857	-120.597235	1467.82	9.00	1476.82
9	45.605796	-120.595051	1468.78	9.00	1477.78
10	45.605723	-120.592141	1458.22	9.00	1467.22
11	45.605678	-120.589904	1436.83	9.00	1445.83
12	45.605599	-120.586846	1418.47	9.00	1427.47
13	45.605565	-120.585038	1404.63	9.00	1413.63
14	45.605502	-120.582415	1382.84	9.00	1391.84
15	45.605509	-120.580248	1391.58	9.00	1400.58
16	45.605497	-120.577594	1393.35	9.00	1402.35

Discrete Observation Point Receptors

Name	ID	Latitude (°)	Longitude (°)	Elevation (ft)	Height (ft)
OP 1	1	45.581671	-120.650971	1462.06	16.00
OP 2	2	45.591202	-120.693499	1345.49	16.00
OP 3	3	45.595312	-120.700334	1283.25	16.00
OP 4	4	45.605526	-120.665361	1365.48	16.00
OP 5	5	45.617148	-120.690993	1231.11	16.00
OP 6	6	45.625705	-120.652694	1408.59	16.00
OP 7	7	45.627981	-120.607648	1474.96	16.00
OP 8	8	45.657315	-120.612840	1458.65	16.00
OP 9	9	45.685485	-120.604651	997.81	16.00
OP 10	10	45.699712	-120.546563	982.95	16.00
OP 11	11	45.650975	-120.557140	1098.94	16.00
OP 12	12	45.633880	-120.525643	1191.55	16.00
OP 13	13	45.584821	-120.519879	1309.33	16.00
OP 14	14	45.647816	-120.590278	1236.55	16.00
OP 15	15	45.629485	-120.559316	1191.53	16.00
OP 16	16	45.622847	-120.562188	1256.78	16.00
OP 17	17	45.548417	-120.552628	1485.05	16.00
OP 18	18	45.549640	-120.592761	1590.69	16.00
OP 19	19	45.568232	-120.603758	1535.54	16.00
OP 20	20	45.583640	-120.614099	1557.37	16.00
OP 21	21	45.591961	-120.627507	1560.17	16.00

Glare Analysis Results

Summary of Results

Glare with potential for temporary after-image predicted

PV Array	Tilt	Orient	Annual Green Glare		Annual Yellow Glare		Energy
	°	°	min	hr	min	hr	kWh
PV array 1	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 10	SA tracking	SA tracking	13,187	219.8	5,344	89.1	-
PV array 11	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 12	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 13	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 14	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 15	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 16	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 17	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 18	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 19	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 2	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 20	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 3	SA tracking	SA tracking	39,731	662.2	7	0.1	-
PV array 4	SA tracking	SA tracking	41,262	687.7	278	4.6	-
PV array 5	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 6	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 7	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 8	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 9	SA tracking	SA tracking	0	0.0	0	0.0	-

Total glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	7,036	117.3	0	0.0
Herin Ln - 1	11,257	187.6	0	0.0
Herin Ln - 2	4,329	72.2	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	12,880	214.7	4,772	79.5
N Klondike Rd	8,907	148.4	210	3.5
Oehman Rd	21,371	356.2	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	1,290	21.5	31	0.5
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	207	3.5	0	0.0
OP 5	401	6.7	0	0.0
OP 6	11,805	196.8	616	10.3
OP 7	2,085	34.8	0	0.0
OP 8	3,884	64.7	0	0.0
OP 9	4,776	79.6	0	0.0
OP 10	1,114	18.6	0	0.0
OP 11	1,060	17.7	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	1,471	24.5	0	0.0
OP 15	250	4.2	0	0.0
OP 16	57	0.9	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV: PV array 1 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV array 1 and Route: Emigrant Springs Ln

No glare found

PV array 1 and Route: Herin Ln - 1

No glare found

PV array 1 and Route: Herin Ln - 2

No glare found

PV array 1 and Route: Hwy 206

No glare found

PV array 1 and Route: I97

No glare found

PV array 1 and Route: Klondike Rd

No glare found

PV array 1 and Route: Medler Ln

No glare found

PV array 1 and Route: N Klondike Rd

No glare found

PV array 1 and Route: Oehman Rd

No glare found

PV array 1 and Route: Old Wasco-Heppner Hwy

No glare found

PV array 1 and Route: Webfoot Rd

No glare found

PV array 1 and OP 1

No glare found

PV array 1 and OP 2

No glare found

PV array 1 and OP 3

No glare found

PV array 1 and OP 4

No glare found

PV array 1 and OP 5

No glare found

PV array 1 and OP 6

No glare found

PV array 1 and OP 7

No glare found

PV array 1 and OP 8

No glare found

PV array 1 and OP 9

No glare found

PV array 1 and OP 10

No glare found

PV array 1 and OP 11

No glare found

PV array 1 and OP 12

No glare found

PV array 1 and OP 13

No glare found

PV array 1 and OP 14

No glare found

PV array 1 and OP 15

No glare found

PV array 1 and OP 16

No glare found

PV array 1 and OP 17

No glare found

PV array 1 and OP 18

No glare found

PV array 1 and OP 19

No glare found

PV array 1 and OP 20

No glare found

PV array 1 and OP 21

No glare found

PV: PV array 10 potential temporary after-image

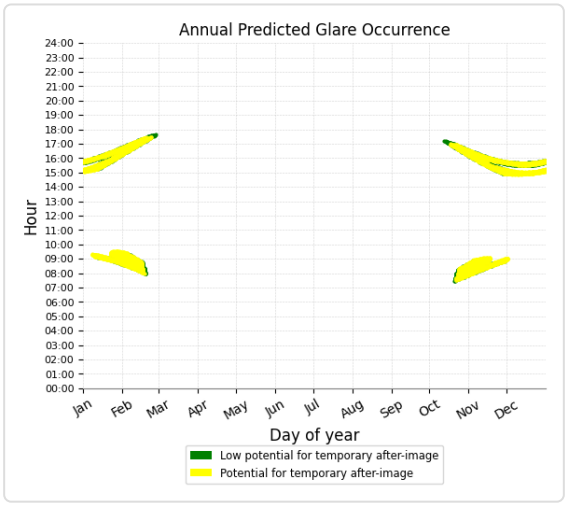
Receptor results ordered by category of glare

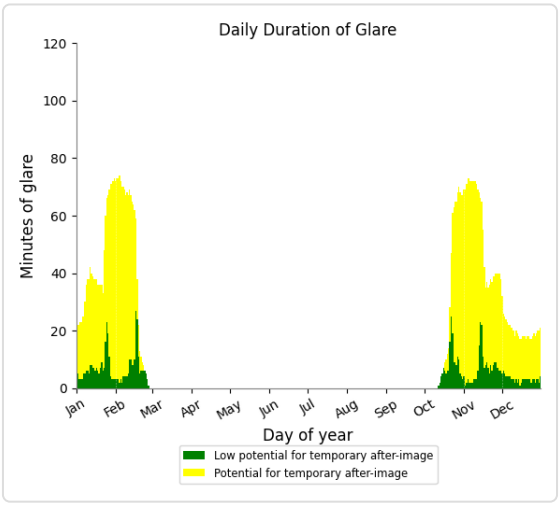
Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Medler Ln	860	14.3	4,728	78.8
Emigrant Springs Ln	1,245	20.8	0	0.0
Herin Ln - 1	1,391	23.2	0	0.0
Herin Ln - 2	363	6.0	0	0.0
Oehman Rd	4,351	72.5	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 6	4,068	67.8	616	10.3
OP 7	34	0.6	0	0.0
OP 9	659	11.0	0	0.0
OP 10	118	2.0	0	0.0
OP 14	98	1.6	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

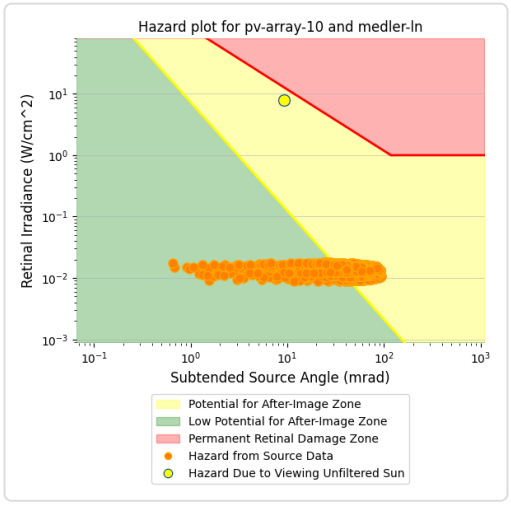
PV array 10 and Route: Medler Ln

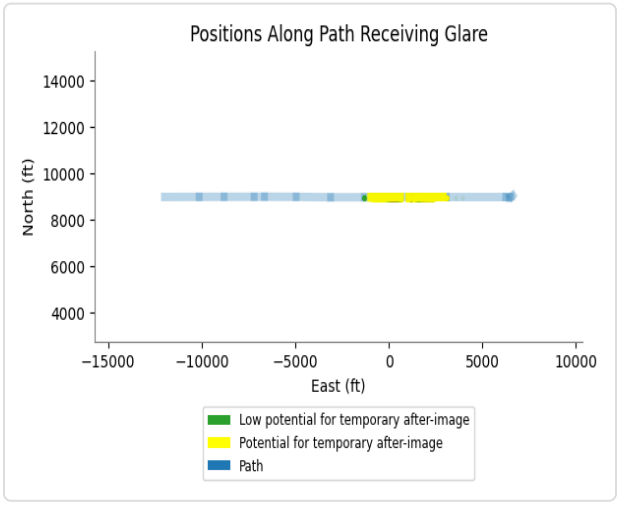
Yellow glare: 4,728 min.

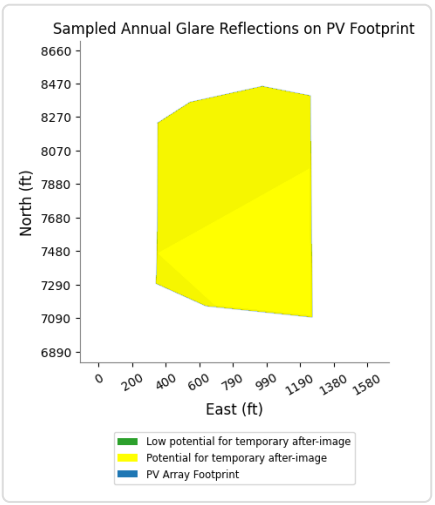
Green glare: 860 min.







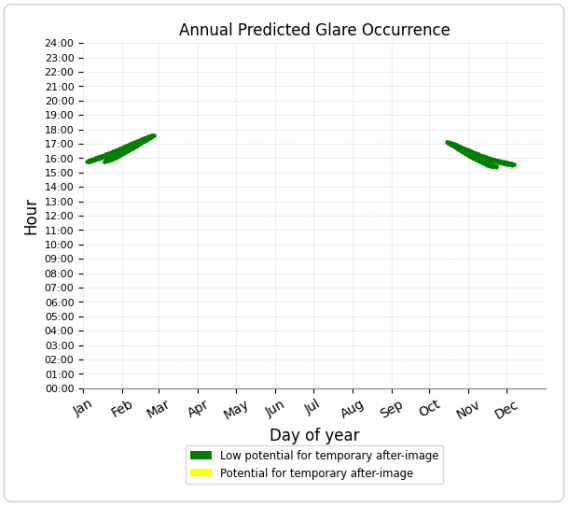


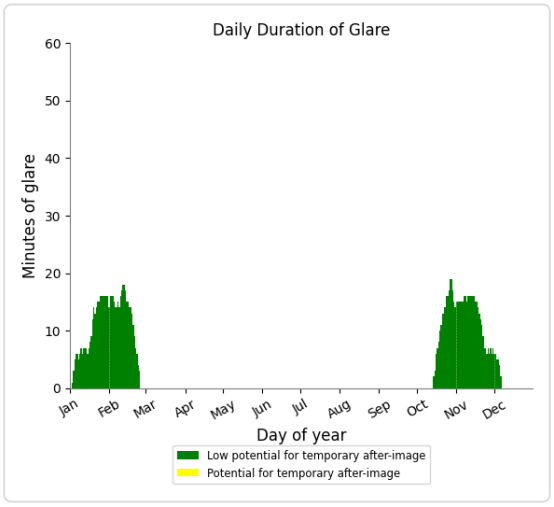


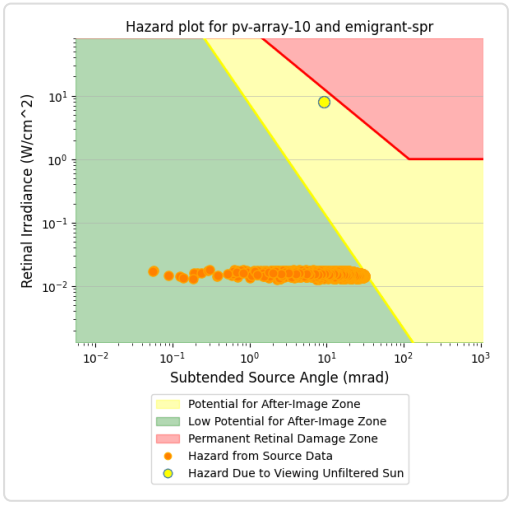
PV array 10 and Route: Emigrant Springs Ln

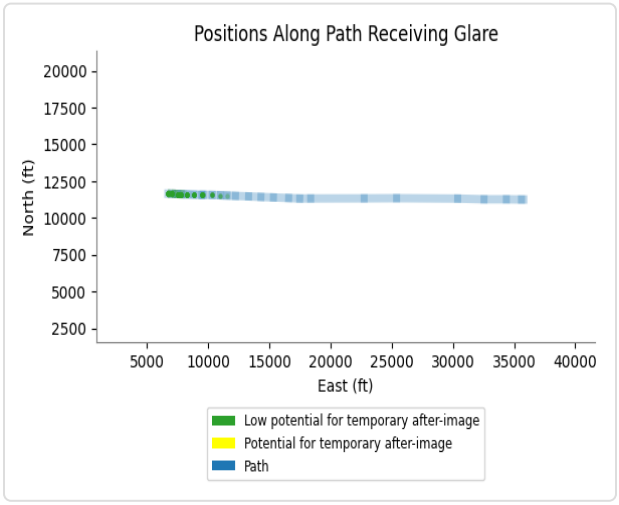
Yellow glare: none

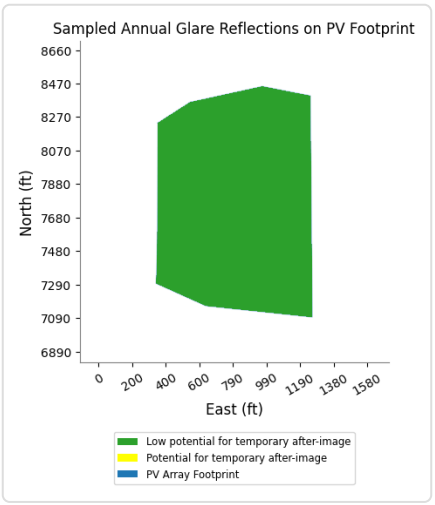
Green glare: 1,245 min.







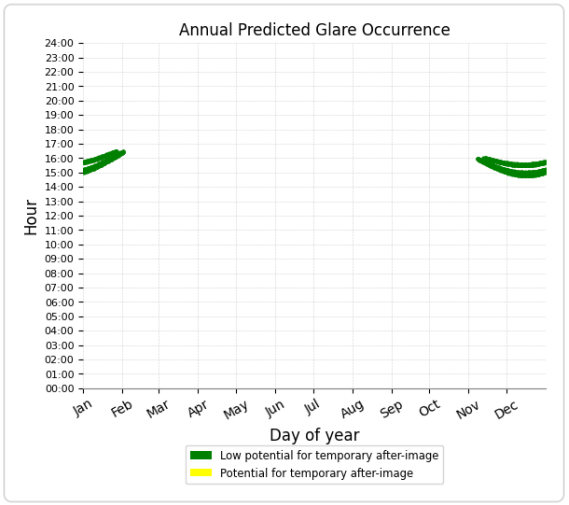


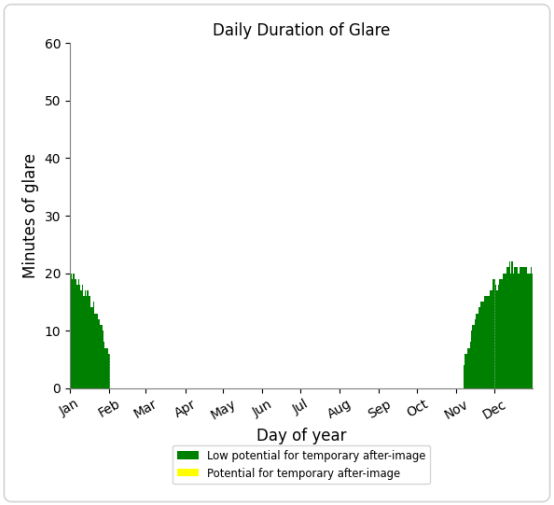


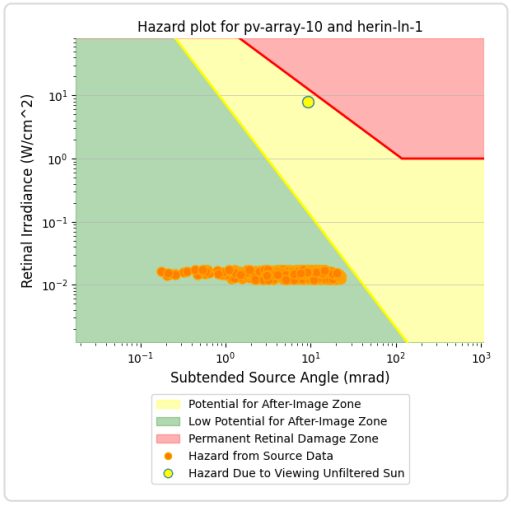
PV array 10 and Route: Herin Ln - 1

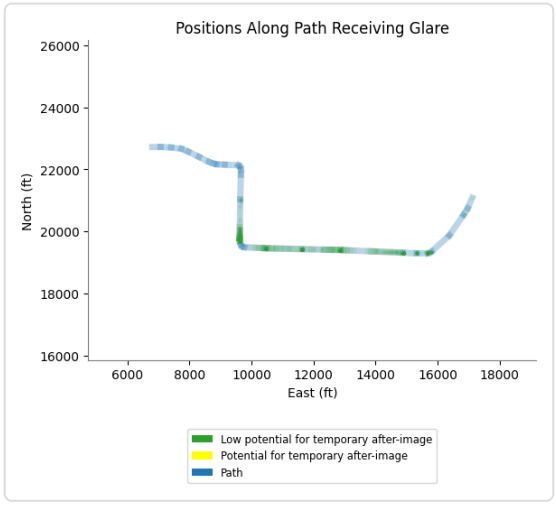
Yellow glare: none

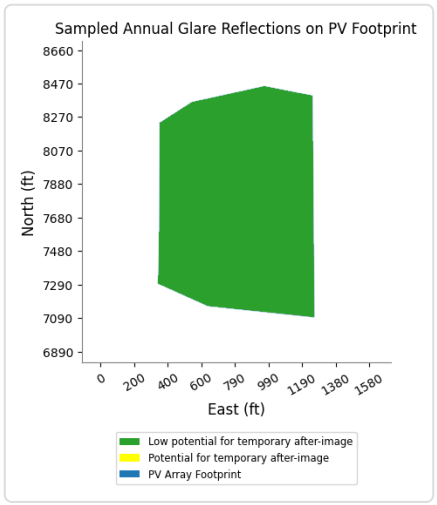
Green glare: 1,391 min.







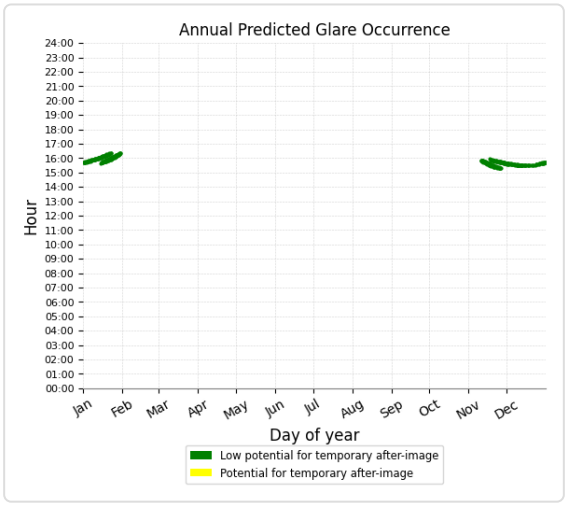


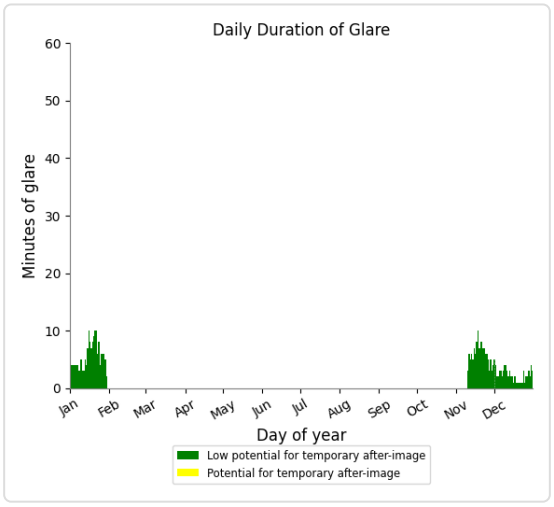


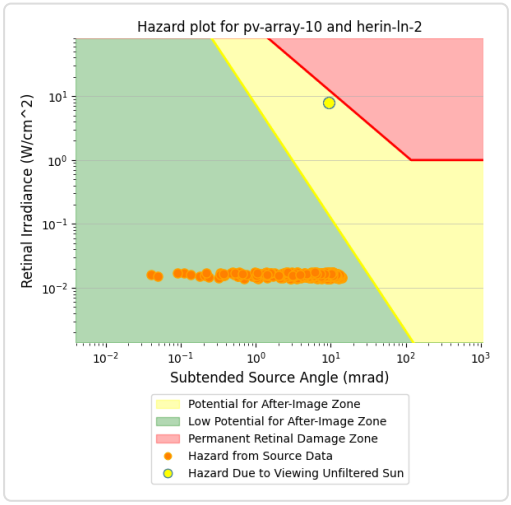
PV array 10 and Route: Herin Ln - 2

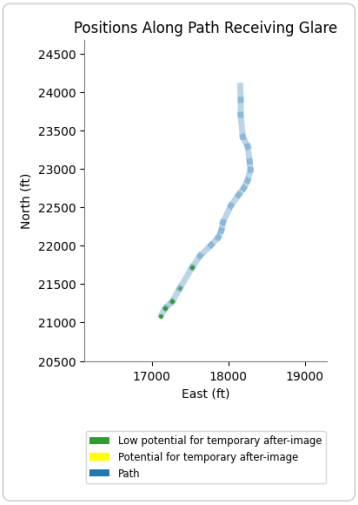
Yellow glare: none

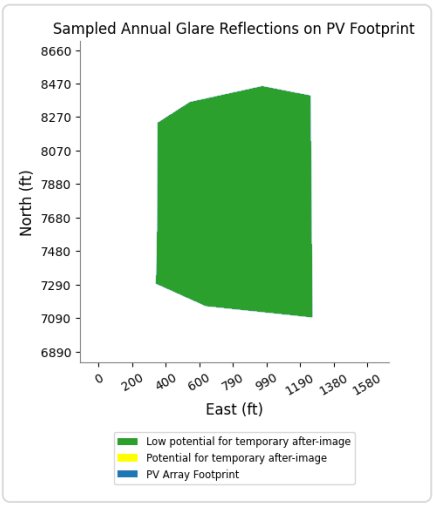
Green glare: 363 min.







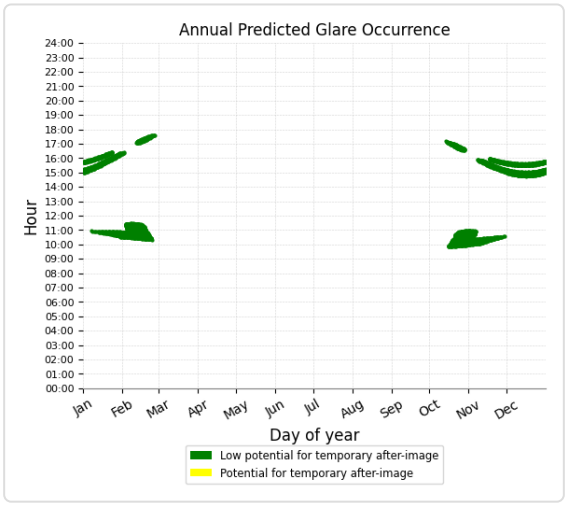


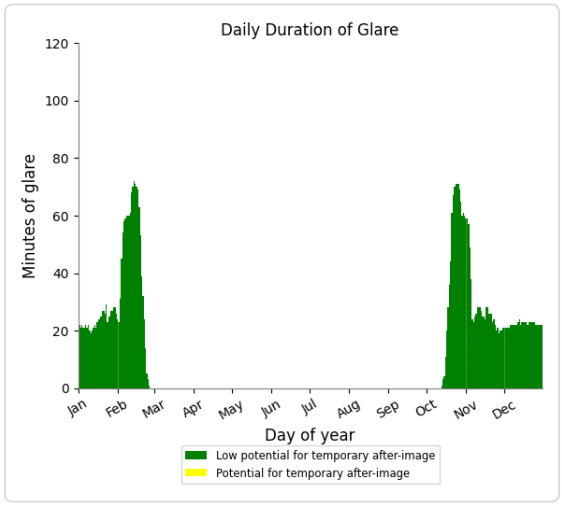


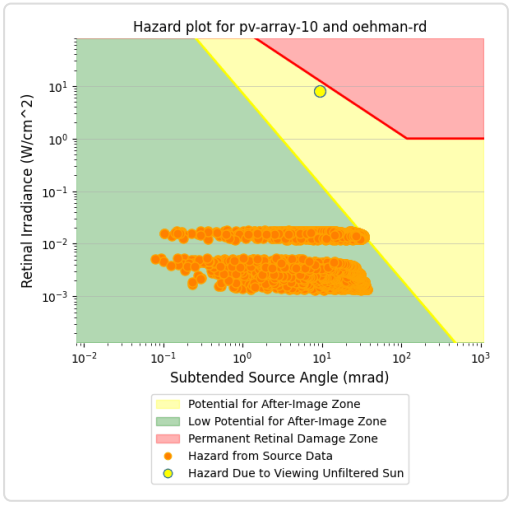
PV array 10 and Route: Oehman Rd

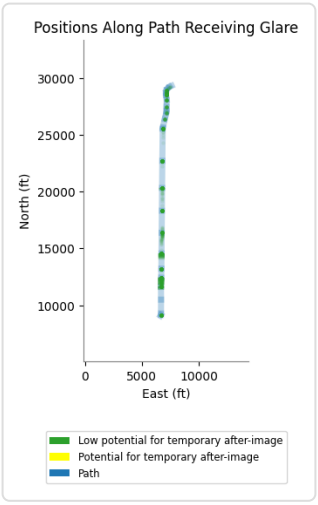
Yellow glare: none

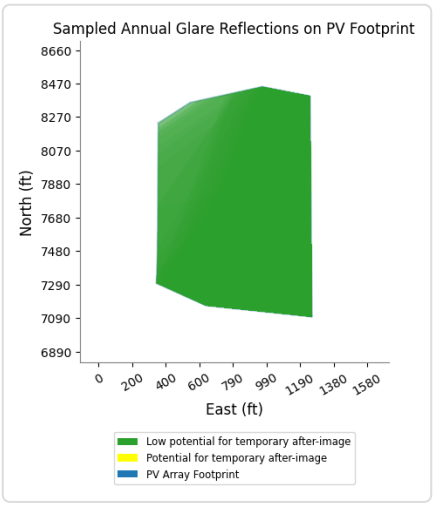
Green glare: 4,351 min.











PV array 10 and Route: Hwy 206

No glare found

PV array 10 and Route: I97

No glare found

PV array 10 and Route: Klondike Rd

No glare found

PV array 10 and Route: N Klondike Rd

No glare found

PV array 10 and Route: Old Wasco-Heppner Hwy

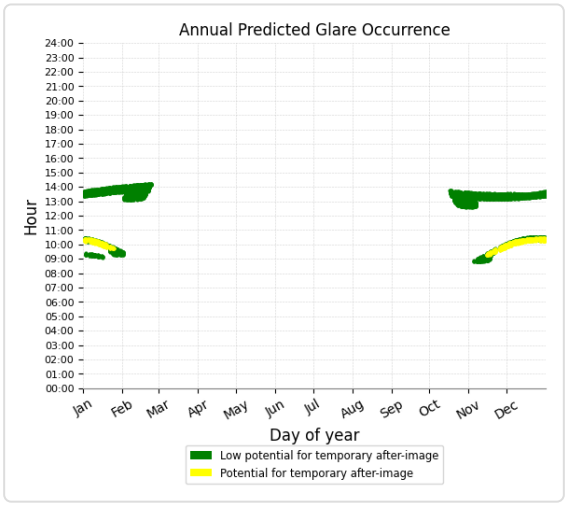
No glare found

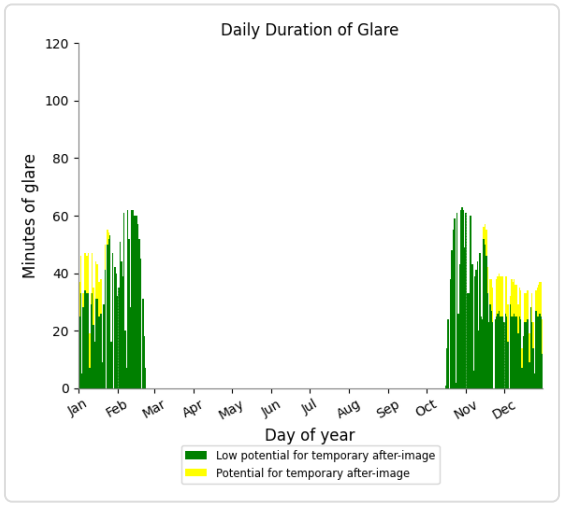
PV array 10 and Route: Webfoot Rd

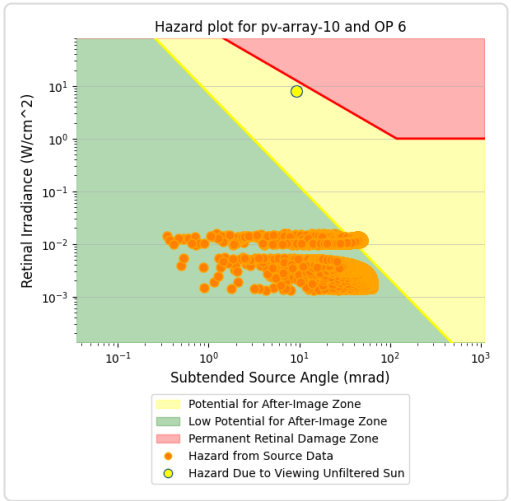
No glare found

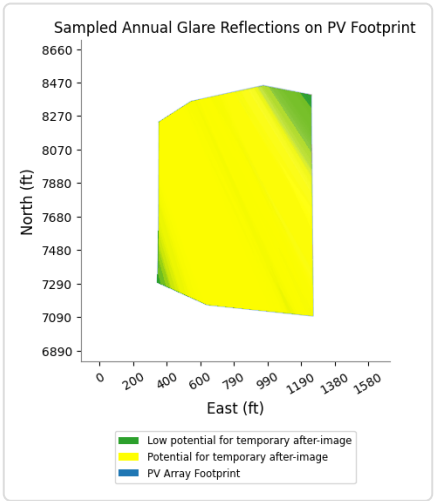
PV array 10 and OP 6

Yellow glare: 616 min.
Green glare: 4,068 min.





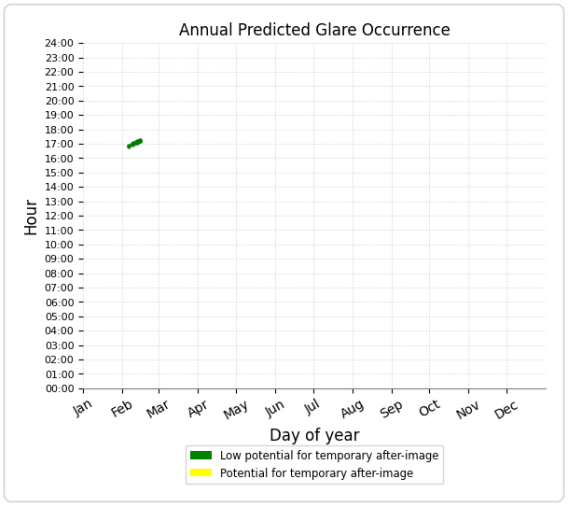


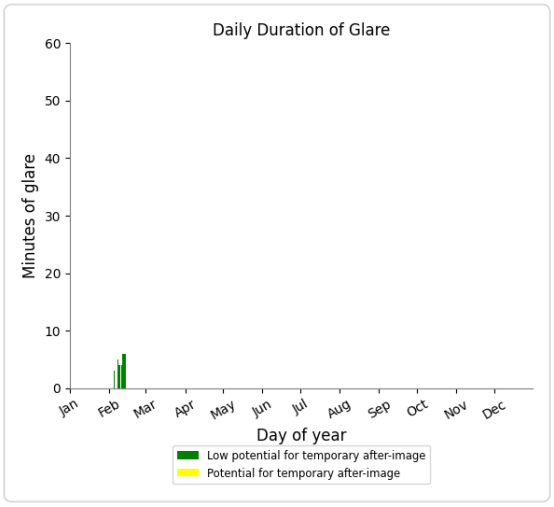


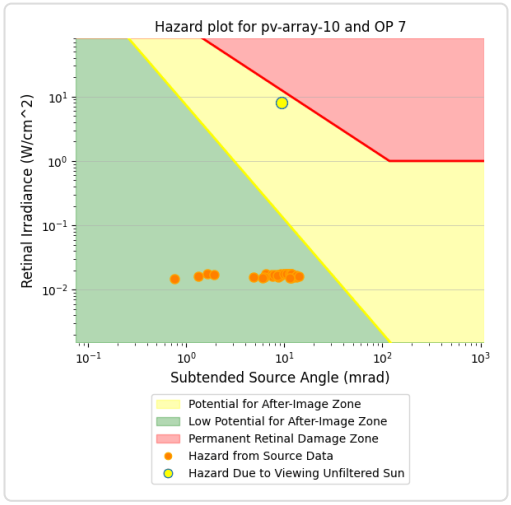
PV array 10 and OP 7

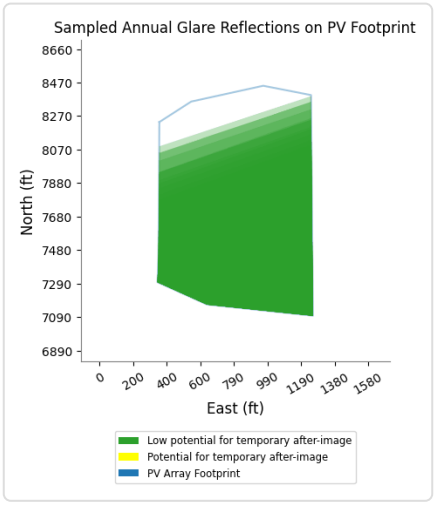
Yellow glare: none

Green glare: 34 min.





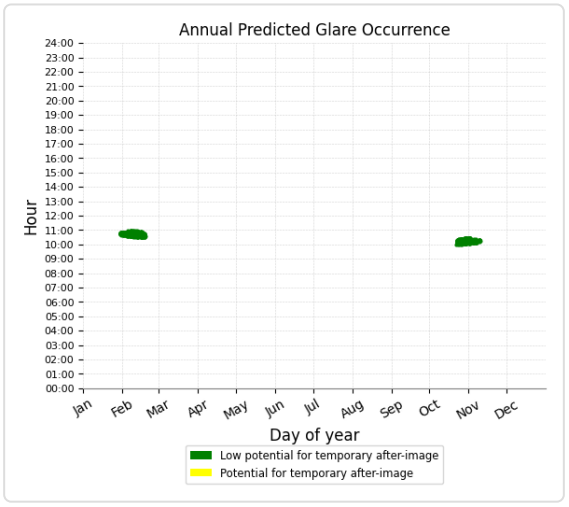


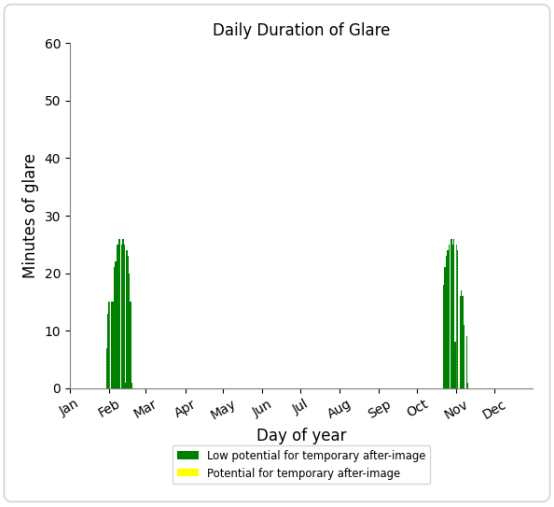


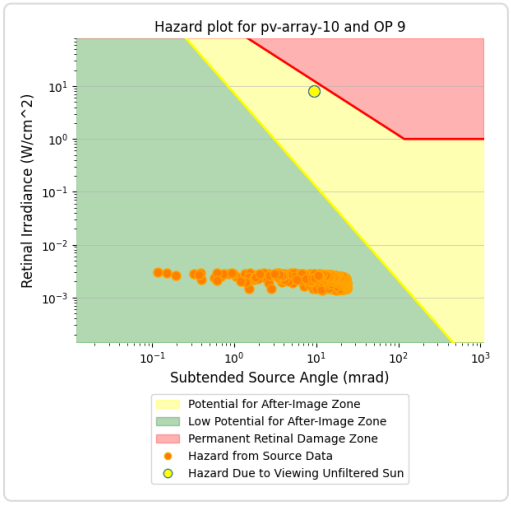
PV array 10 and OP 9

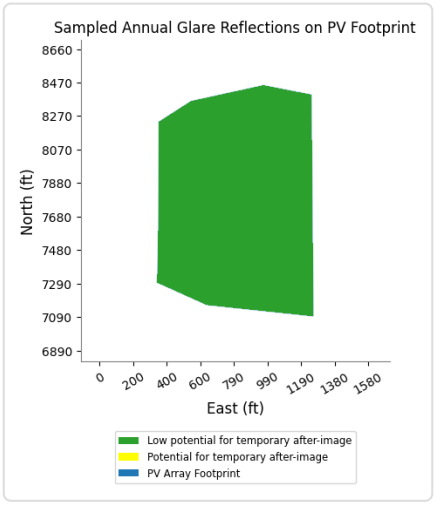
Yellow glare: none

Green glare: 659 min.





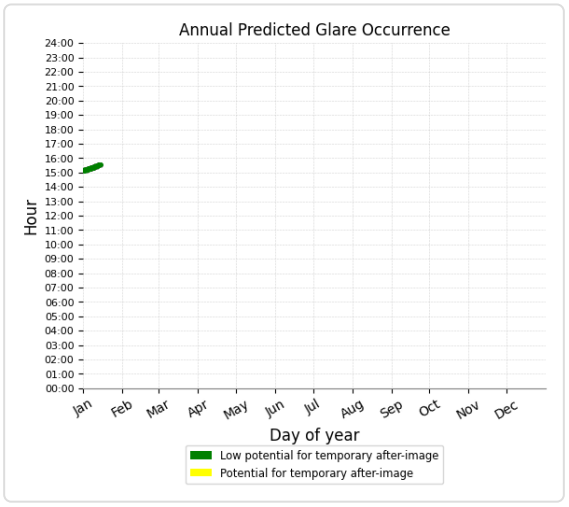


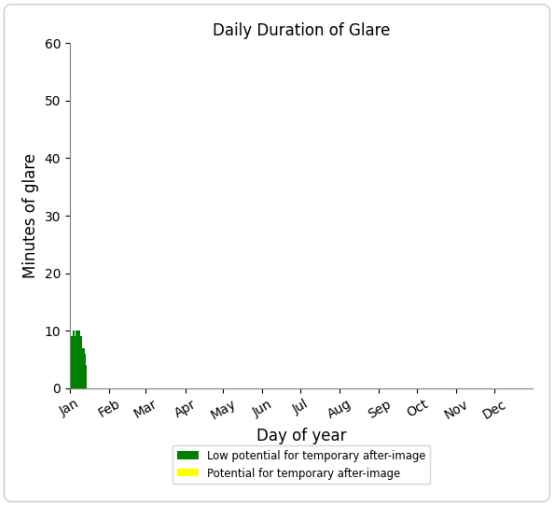


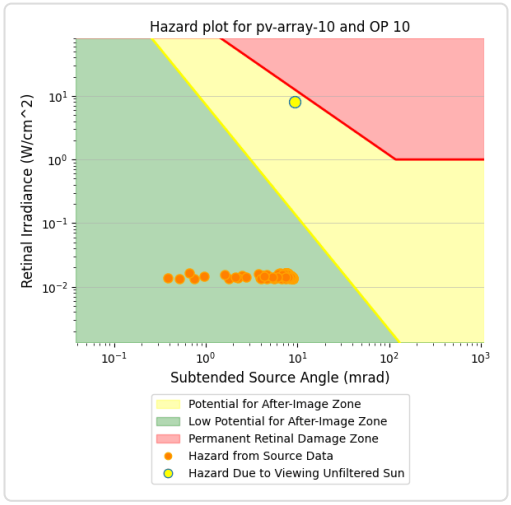
PV array 10 and OP 10

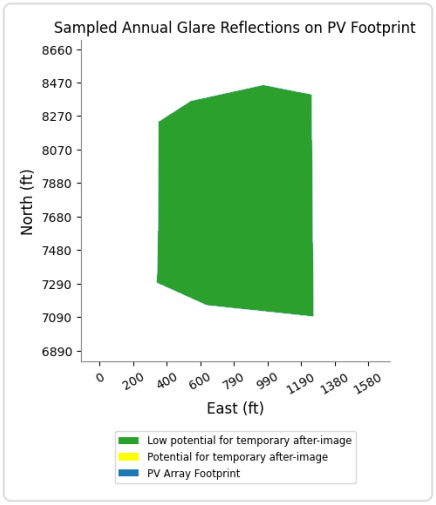
Yellow glare: none

Green glare: 118 min.





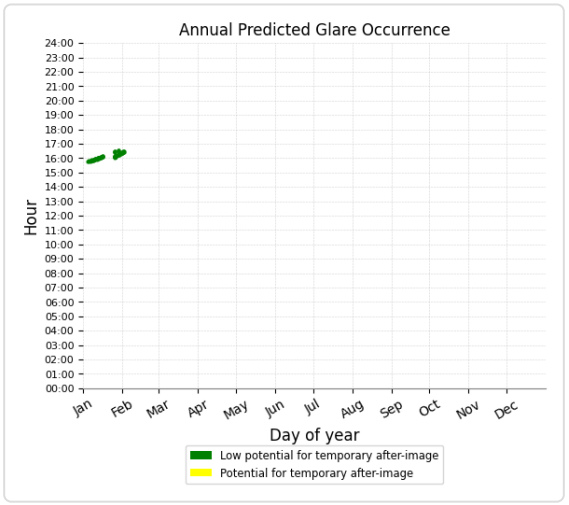


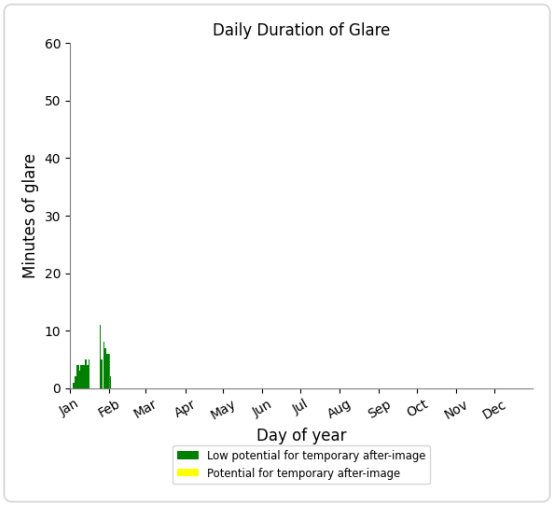


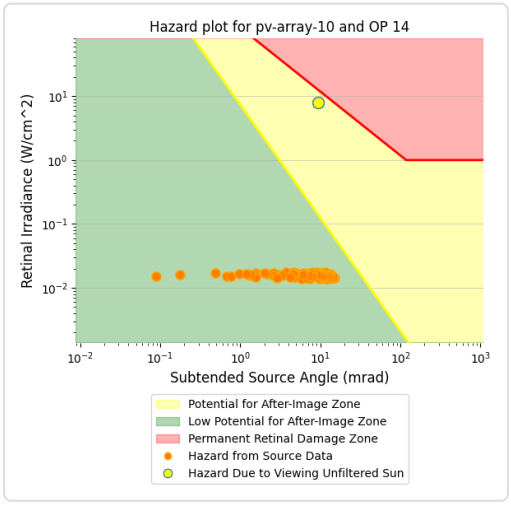
PV array 10 and OP 14

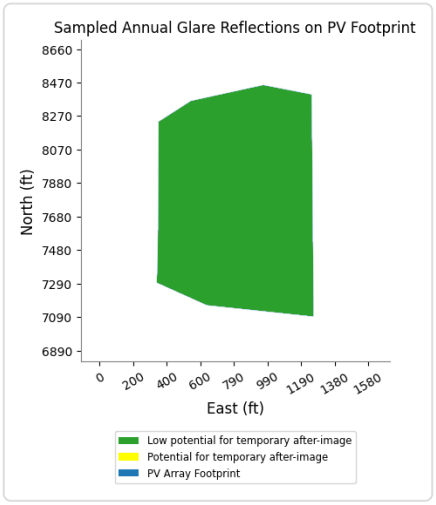
Yellow glare: none

Green glare: 98 min.









PV array 10 and OP 1

No glare found

PV array 10 and OP 2

No glare found

PV array 10 and OP 3

No glare found

PV array 10 and OP 4

No glare found

PV array 10 and OP 5

No glare found

PV array 10 and OP 8

No glare found

PV array 10 and OP 11

No glare found

PV array 10 and OP 12

No glare found

PV array 10 and OP 13

No glare found

PV array 10 and OP 15

No glare found

PV array 10 and OP 16

No glare found

PV array 10 and OP 17

No glare found

PV array 10 and OP 18

No glare found

PV array 10 and OP 19

No glare found

PV array 10 and OP 20

No glare found

PV array 10 and OP 21

No glare found

PV: PV array 11 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV array 11 and Route: Emigrant Springs Ln

No glare found

PV array 11 and Route: Herin Ln - 1

No glare found

PV array 11 and Route: Herin Ln - 2

No glare found

PV array 11 and Route: Hwy 206

No glare found

PV array 11 and Route: I97

No glare found

PV array 11 and Route: Klondike Rd

No glare found

PV array 11 and Route: Medler Ln

No glare found

PV array 11 and Route: N Klondike Rd

No glare found

PV array 11 and Route: Oehman Rd

No glare found

PV array 11 and Route: Old Wasco-Heppner Hwy

No glare found

PV array 11 and Route: Webfoot Rd

No glare found

PV array 11 and OP 1

No glare found

PV array 11 and OP 2

No glare found

PV array 11 and OP 3

No glare found

PV array 11 and OP 4

No glare found

PV array 11 and OP 5

No glare found

PV array 11 and OP 6

No glare found

PV array 11 and OP 7

No glare found

PV array 11 and OP 8

No glare found

PV array 11 and OP 9

No glare found

PV array 11 and OP 10

No glare found

PV array 11 and OP 11

No glare found

PV array 11 and OP 12

No glare found

PV array 11 and OP 13

No glare found

PV array 11 and OP 14

No glare found

PV array 11 and OP 15

No glare found

PV array 11 and OP 16

No glare found

PV array 11 and OP 17

No glare found

PV array 11 and OP 18

No glare found

PV array 11 and OP 19

No glare found

PV array 11 and OP 20

No glare found

PV array 11 and OP 21

No glare found

PV: PV array 12 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV array 12 and Route: Emigrant Springs Ln

No glare found

PV array 12 and Route: Herin Ln - 1

No glare found

PV array 12 and Route: Herin Ln - 2

No glare found

PV array 12 and Route: Hwy 206

No glare found

PV array 12 and Route: I97

No glare found

PV array 12 and Route: Klondike Rd

No glare found

PV array 12 and Route: Medler Ln

No glare found

PV array 12 and Route: N Klondike Rd

No glare found

PV array 12 and Route: Oehman Rd

No glare found

PV array 12 and Route: Old Wasco-Heppner Hwy

No glare found

PV array 12 and Route: Webfoot Rd

No glare found

PV array 12 and OP 1

No glare found

PV array 12 and OP 2

No glare found

PV array 12 and OP 3

No glare found

PV array 12 and OP 4

No glare found

PV array 12 and OP 5

No glare found

PV array 12 and OP 6

No glare found

PV array 12 and OP 7

No glare found

PV array 12 and OP 8

No glare found

PV array 12 and OP 9

No glare found

PV array 12 and OP 10

No glare found

PV array 12 and OP 11

No glare found

PV array 12 and OP 12

No glare found

PV array 12 and OP 13

No glare found

PV array 12 and OP 14

No glare found

PV array 12 and OP 15

No glare found

PV array 12 and OP 16

No glare found

PV array 12 and OP 17

No glare found

PV array 12 and OP 18

No glare found

PV array 12 and OP 19

No glare found

PV array 12 and OP 20

No glare found

PV array 12 and OP 21

No glare found

PV: PV array 13 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV array 13 and Route: Emigrant Springs Ln

No glare found

PV array 13 and Route: Herin Ln - 1

No glare found

PV array 13 and Route: Herin Ln - 2

No glare found

PV array 13 and Route: Hwy 206

No glare found

PV array 13 and Route: I97

No glare found

PV array 13 and Route: Klondike Rd

No glare found

PV array 13 and Route: Medler Ln

No glare found

PV array 13 and Route: N Klondike Rd

No glare found

PV array 13 and Route: Oehman Rd

No glare found

PV array 13 and Route: Old Wasco-Heppner Hwy

No glare found

PV array 13 and Route: Webfoot Rd

No glare found

PV array 13 and OP 1

No glare found

PV array 13 and OP 2

No glare found

PV array 13 and OP 3

No glare found

PV array 13 and OP 4

No glare found

PV array 13 and OP 5

No glare found

PV array 13 and OP 6

No glare found

PV array 13 and OP 7

No glare found

PV array 13 and OP 8

No glare found

PV array 13 and OP 9

No glare found

PV array 13 and OP 10

No glare found

PV array 13 and OP 11

No glare found

PV array 13 and OP 12

No glare found

PV array 13 and OP 13

No glare found

PV array 13 and OP 14

No glare found

PV array 13 and OP 15

No glare found

PV array 13 and OP 16

No glare found

PV array 13 and OP 17

No glare found

PV array 13 and OP 18

No glare found

PV array 13 and OP 19

No glare found

PV array 13 and OP 20

No glare found

PV array 13 and OP 21

No glare found

PV: PV array 14 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV array 14 and Route: Emigrant Springs Ln

No glare found

PV array 14 and Route: Herin Ln - 1

No glare found

PV array 14 and Route: Herin Ln - 2

No glare found

PV array 14 and Route: Hwy 206

No glare found

PV array 14 and Route: I97

No glare found

PV array 14 and Route: Klondike Rd

No glare found

PV array 14 and Route: Medler Ln

No glare found

PV array 14 and Route: N Klondike Rd

No glare found

PV array 14 and Route: Oehman Rd

No glare found

PV array 14 and Route: Old Wasco-Heppner Hwy

No glare found

PV array 14 and Route: Webfoot Rd

No glare found

PV array 14 and OP 1

No glare found

PV array 14 and OP 2

No glare found

PV array 14 and OP 3

No glare found

PV array 14 and OP 4

No glare found

PV array 14 and OP 5

No glare found

PV array 14 and OP 6

No glare found

PV array 14 and OP 7

No glare found

PV array 14 and OP 8

No glare found

PV array 14 and OP 9

No glare found

PV array 14 and OP 10

No glare found

PV array 14 and OP 11

No glare found

PV array 14 and OP 12

No glare found

PV array 14 and OP 13

No glare found

PV array 14 and OP 14

No glare found

PV array 14 and OP 15

No glare found

PV array 14 and OP 16

No glare found

PV array 14 and OP 17

No glare found

PV array 14 and OP 18

No glare found

PV array 14 and OP 19

No glare found

PV array 14 and OP 20

No glare found

PV array 14 and OP 21

No glare found

PV: PV array 15 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV array 15 and Route: Emigrant Springs Ln

No glare found

PV array 15 and Route: Herin Ln - 1

No glare found

PV array 15 and Route: Herin Ln - 2

No glare found

PV array 15 and Route: Hwy 206

No glare found

PV array 15 and Route: I97

No glare found

PV array 15 and Route: Klondike Rd

No glare found

PV array 15 and Route: Medler Ln

No glare found

PV array 15 and Route: N Klondike Rd

No glare found

PV array 15 and Route: Oehman Rd

No glare found

PV array 15 and Route: Old Wasco-Heppner Hwy

No glare found

PV array 15 and Route: Webfoot Rd

No glare found

PV array 15 and OP 1

No glare found

PV array 15 and OP 2

No glare found

PV array 15 and OP 3

No glare found

PV array 15 and OP 4

No glare found

PV array 15 and OP 5

No glare found

PV array 15 and OP 6

No glare found

PV array 15 and OP 7

No glare found

PV array 15 and OP 8

No glare found

PV array 15 and OP 9

No glare found

PV array 15 and OP 10

No glare found

PV array 15 and OP 11

No glare found

PV array 15 and OP 12

No glare found

PV array 15 and OP 13

No glare found

PV array 15 and OP 14

No glare found

PV array 15 and OP 15

No glare found

PV array 15 and OP 16

No glare found

PV array 15 and OP 17

No glare found

PV array 15 and OP 18

No glare found

PV array 15 and OP 19

No glare found

PV array 15 and OP 20

No glare found

PV array 15 and OP 21

No glare found

PV: PV array 16 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV array 16 and Route: Emigrant Springs Ln

No glare found

PV array 16 and Route: Herin Ln - 1

No glare found

PV array 16 and Route: Herin Ln - 2

No glare found

PV array 16 and Route: Hwy 206

No glare found

PV array 16 and Route: I97

No glare found

PV array 16 and Route: Klondike Rd

No glare found

PV array 16 and Route: Medler Ln

No glare found

PV array 16 and Route: N Klondike Rd

No glare found

PV array 16 and Route: Oehman Rd

No glare found

PV array 16 and Route: Old Wasco-Heppner Hwy

No glare found

PV array 16 and Route: Webfoot Rd

No glare found

PV array 16 and OP 1

No glare found

PV array 16 and OP 2

No glare found

PV array 16 and OP 3

No glare found

PV array 16 and OP 4

No glare found

PV array 16 and OP 5

No glare found

PV array 16 and OP 6

No glare found

PV array 16 and OP 7

No glare found

PV array 16 and OP 8

No glare found

PV array 16 and OP 9

No glare found

PV array 16 and OP 10

No glare found

PV array 16 and OP 11

No glare found

PV array 16 and OP 12

No glare found

PV array 16 and OP 13

No glare found

PV array 16 and OP 14

No glare found

PV array 16 and OP 15

No glare found

PV array 16 and OP 16

No glare found

PV array 16 and OP 17

No glare found

PV array 16 and OP 18

No glare found

PV array 16 and OP 19

No glare found

PV array 16 and OP 20

No glare found

PV array 16 and OP 21

No glare found

PV: PV array 17 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV array 17 and Route: Emigrant Springs Ln

No glare found

PV array 17 and Route: Herin Ln - 1

No glare found

PV array 17 and Route: Herin Ln - 2

No glare found

PV array 17 and Route: Hwy 206

No glare found

PV array 17 and Route: I97

No glare found

PV array 17 and Route: Klondike Rd

No glare found

PV array 17 and Route: Medler Ln

No glare found

PV array 17 and Route: N Klondike Rd

No glare found

PV array 17 and Route: Oehman Rd

No glare found

PV array 17 and Route: Old Wasco-Heppner Hwy

No glare found

PV array 17 and Route: Webfoot Rd

No glare found

PV array 17 and OP 1

No glare found

PV array 17 and OP 2

No glare found

PV array 17 and OP 3

No glare found

PV array 17 and OP 4

No glare found

PV array 17 and OP 5

No glare found

PV array 17 and OP 6

No glare found

PV array 17 and OP 7

No glare found

PV array 17 and OP 8

No glare found

PV array 17 and OP 9

No glare found

PV array 17 and OP 10

No glare found

PV array 17 and OP 11

No glare found

PV array 17 and OP 12

No glare found

PV array 17 and OP 13

No glare found

PV array 17 and OP 14

No glare found

PV array 17 and OP 15

No glare found

PV array 17 and OP 16

No glare found

PV array 17 and OP 17

No glare found

PV array 17 and OP 18

No glare found

PV array 17 and OP 19

No glare found

PV array 17 and OP 20

No glare found

PV array 17 and OP 21

No glare found

PV: PV array 18 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV array 18 and Route: Emigrant Springs Ln

No glare found

PV array 18 and Route: Herin Ln - 1

No glare found

PV array 18 and Route: Herin Ln - 2

No glare found

PV array 18 and Route: Hwy 206

No glare found

PV array 18 and Route: I97

No glare found

PV array 18 and Route: Klondike Rd

No glare found

PV array 18 and Route: Medler Ln

No glare found

PV array 18 and Route: N Klondike Rd

No glare found

PV array 18 and Route: Oehman Rd

No glare found

PV array 18 and Route: Old Wasco-Heppner Hwy

No glare found

PV array 18 and Route: Webfoot Rd

No glare found

PV array 18 and OP 1

No glare found

PV array 18 and OP 2

No glare found

PV array 18 and OP 3

No glare found

PV array 18 and OP 4

No glare found

PV array 18 and OP 5

No glare found

PV array 18 and OP 6

No glare found

PV array 18 and OP 7

No glare found

PV array 18 and OP 8

No glare found

PV array 18 and OP 9

No glare found

PV array 18 and OP 10

No glare found

PV array 18 and OP 11

No glare found

PV array 18 and OP 12

No glare found

PV array 18 and OP 13

No glare found

PV array 18 and OP 14

No glare found

PV array 18 and OP 15

No glare found

PV array 18 and OP 16

No glare found

PV array 18 and OP 17

No glare found

PV array 18 and OP 18

No glare found

PV array 18 and OP 19

No glare found

PV array 18 and OP 20

No glare found

PV array 18 and OP 21

No glare found

PV: PV array 19 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV array 19 and Route: Emigrant Springs Ln

No glare found

PV array 19 and Route: Herin Ln - 1

No glare found

PV array 19 and Route: Herin Ln - 2

No glare found

PV array 19 and Route: Hwy 206

No glare found

PV array 19 and Route: I97

No glare found

PV array 19 and Route: Klondike Rd

No glare found

PV array 19 and Route: Medler Ln

No glare found

PV array 19 and Route: N Klondike Rd

No glare found

PV array 19 and Route: Oehman Rd

No glare found

PV array 19 and Route: Old Wasco-Heppner Hwy

No glare found

PV array 19 and Route: Webfoot Rd

No glare found

PV array 19 and OP 1

No glare found

PV array 19 and OP 2

No glare found

PV array 19 and OP 3

No glare found

PV array 19 and OP 4

No glare found

PV array 19 and OP 5

No glare found

PV array 19 and OP 6

No glare found

PV array 19 and OP 7

No glare found

PV array 19 and OP 8

No glare found

PV array 19 and OP 9

No glare found

PV array 19 and OP 10

No glare found

PV array 19 and OP 11

No glare found

PV array 19 and OP 12

No glare found

PV array 19 and OP 13

No glare found

PV array 19 and OP 14

No glare found

PV array 19 and OP 15

No glare found

PV array 19 and OP 16

No glare found

PV array 19 and OP 17

No glare found

PV array 19 and OP 18

No glare found

PV array 19 and OP 19

No glare found

PV array 19 and OP 20

No glare found

PV array 19 and OP 21

No glare found

PV: PV array 2 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV array 2 and Route: Emigrant Springs Ln

No glare found

PV array 2 and Route: Herin Ln - 1

No glare found

PV array 2 and Route: Herin Ln - 2

No glare found

PV array 2 and Route: Hwy 206

No glare found

PV array 2 and Route: I97

No glare found

PV array 2 and Route: Klondike Rd

No glare found

PV array 2 and Route: Medler Ln

No glare found

PV array 2 and Route: N Klondike Rd

No glare found

PV array 2 and Route: Oehman Rd

No glare found

PV array 2 and Route: Old Wasco-Heppner Hwy

No glare found

PV array 2 and Route: Webfoot Rd

No glare found

PV array 2 and OP 1

No glare found

PV array 2 and OP 2

No glare found

PV array 2 and OP 3

No glare found

PV array 2 and OP 4

No glare found

PV array 2 and OP 5

No glare found

PV array 2 and OP 6

No glare found

PV array 2 and OP 7

No glare found

PV array 2 and OP 8

No glare found

PV array 2 and OP 9

No glare found

PV array 2 and OP 10

No glare found

PV array 2 and OP 11

No glare found

PV array 2 and OP 12

No glare found

PV array 2 and OP 13

No glare found

PV array 2 and OP 14

No glare found

PV array 2 and OP 15

No glare found

PV array 2 and OP 16

No glare found

PV array 2 and OP 17

No glare found

PV array 2 and OP 18

No glare found

PV array 2 and OP 19

No glare found

PV array 2 and OP 20

No glare found

PV array 2 and OP 21

No glare found

PV: PV array 20 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV array 20 and Route: Emigrant Springs Ln

No glare found

PV array 20 and Route: Herin Ln - 1

No glare found

PV array 20 and Route: Herin Ln - 2

No glare found

PV array 20 and Route: Hwy 206

No glare found

PV array 20 and Route: I97

No glare found

PV array 20 and Route: Klondike Rd

No glare found

PV array 20 and Route: Medler Ln

No glare found

PV array 20 and Route: N Klondike Rd

No glare found

PV array 20 and Route: Oehman Rd

No glare found

PV array 20 and Route: Old Wasco-Heppner Hwy

No glare found

PV array 20 and Route: Webfoot Rd

No glare found

PV array 20 and OP 1

No glare found

PV array 20 and OP 2

No glare found

PV array 20 and OP 3

No glare found

PV array 20 and OP 4

No glare found

PV array 20 and OP 5

No glare found

PV array 20 and OP 6

No glare found

PV array 20 and OP 7

No glare found

PV array 20 and OP 8

No glare found

PV array 20 and OP 9

No glare found

PV array 20 and OP 10

No glare found

PV array 20 and OP 11

No glare found

PV array 20 and OP 12

No glare found

PV array 20 and OP 13

No glare found

PV array 20 and OP 14

No glare found

PV array 20 and OP 15

No glare found

PV array 20 and OP 16

No glare found

PV array 20 and OP 17

No glare found

PV array 20 and OP 18

No glare found

PV array 20 and OP 19

No glare found

PV array 20 and OP 20

No glare found

PV array 20 and OP 21

No glare found

PV: PV array 3 potential temporary after-image

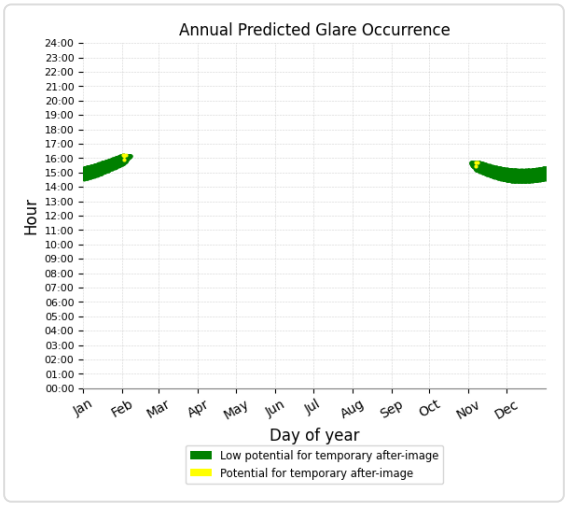
Receptor results ordered by category of glare

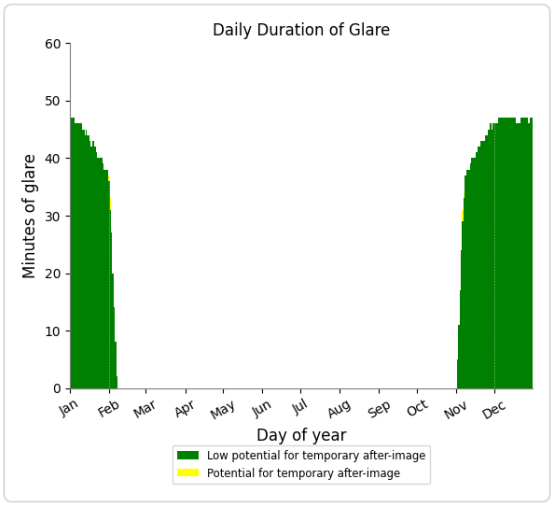
Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
N Klondike Rd	4,004	66.7	7	0.1
Emigrant Springs Ln	3,362	56.0	0	0.0
Herin Ln - 1	4,512	75.2	0	0.0
Herin Ln - 2	2,581	43.0	0	0.0
Medler Ln	4,929	82.2	0	0.0
Oehman Rd	8,745	145.8	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 4	207	3.5	0	0.0
OP 5	353	5.9	0	0.0
OP 6	5,692	94.9	0	0.0
OP 7	777	12.9	0	0.0
OP 8	1,441	24.0	0	0.0
OP 9	2,072	34.5	0	0.0
OP 10	268	4.5	0	0.0
OP 11	211	3.5	0	0.0
OP 14	577	9.6	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

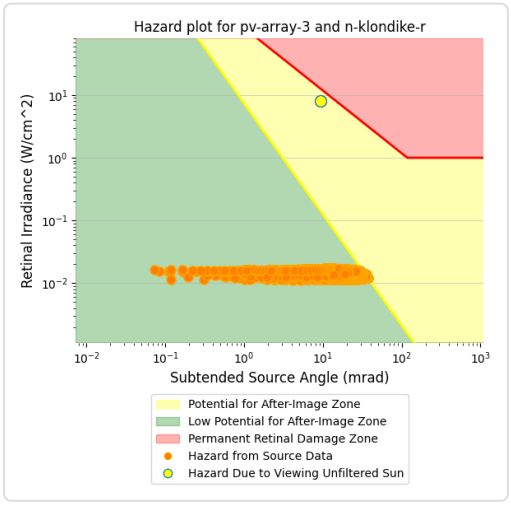
PV array 3 and Route: N Klondike Rd

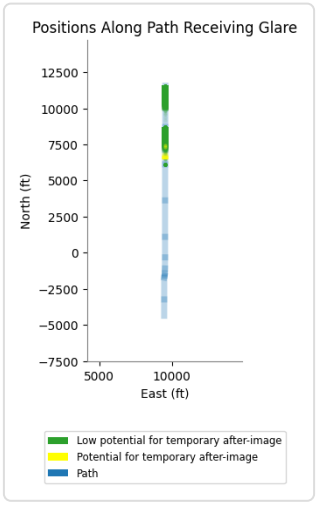
Yellow glare: 7 min.

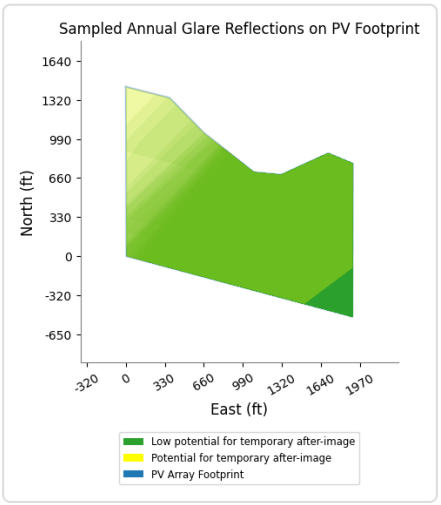
Green glare: 4,004 min.







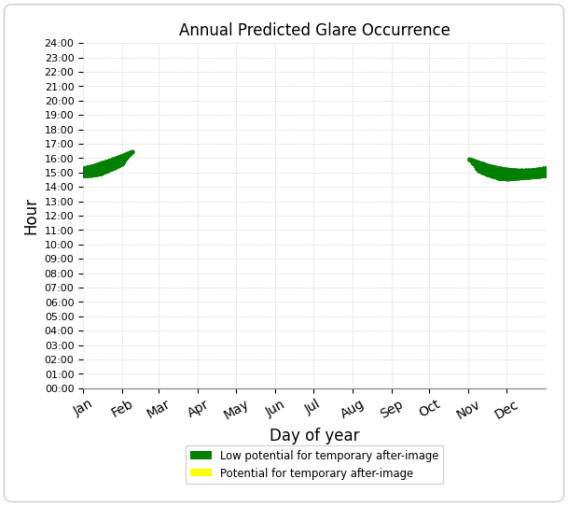


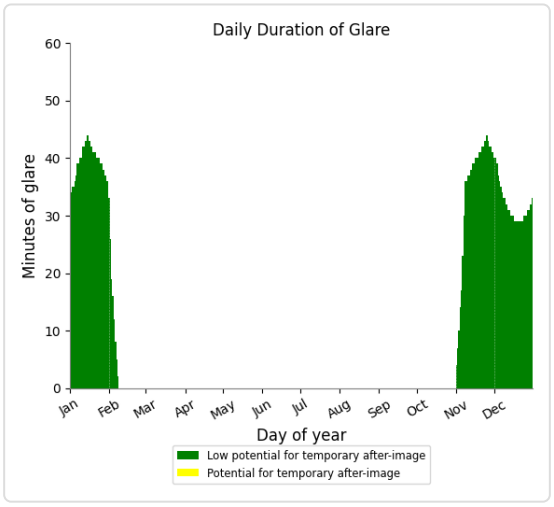


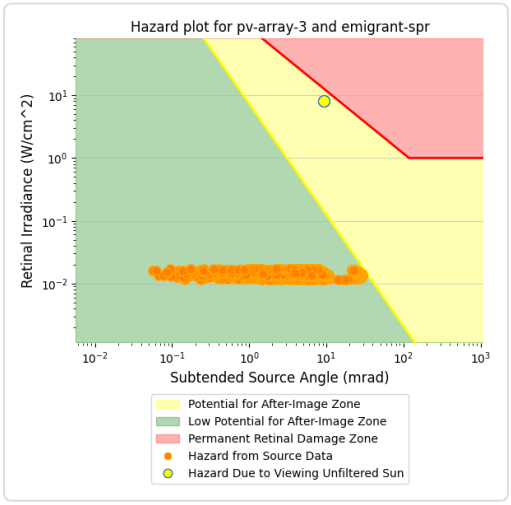
PV array 3 and Route: Emigrant Springs Ln

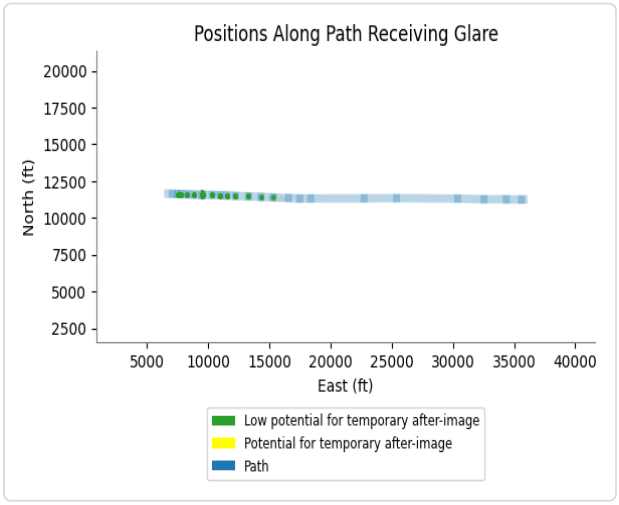
Yellow glare: none

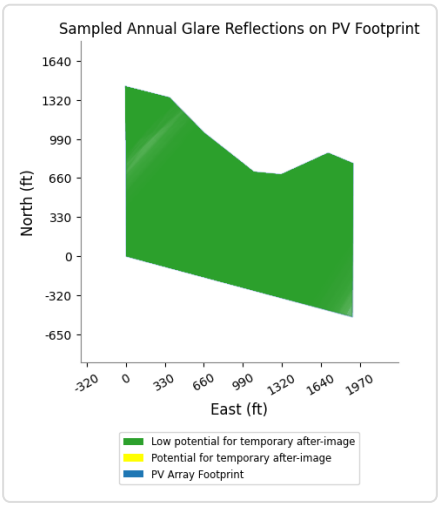
Green glare: 3,362 min.







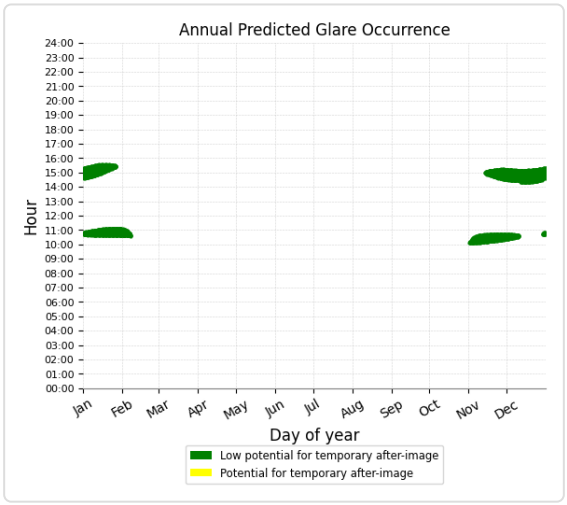


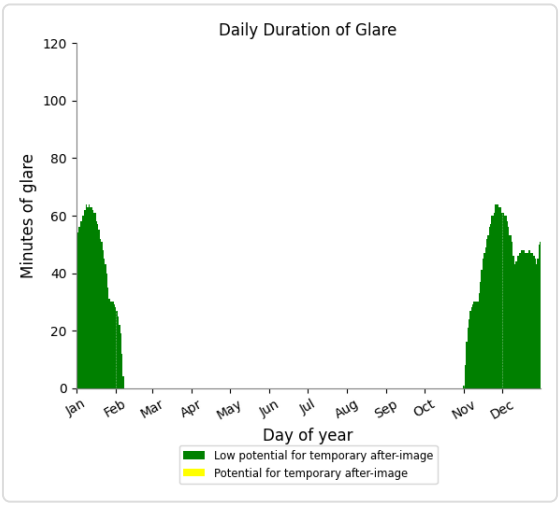


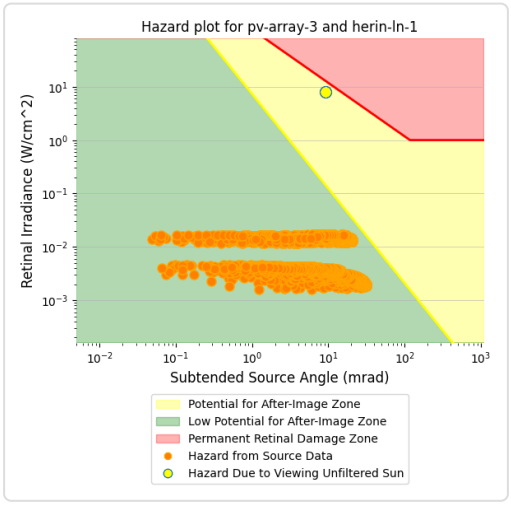
PV array 3 and Route: Herin Ln - 1

Yellow glare: none

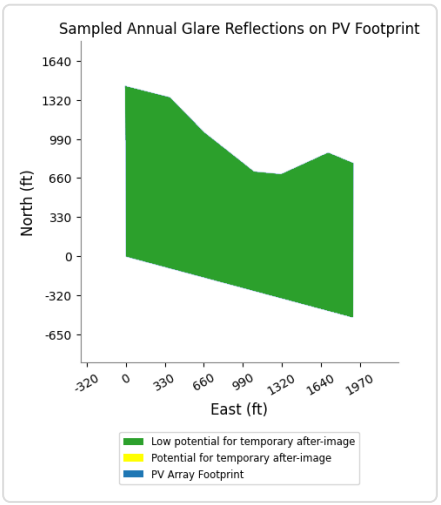
Green glare: 4,512 min.







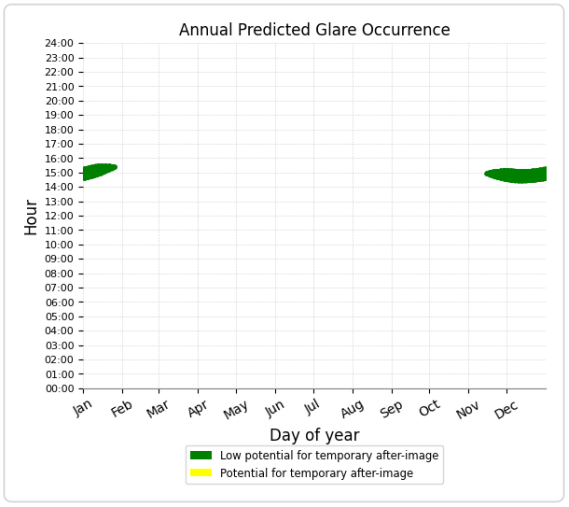


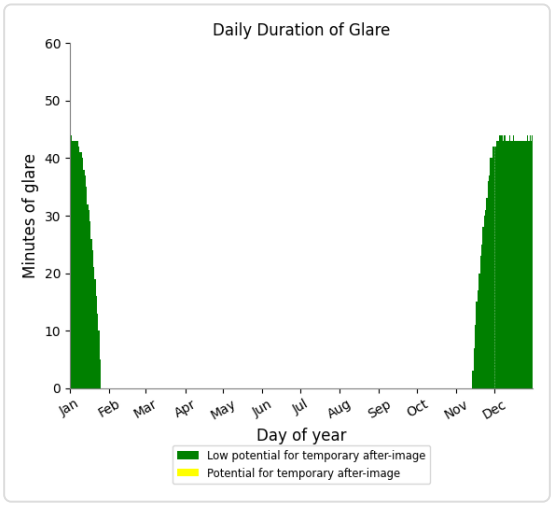


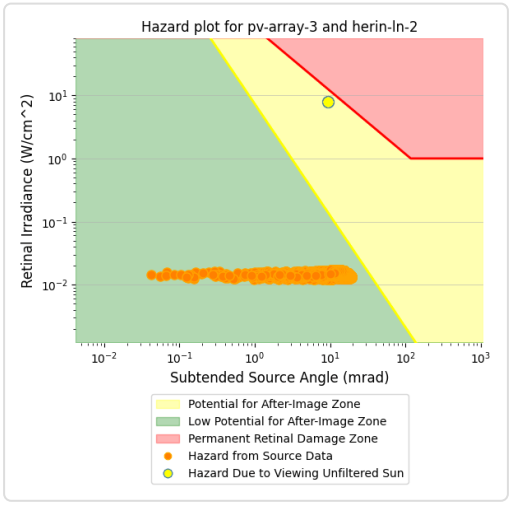
PV array 3 and Route: Herin Ln - 2

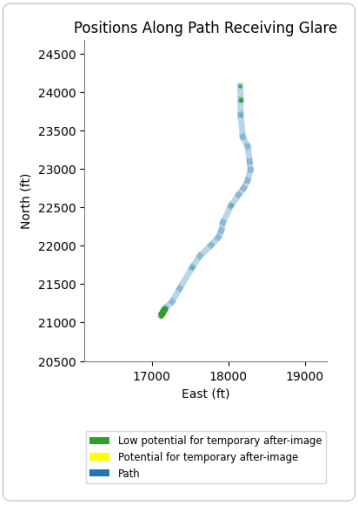
Yellow glare: none

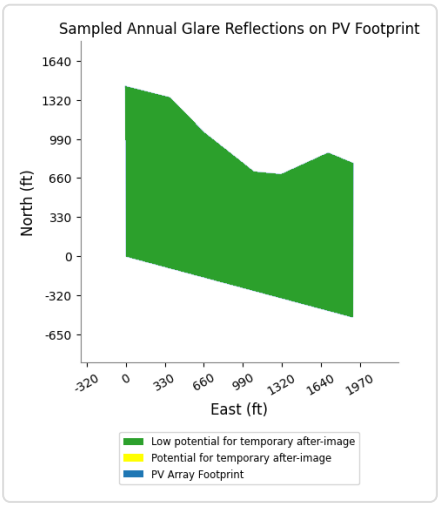
Green glare: 2,581 min.







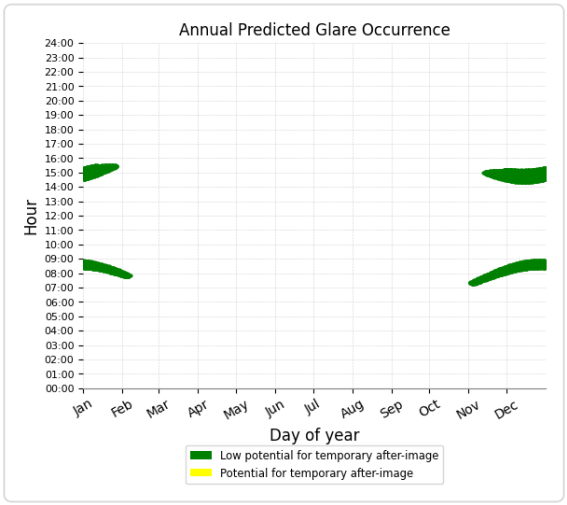


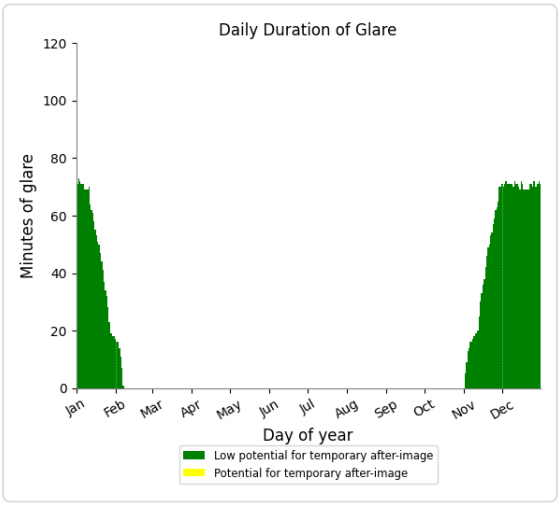


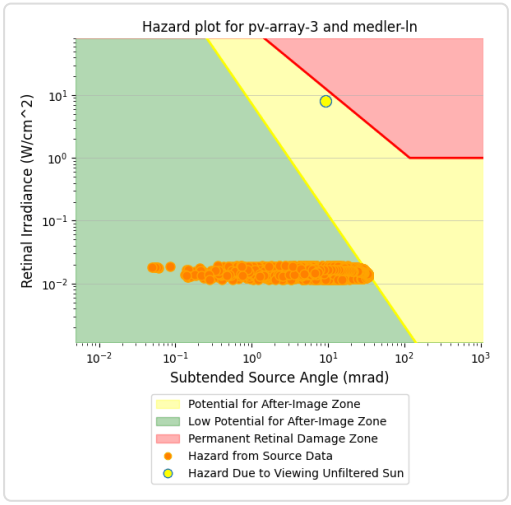
PV array 3 and Route: Medler Ln

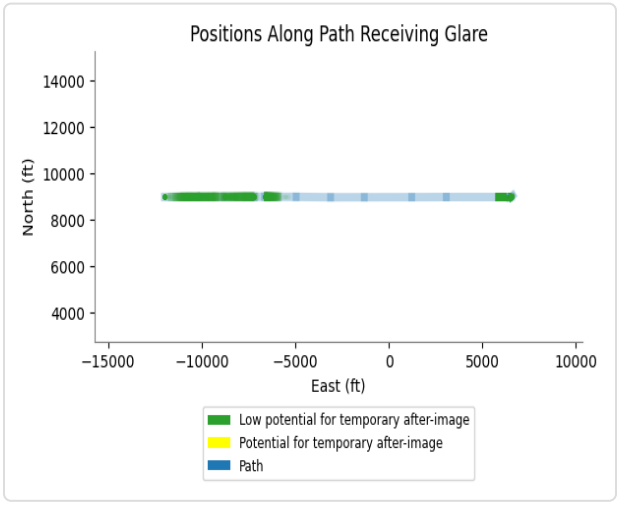
Yellow glare: none

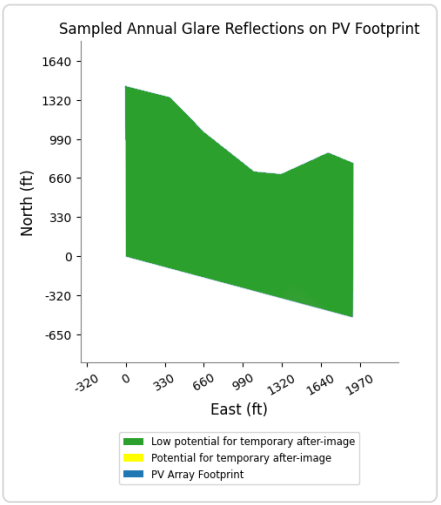
Green glare: 4,929 min.







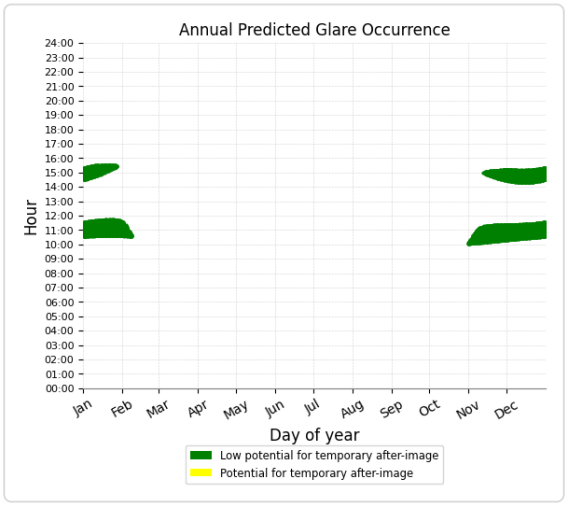


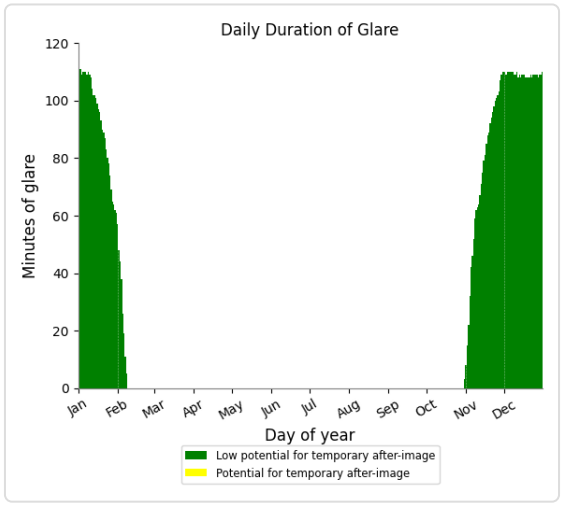


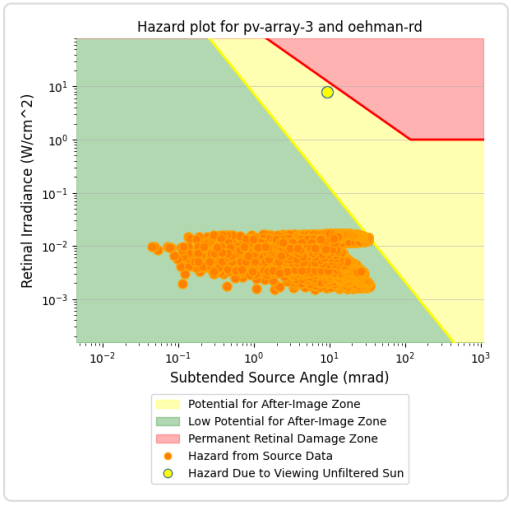
PV array 3 and Route: Oehman Rd

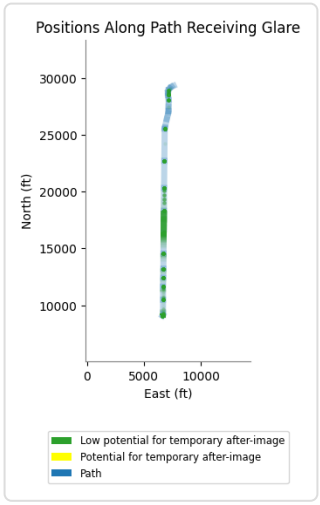
Yellow glare: none

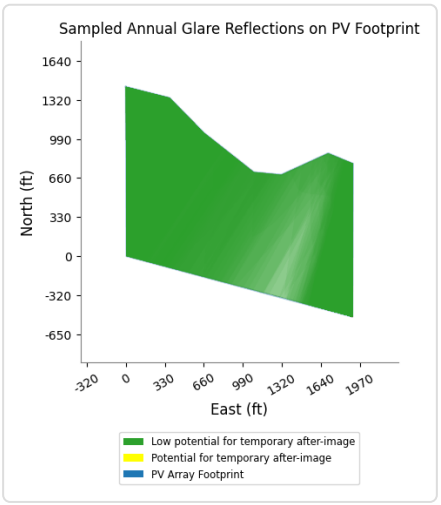
Green glare: 8,745 min.











PV array 3 and Route: Hwy 206

No glare found

PV array 3 and Route: I97

No glare found

PV array 3 and Route: Klondike Rd

No glare found

PV array 3 and Route: Old Wasco-Heppner Hwy

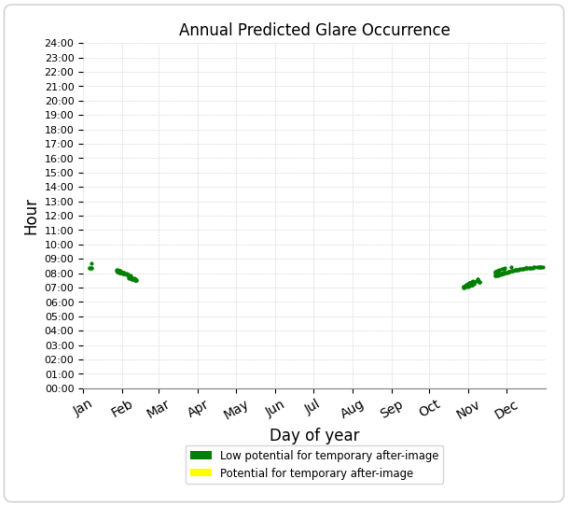
No glare found

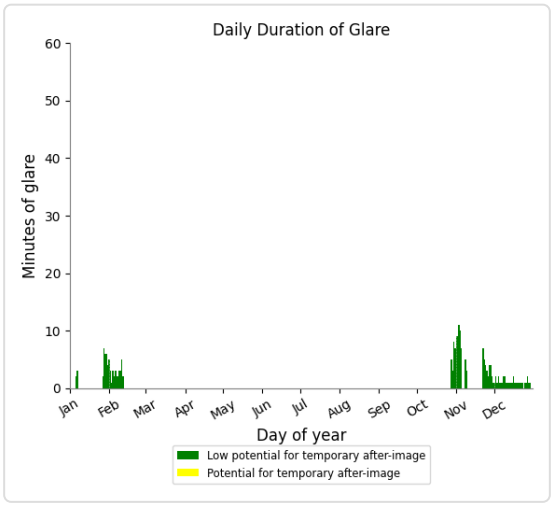
PV array 3 and Route: Webfoot Rd

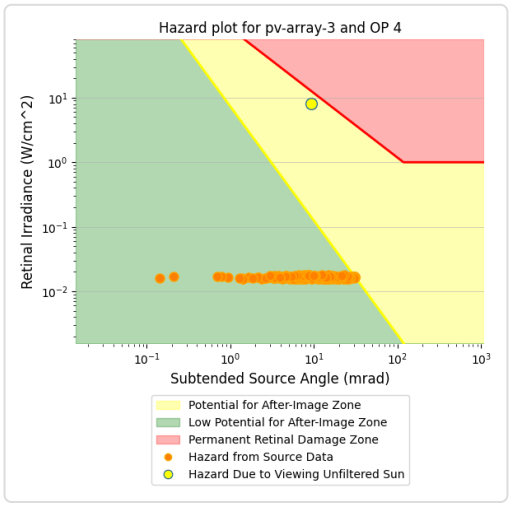
No glare found

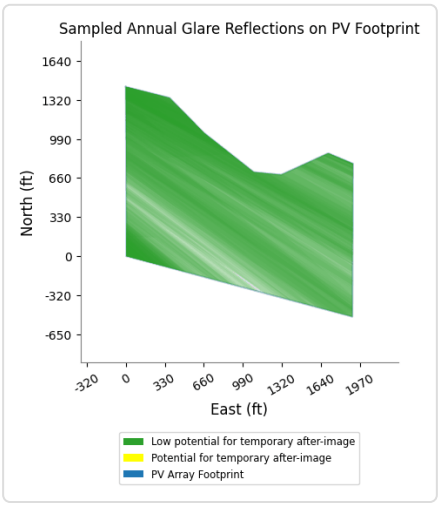
PV array 3 and OP 4

Yellow glare: none
Green glare: 207 min.





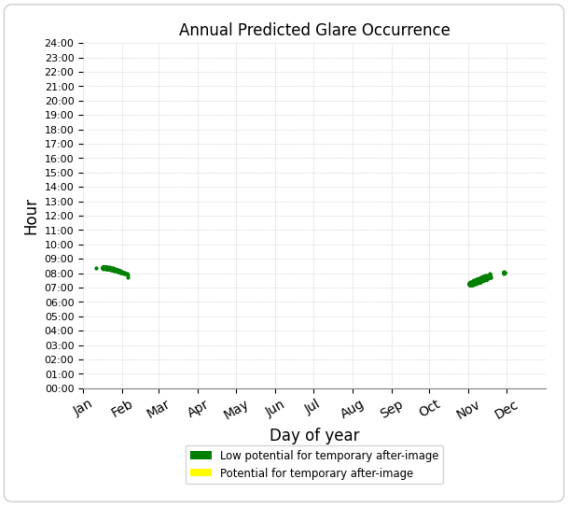


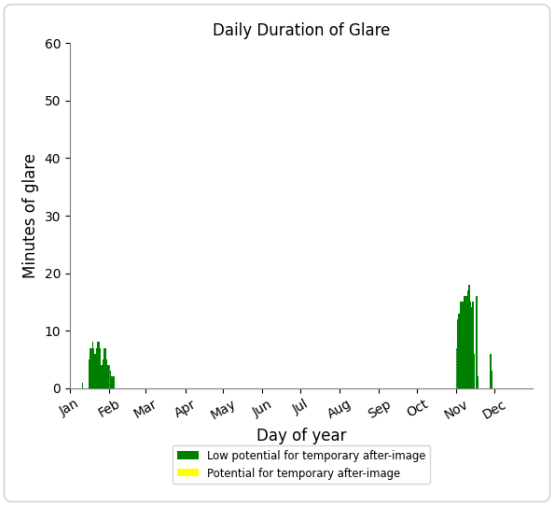


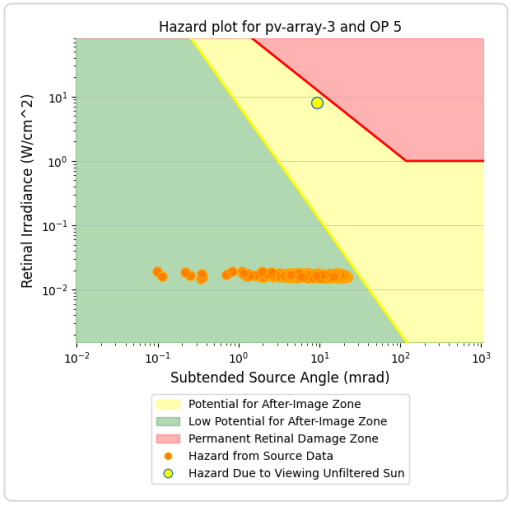
PV array 3 and OP 5

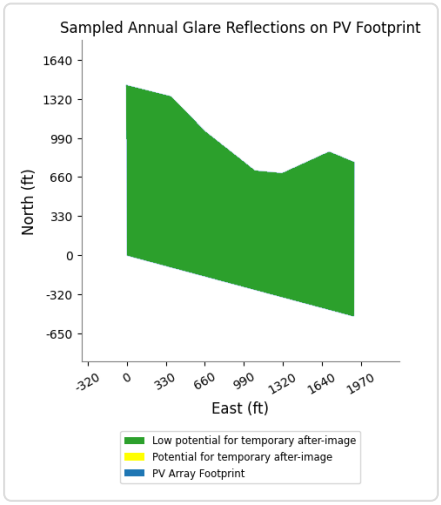
Yellow glare: none

Green glare: 353 min.





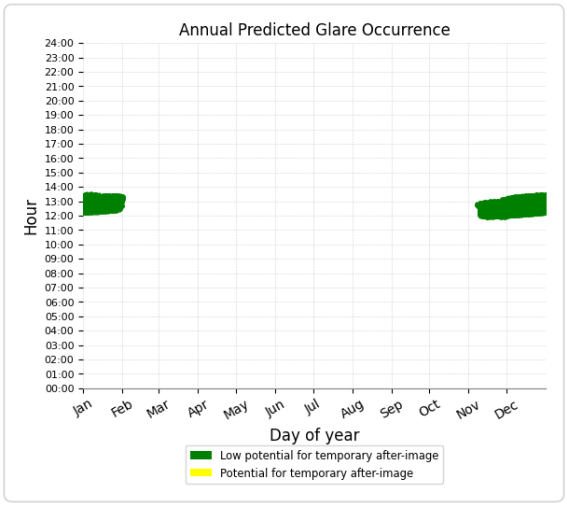


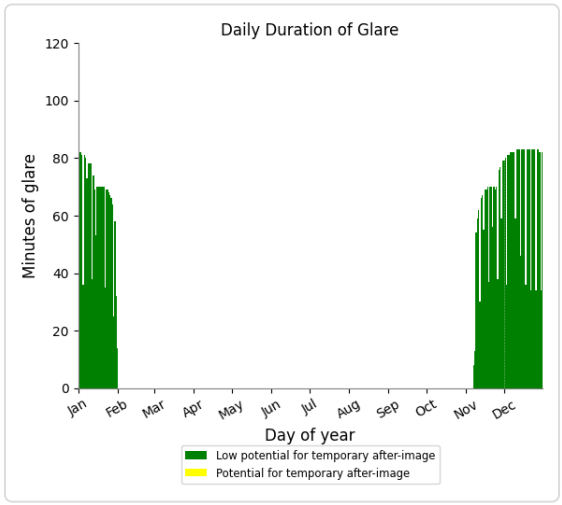


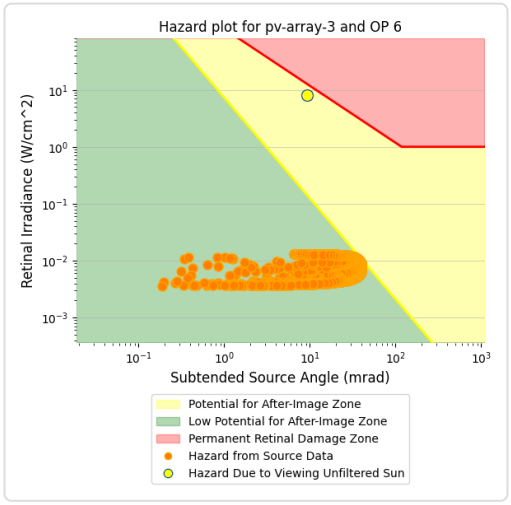
PV array 3 and OP 6

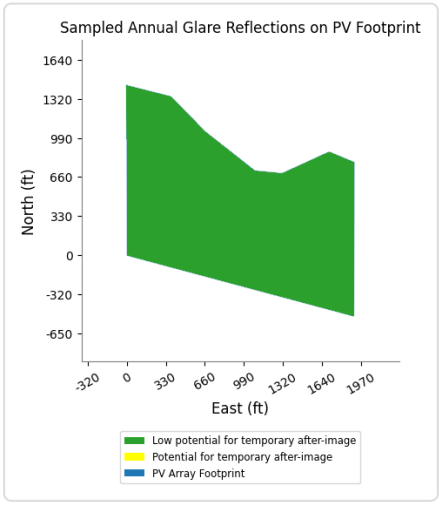
Yellow glare: none

Green glare: 5,692 min.





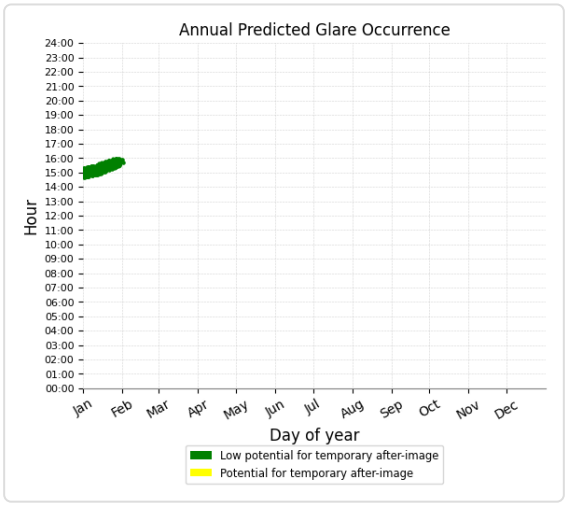


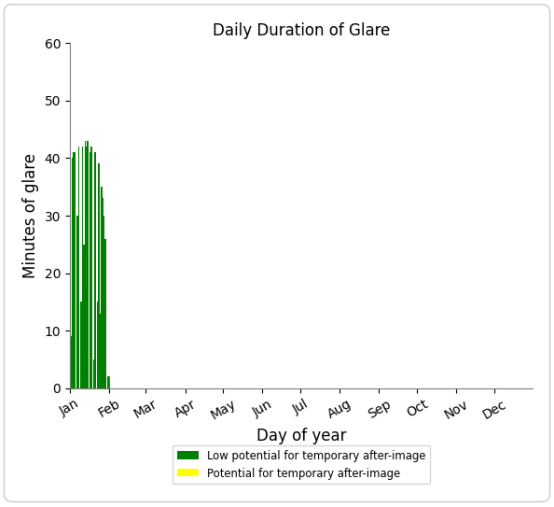


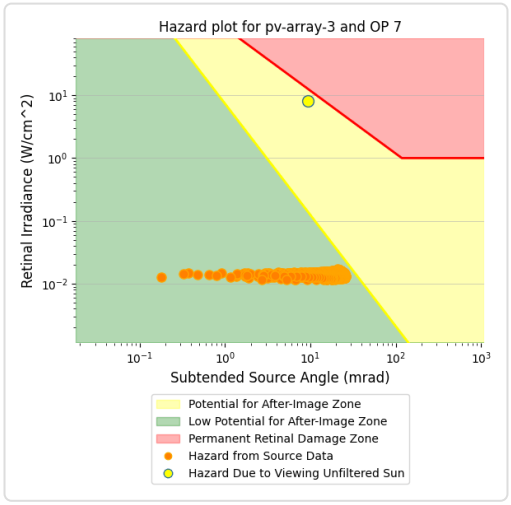
PV array 3 and OP 7

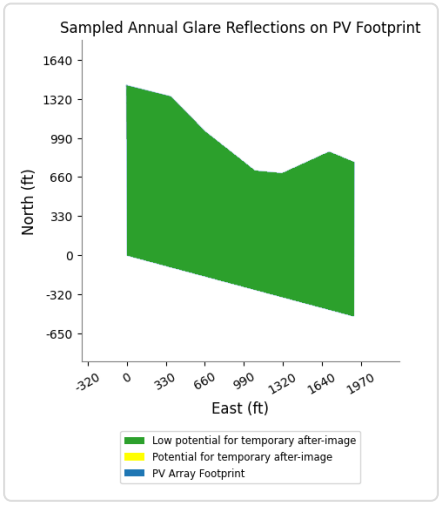
Yellow glare: none

Green glare: 777 min.





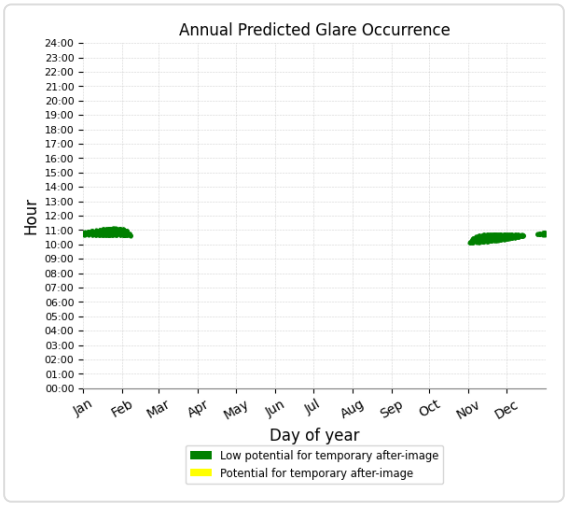


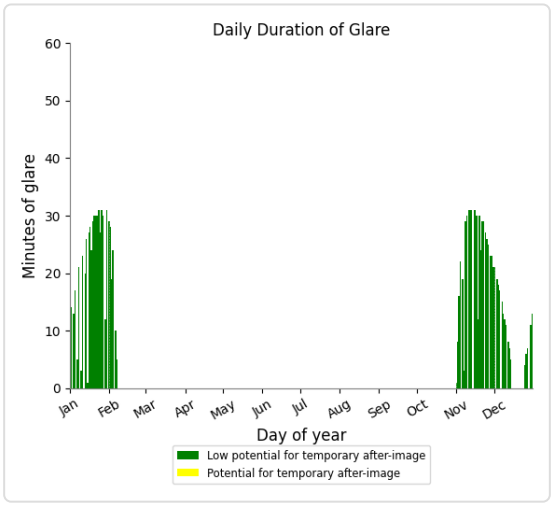


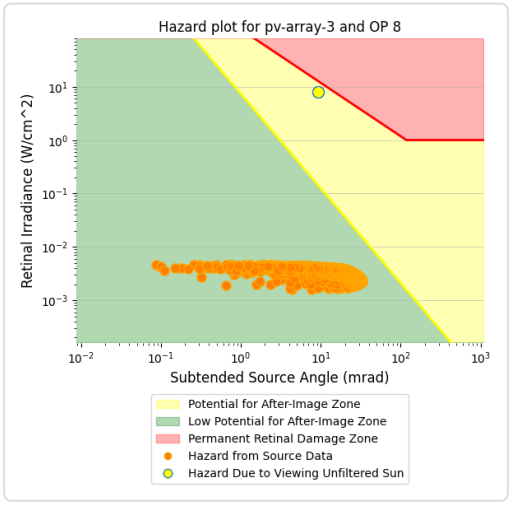
PV array 3 and OP 8

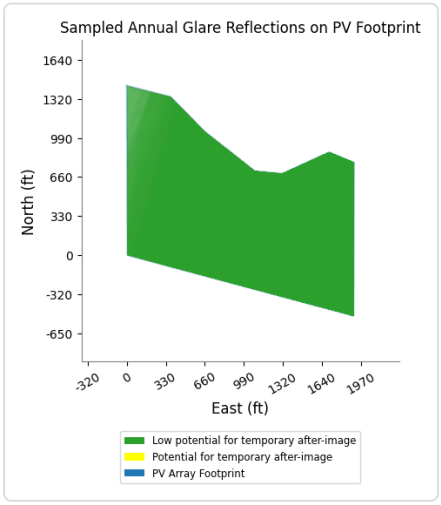
Yellow glare: none

Green glare: 1,441 min.





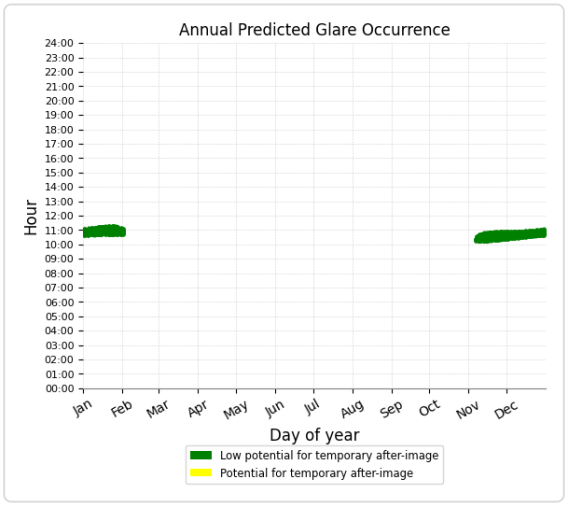


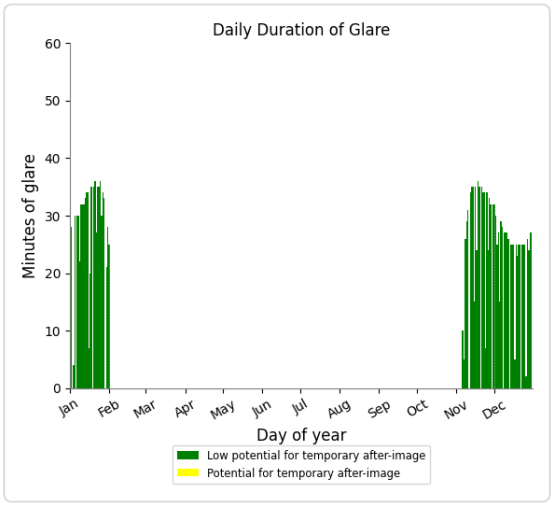


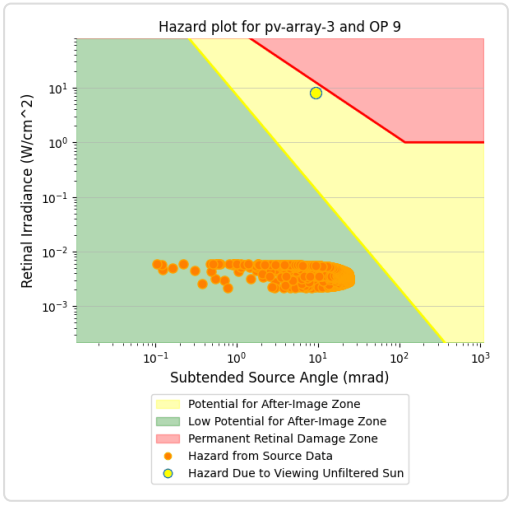
PV array 3 and OP 9

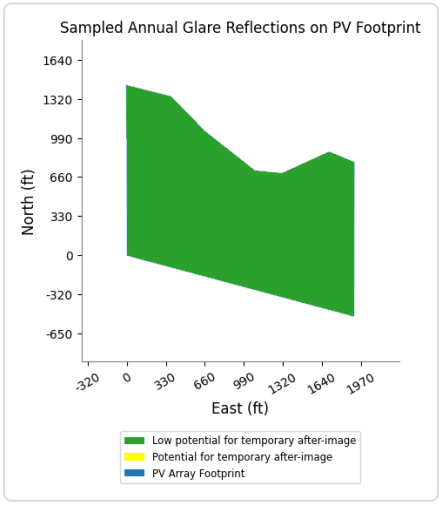
Yellow glare: none

Green glare: 2,072 min.





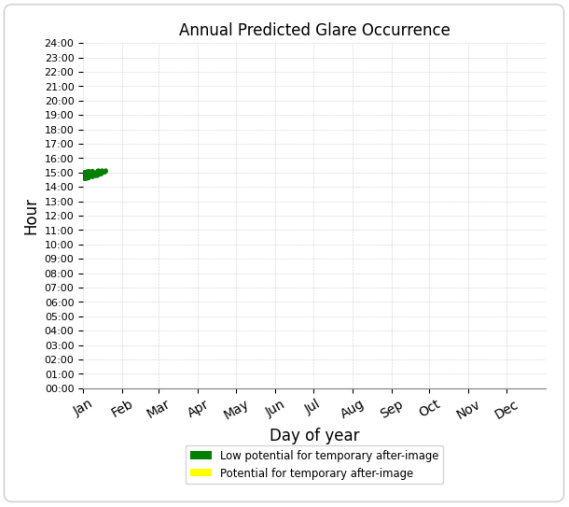


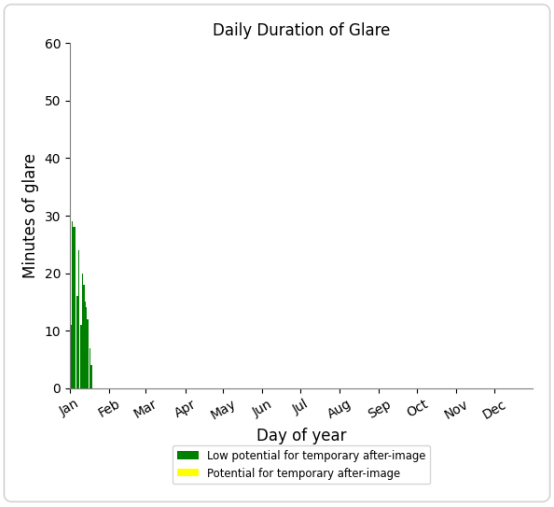


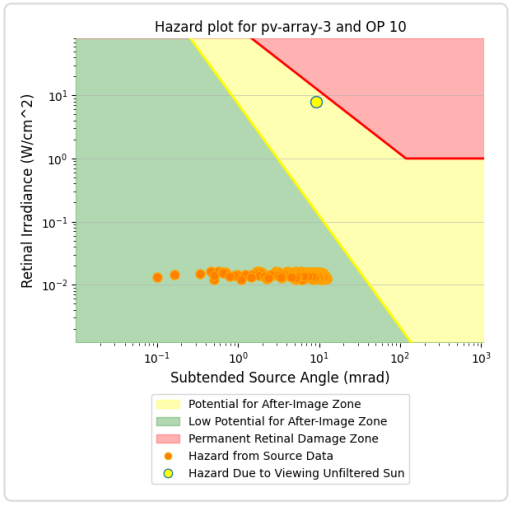
PV array 3 and OP 10

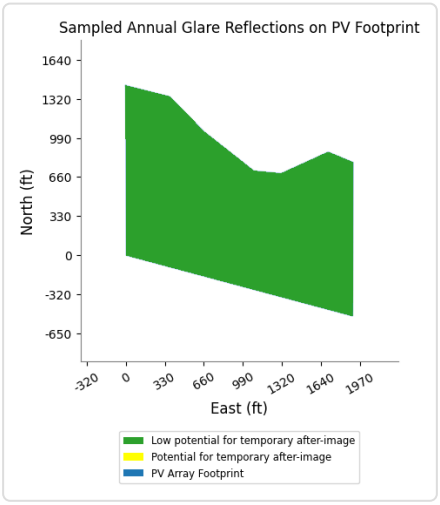
Yellow glare: none

Green glare: 268 min.





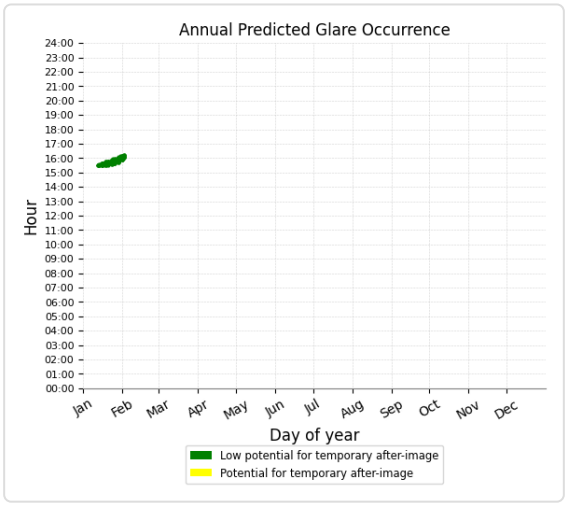


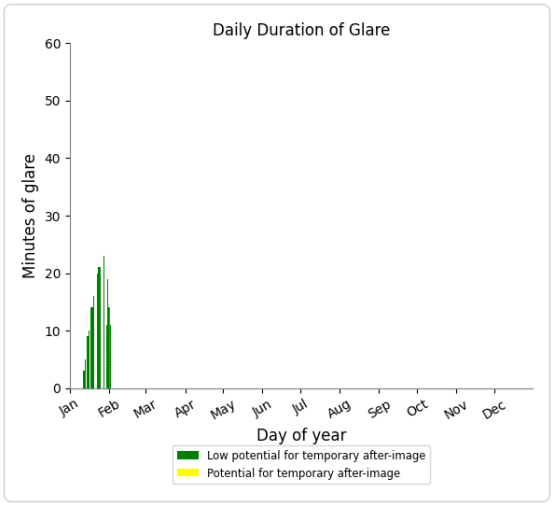


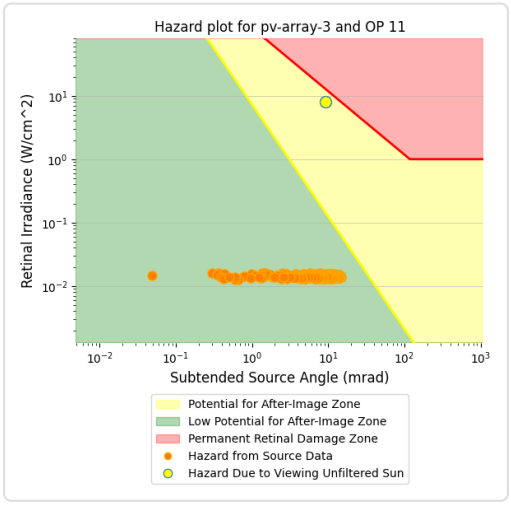
PV array 3 and OP 11

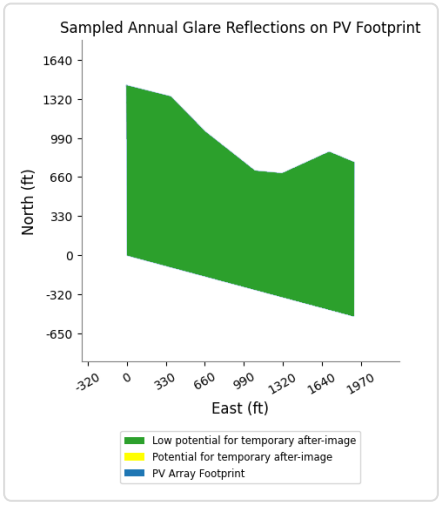
Yellow glare: none

Green glare: 211 min.





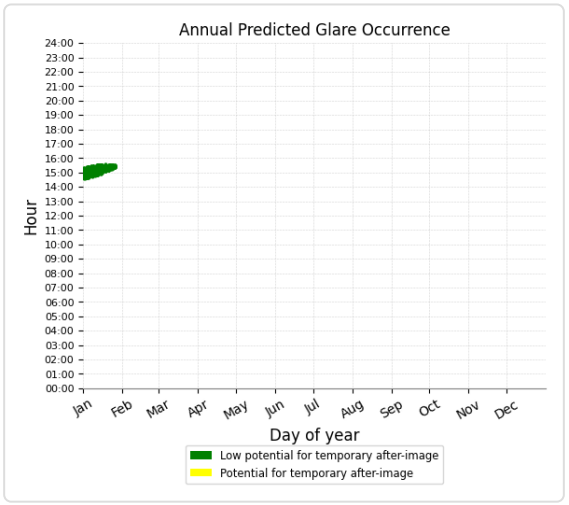


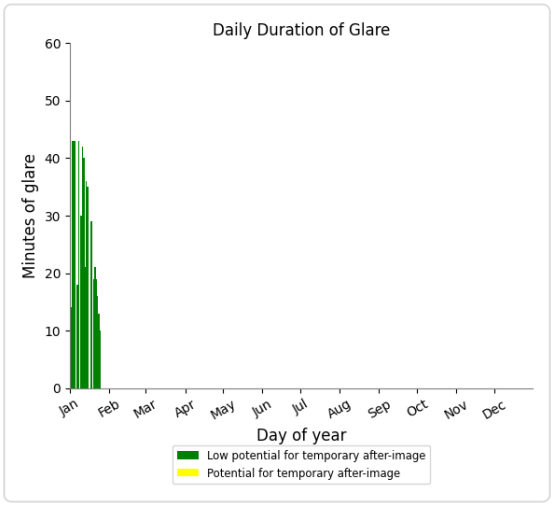


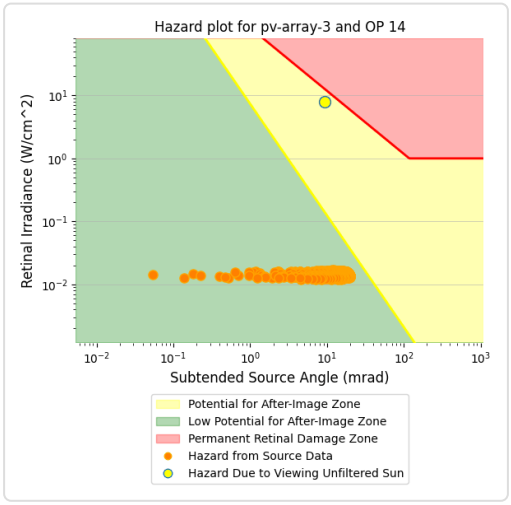
PV array 3 and OP 14

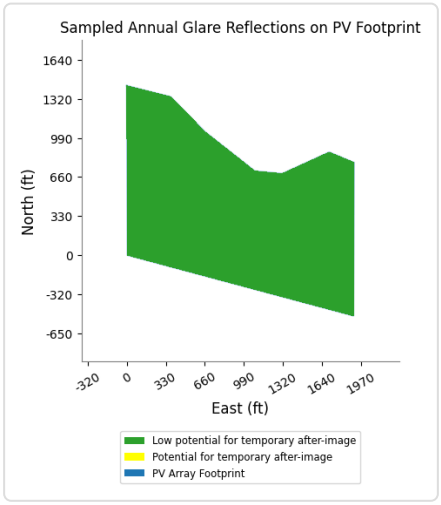
Yellow glare: none

Green glare: 577 min.









PV array 3 and OP 1

No glare found

PV array 3 and OP 2

No glare found

PV array 3 and OP 3

No glare found

PV array 3 and OP 12

No glare found

PV array 3 and OP 13

No glare found

PV array 3 and OP 15

No glare found

PV array 3 and OP 16

No glare found

PV array 3 and OP 17

No glare found

PV array 3 and OP 18

No glare found

PV array 3 and OP 19

No glare found

PV array 3 and OP 20

No glare found

PV array 3 and OP 21

No glare found

PV: PV array 4 potential temporary after-image

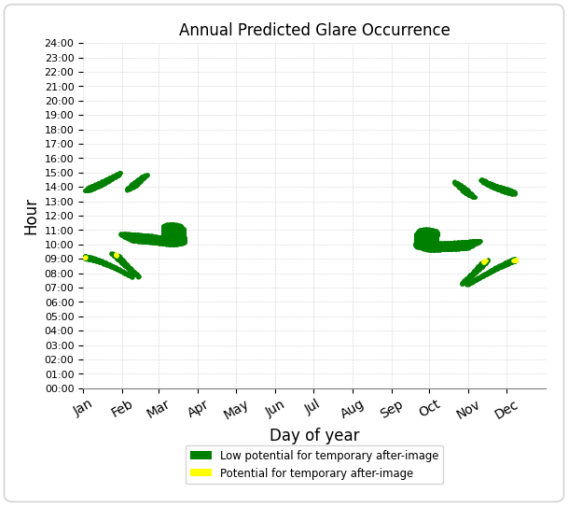
Receptor results ordered by category of glare

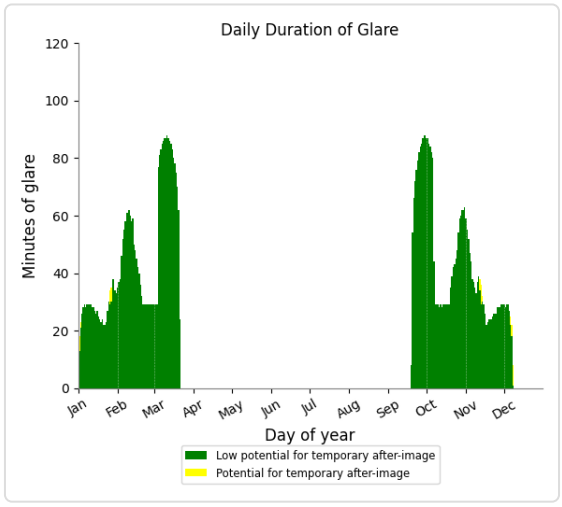
Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Medler Ln	7,091	118.2	44	0.7
N Klondike Rd	4,903	81.7	203	3.4
Webfoot Rd	1,290	21.5	31	0.5
Emigrant Springs Ln	2,429	40.5	0	0.0
Herin Ln - 1	5,354	89.2	0	0.0
Herin Ln - 2	1,385	23.1	0	0.0
Oehman Rd	8,275	137.9	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
OP 5	48	0.8	0	0.0
OP 6	2,045	34.1	0	0.0
OP 7	1,274	21.2	0	0.0
OP 8	2,443	40.7	0	0.0
OP 9	2,045	34.1	0	0.0
OP 10	728	12.1	0	0.0
OP 11	849	14.2	0	0.0
OP 14	796	13.3	0	0.0
OP 15	250	4.2	0	0.0
OP 16	57	0.9	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

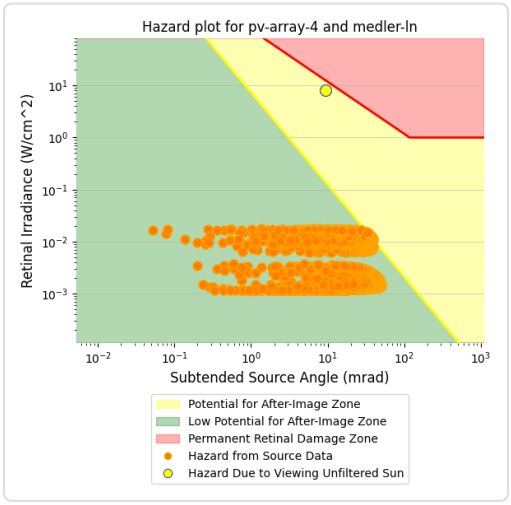
PV array 4 and Route: Medler Ln

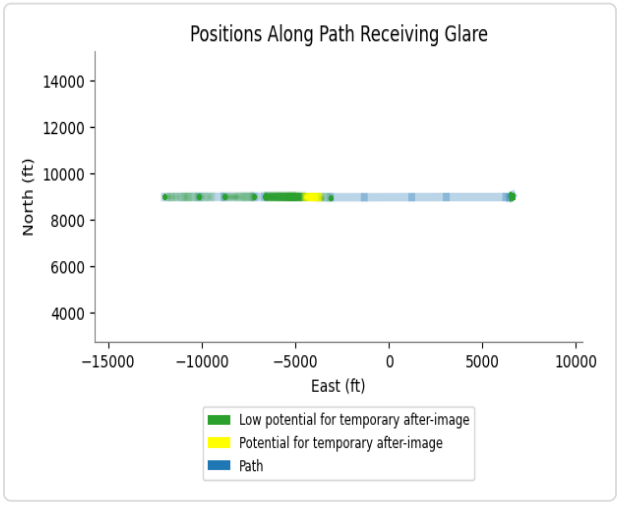
Yellow glare: 44 min.

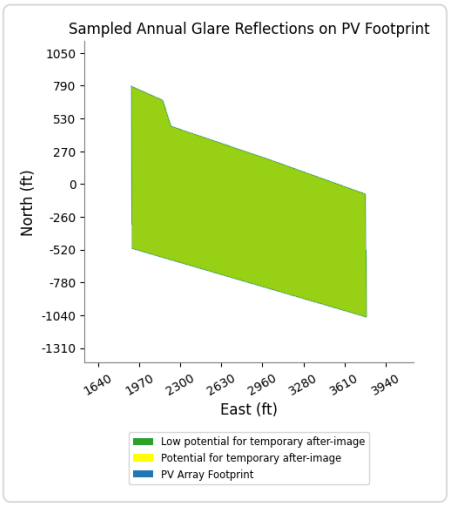
Green glare: 7,091 min.







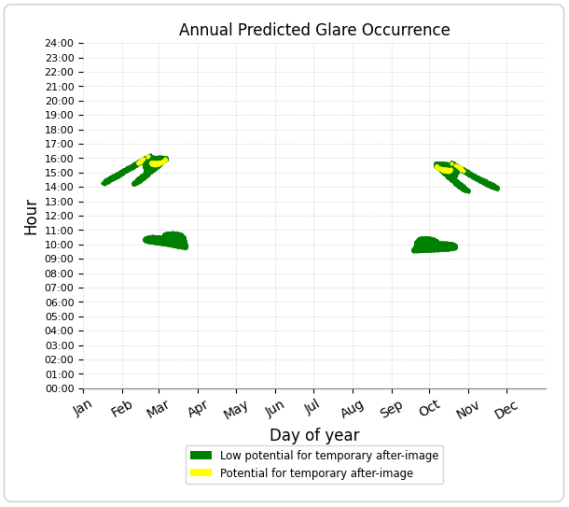


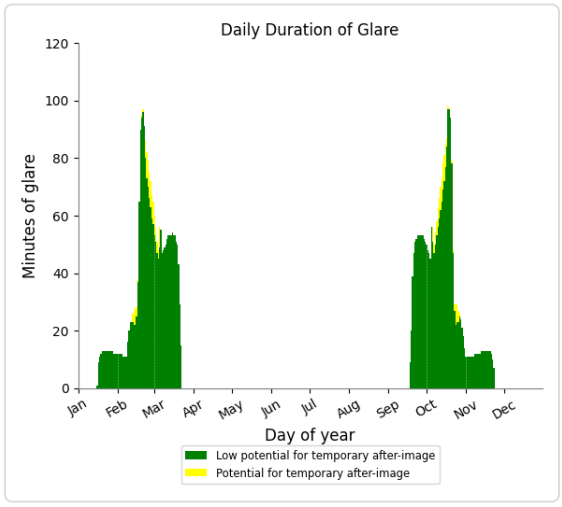


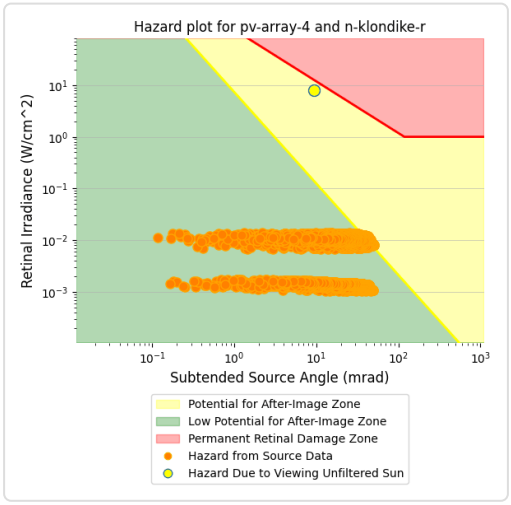
PV array 4 and Route: N Klondike Rd

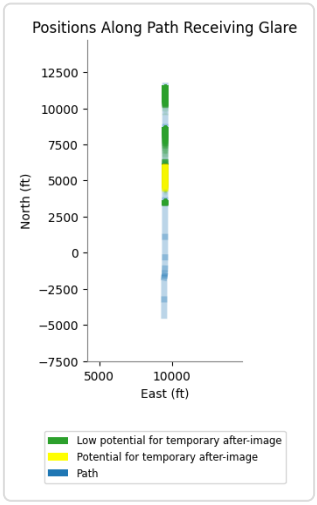
Yellow glare: 203 min.

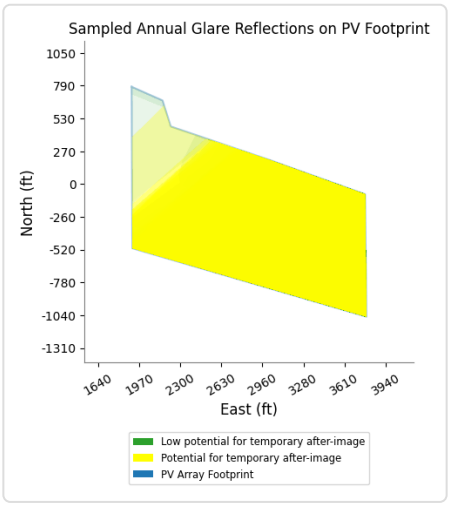
Green glare: 4,903 min.







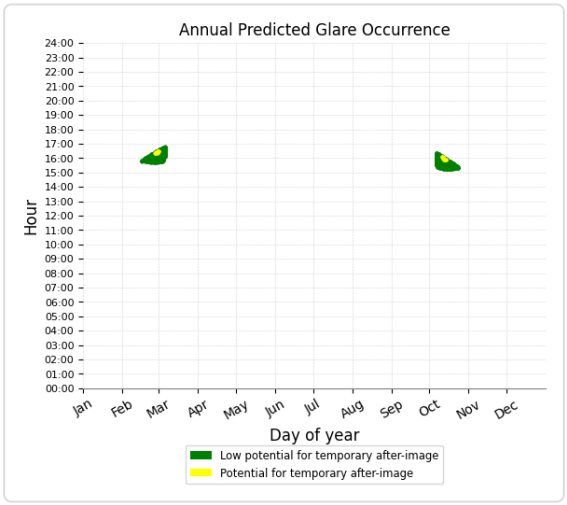


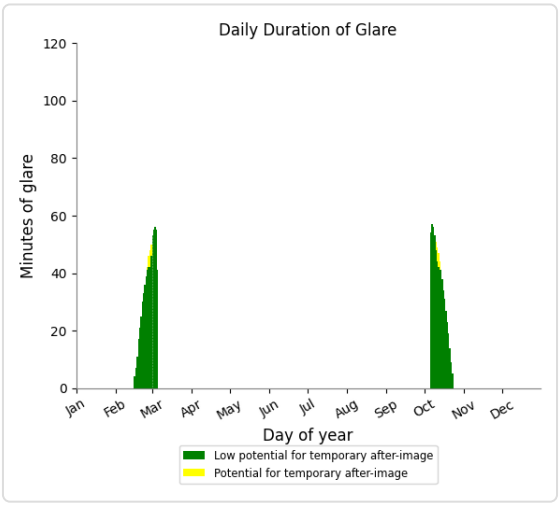


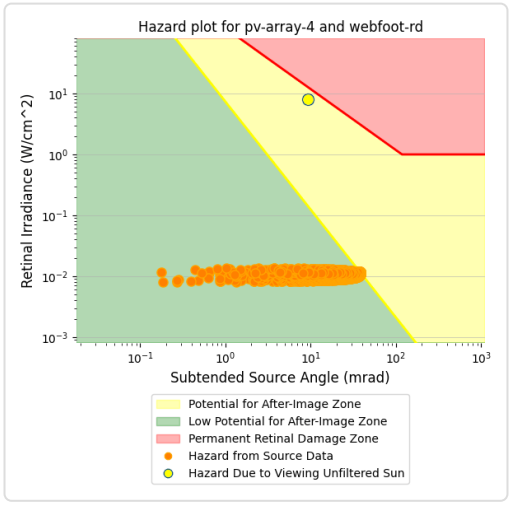
PV array 4 and Route: Webfoot Rd

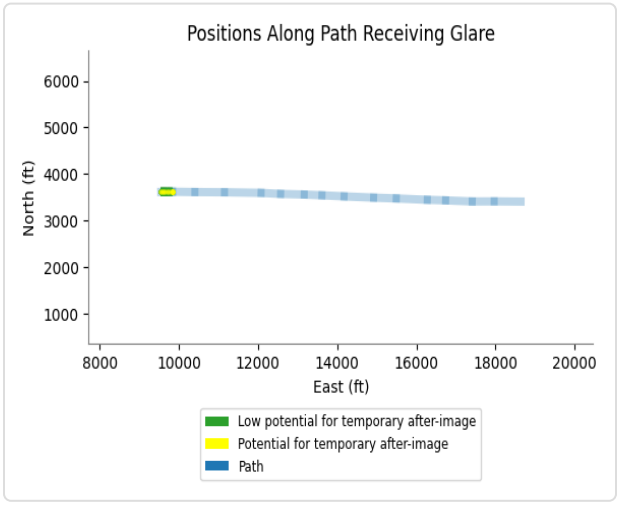
Yellow glare: 31 min.

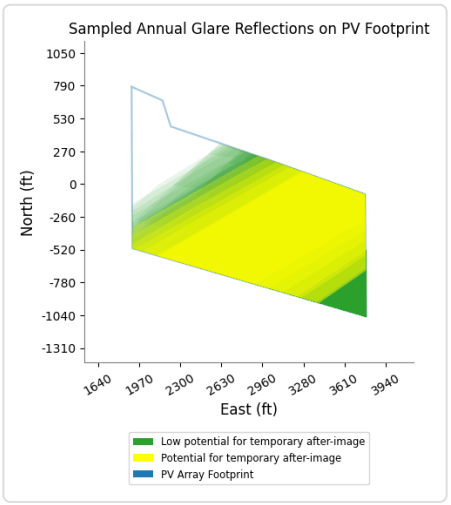
Green glare: 1,290 min.







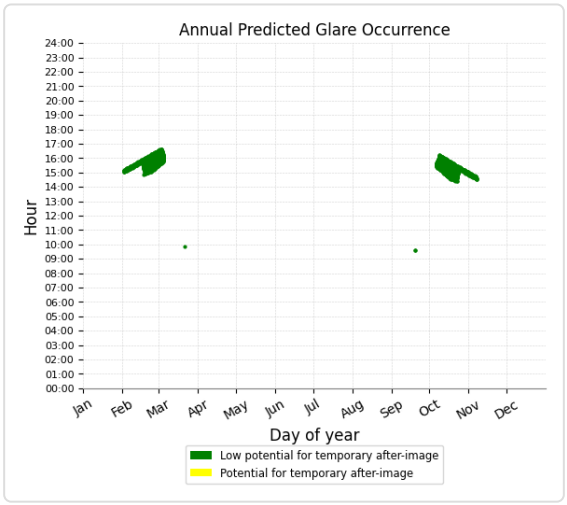


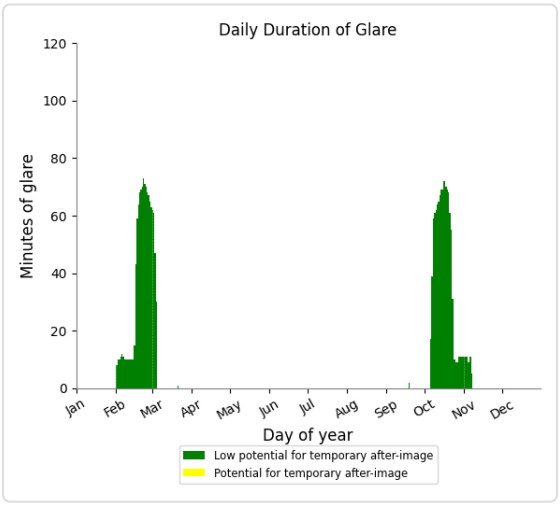


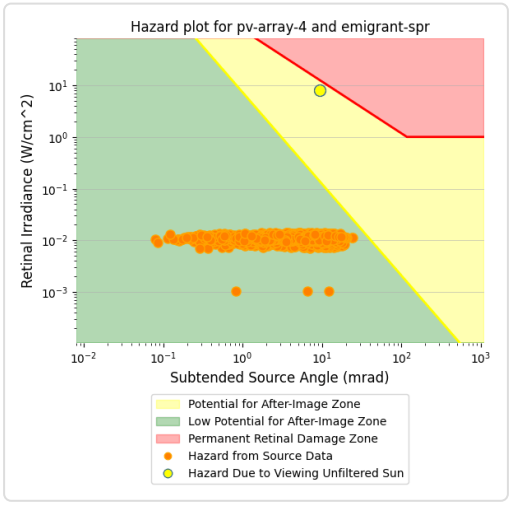
PV array 4 and Route: Emigrant Springs Ln

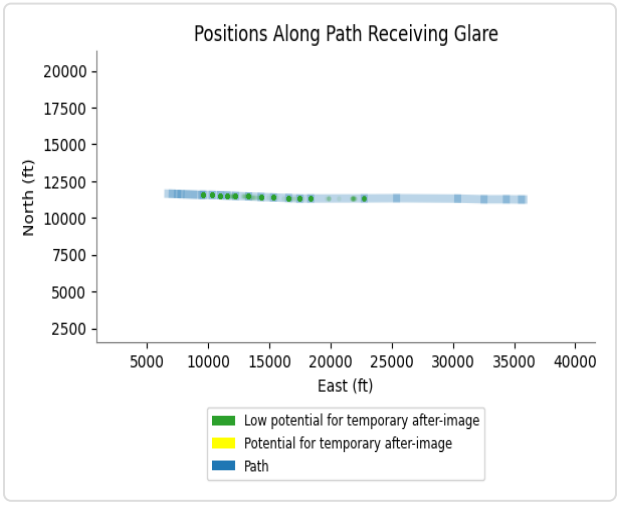
Yellow glare: none

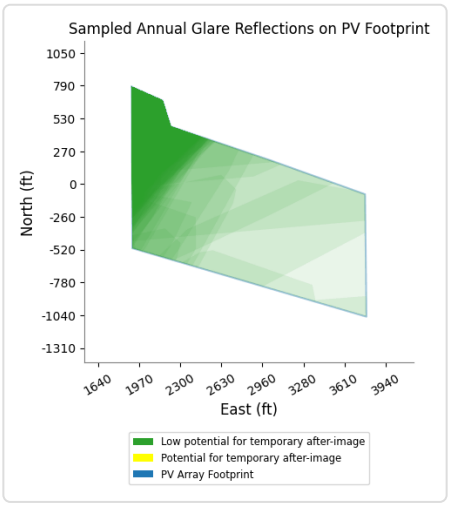
Green glare: 2,429 min.







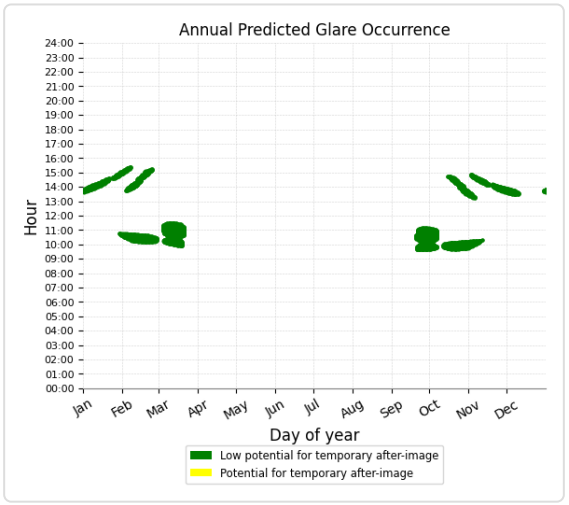


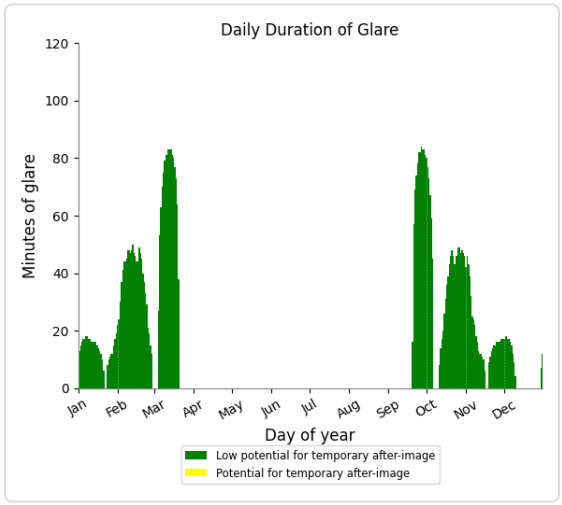


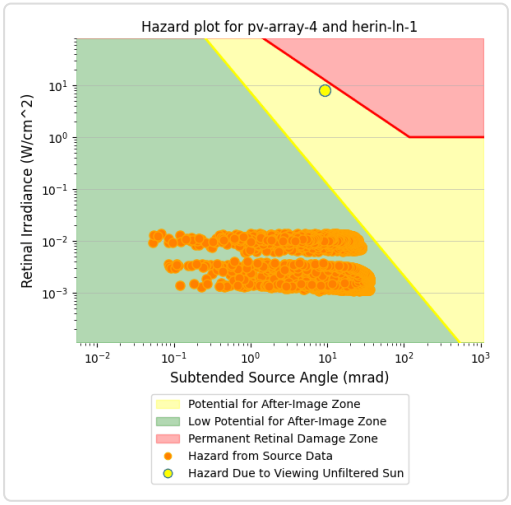
PV array 4 and Route: Herin Ln - 1

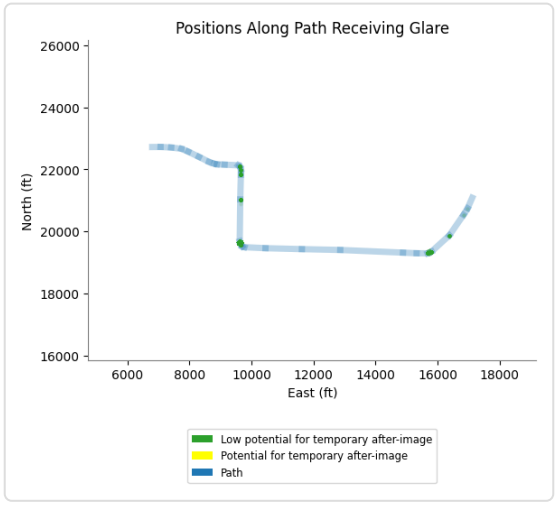
Yellow glare: none

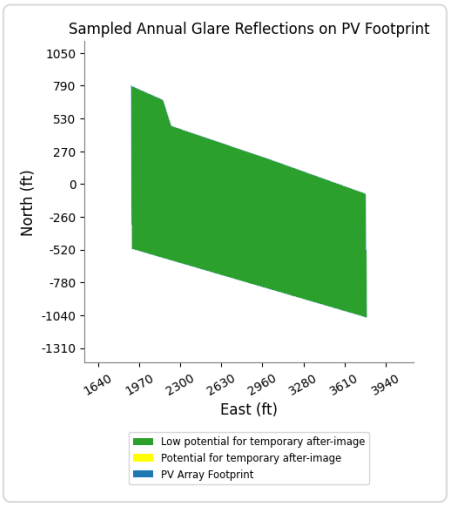
Green glare: 5,354 min.







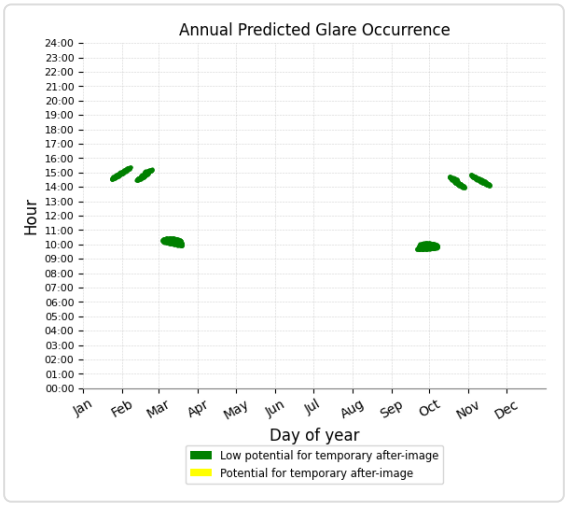


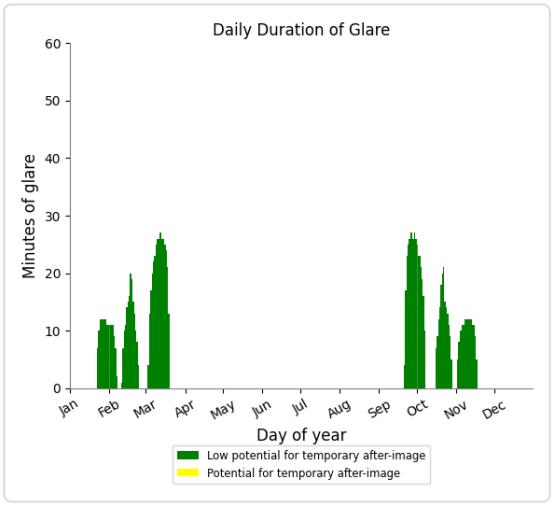


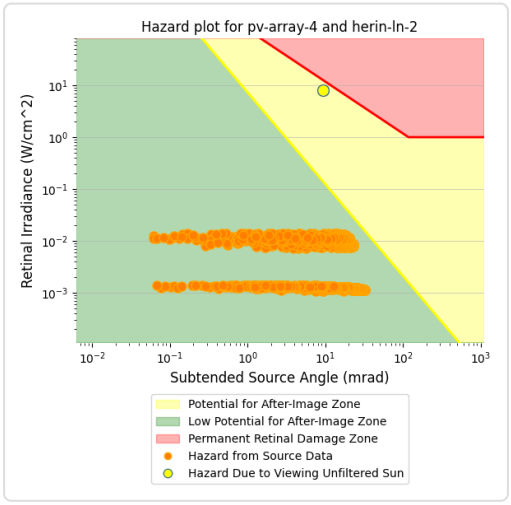
PV array 4 and Route: Herin Ln - 2

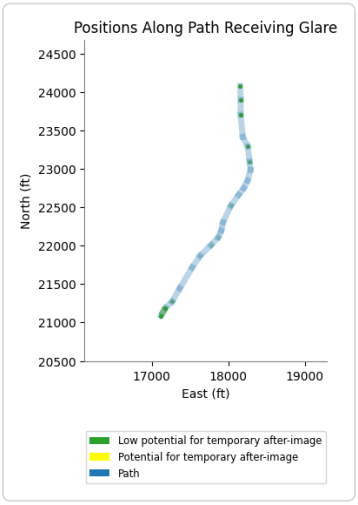
Yellow glare: none

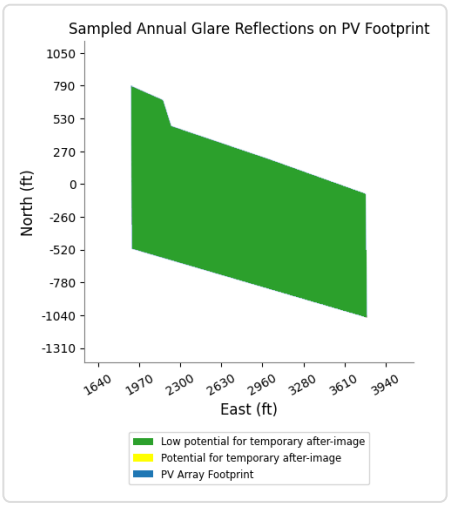
Green glare: 1,385 min.







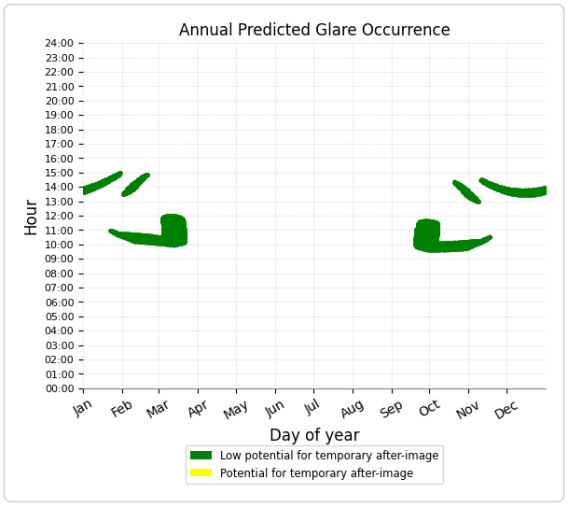


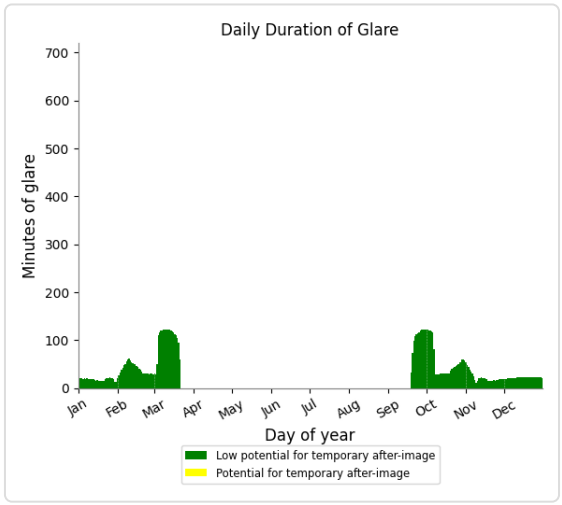


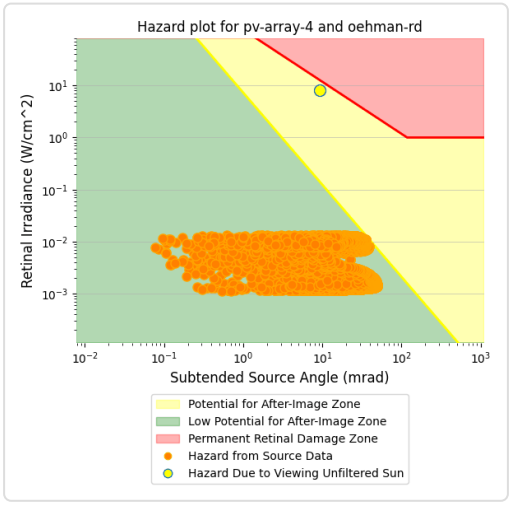
PV array 4 and Route: Oehman Rd

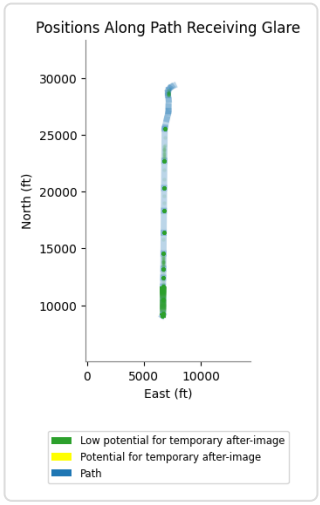
Yellow glare: none

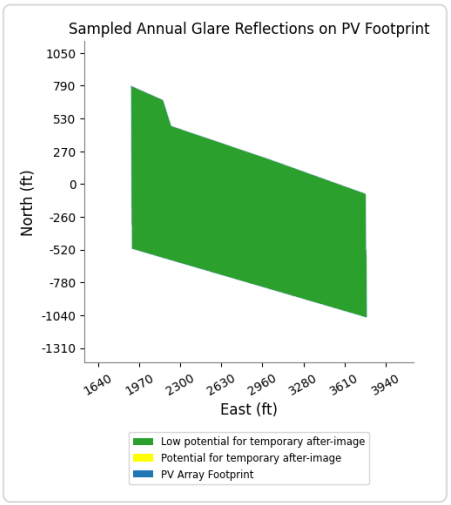
Green glare: 8,275 min.











PV array 4 and Route: Hwy 206

No glare found

PV array 4 and Route: I97

No glare found

PV array 4 and Route: Klondike Rd

No glare found

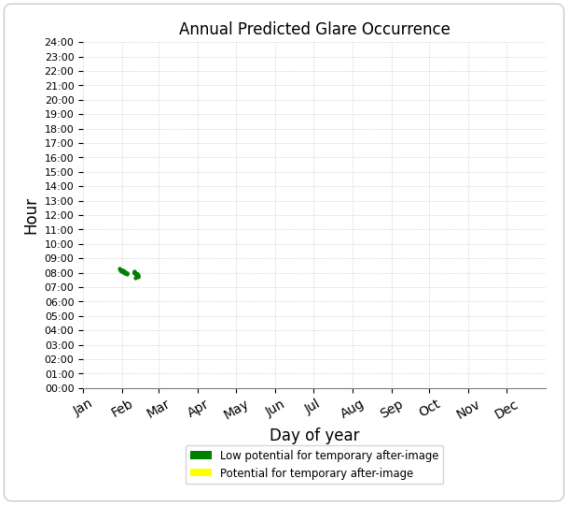
PV array 4 and Route: Old Wasco-Heppner Hwy

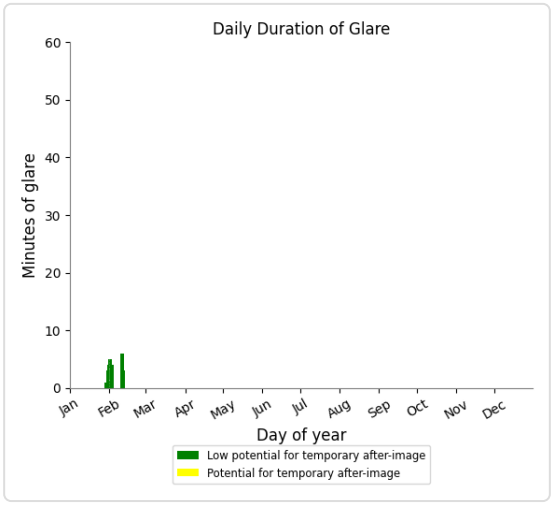
No glare found

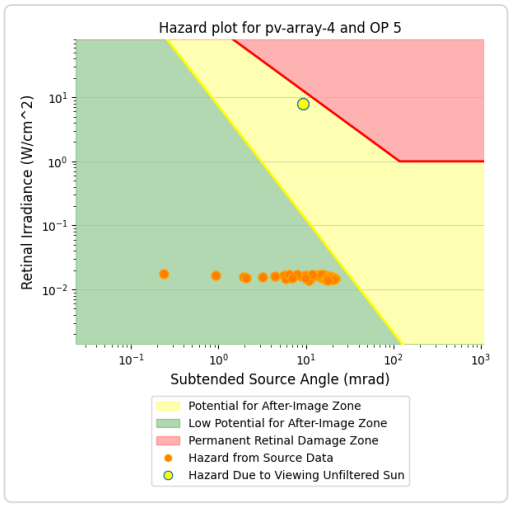
PV array 4 and OP 5

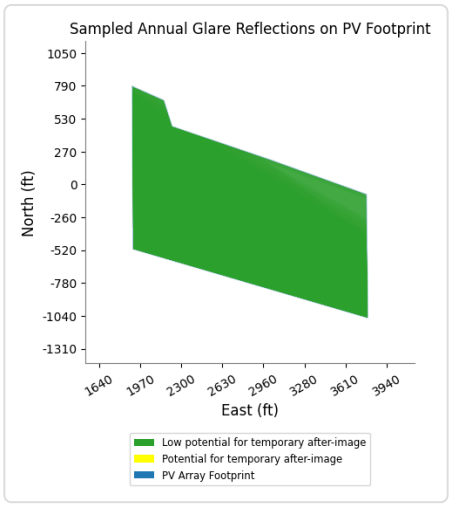
Yellow glare: none

Green glare: 48 min.





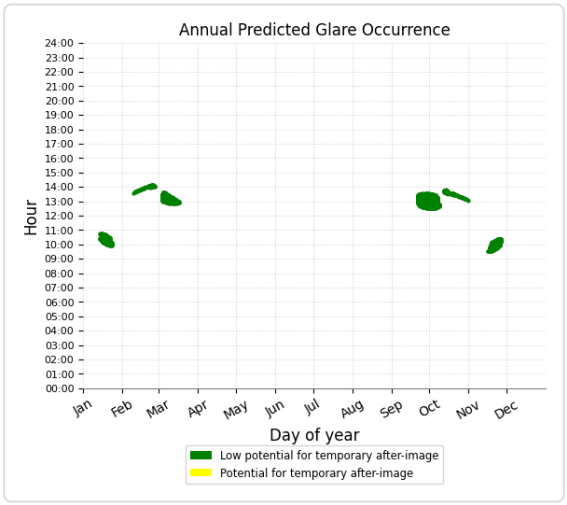


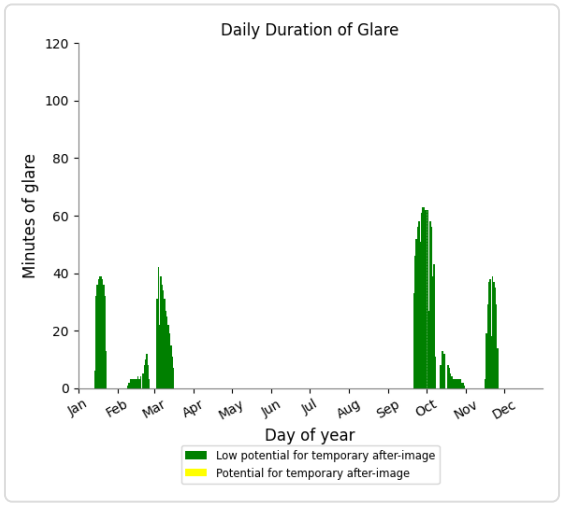


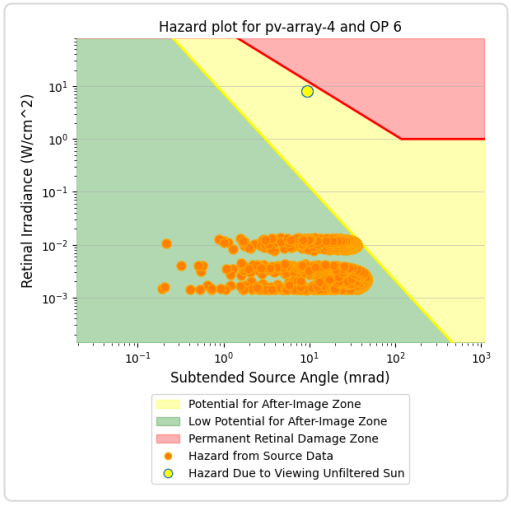
PV array 4 and OP 6

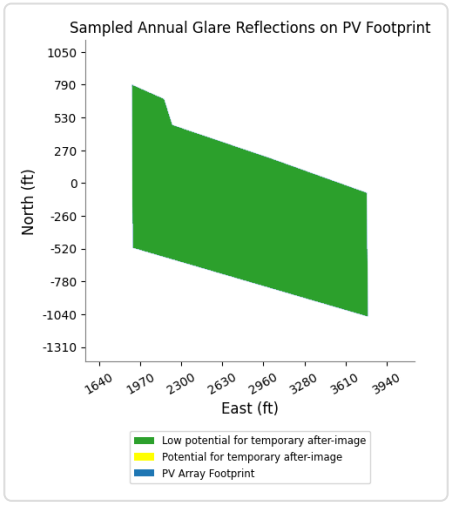
Yellow glare: none

Green glare: 2,045 min.





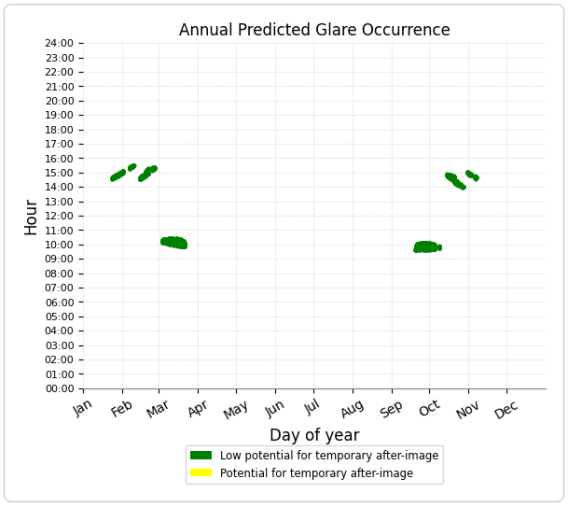


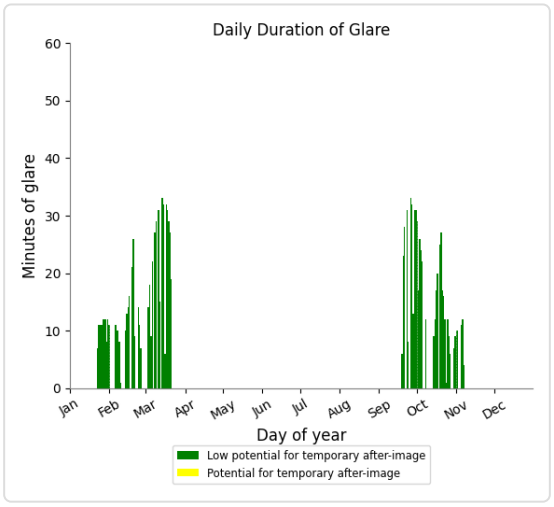


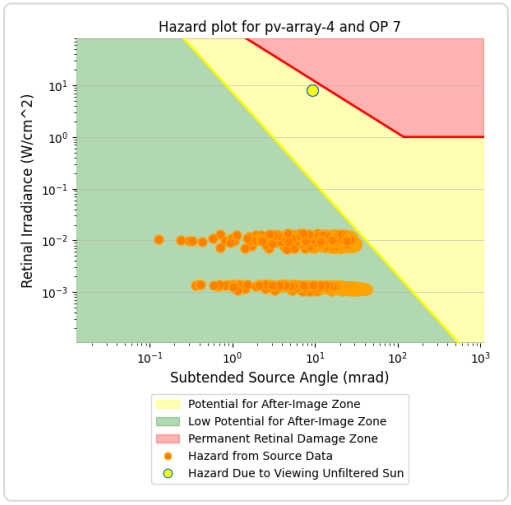
PV array 4 and OP 7

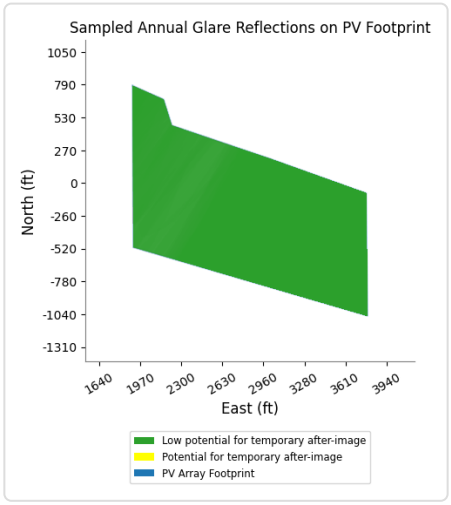
Yellow glare: none

Green glare: 1,274 min.





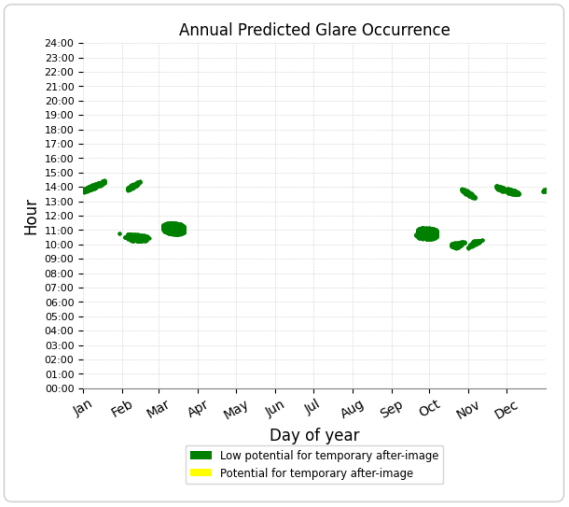


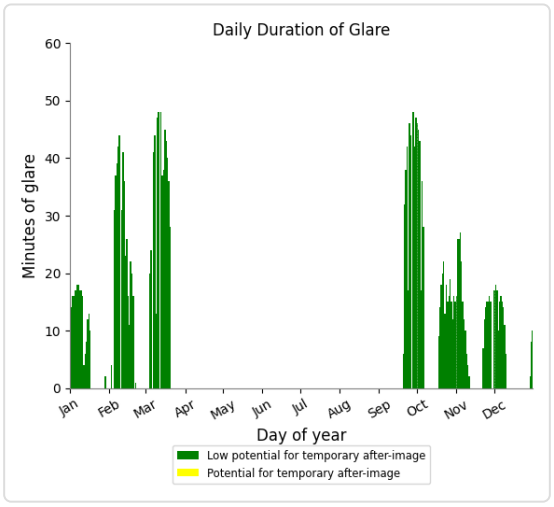


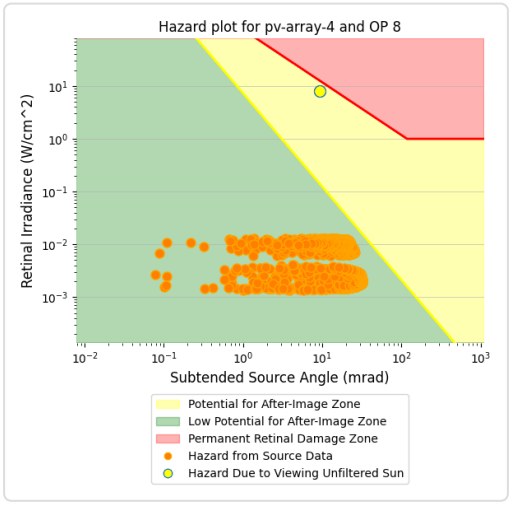
PV array 4 and OP 8

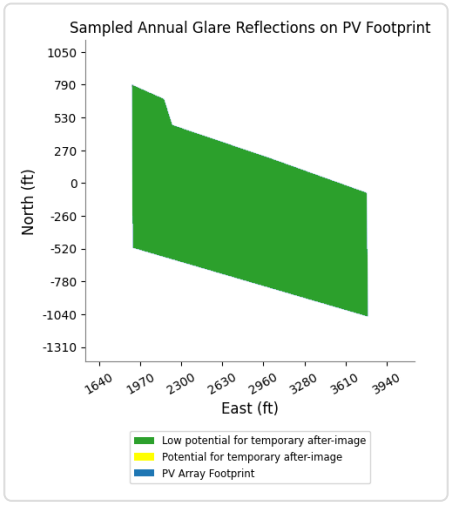
Yellow glare: none

Green glare: 2,443 min.





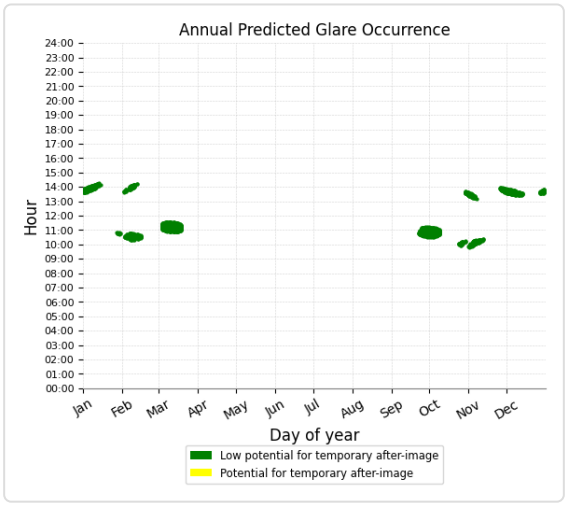


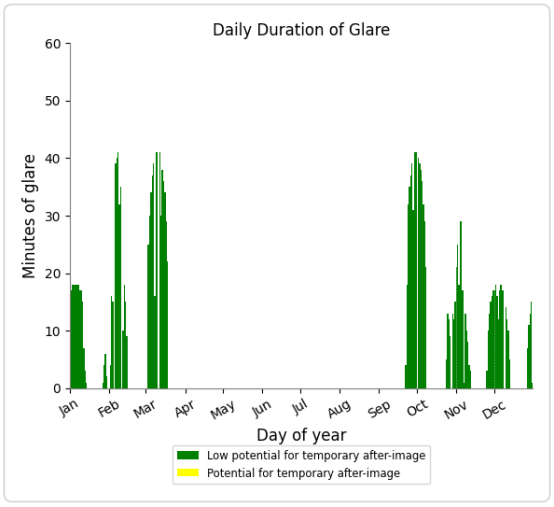


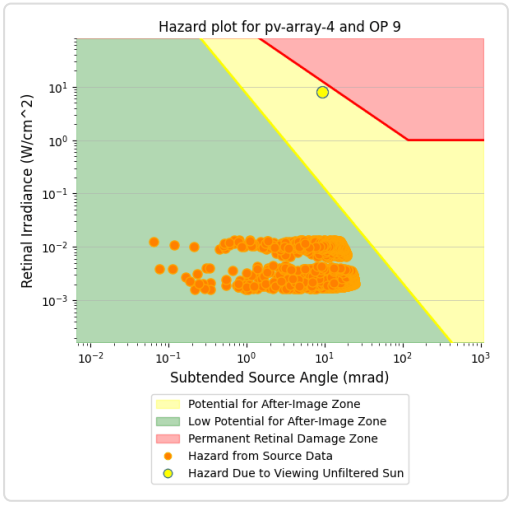
PV array 4 and OP 9

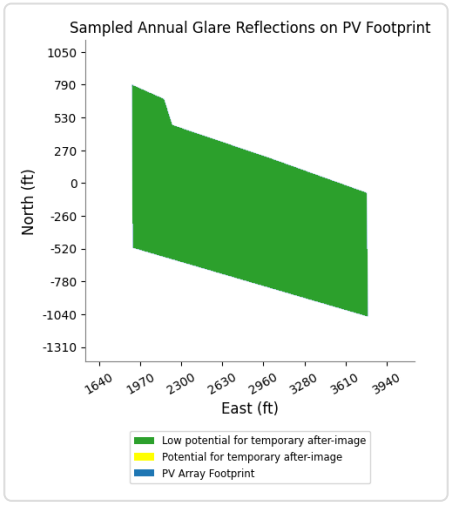
Yellow glare: none

Green glare: 2,045 min.





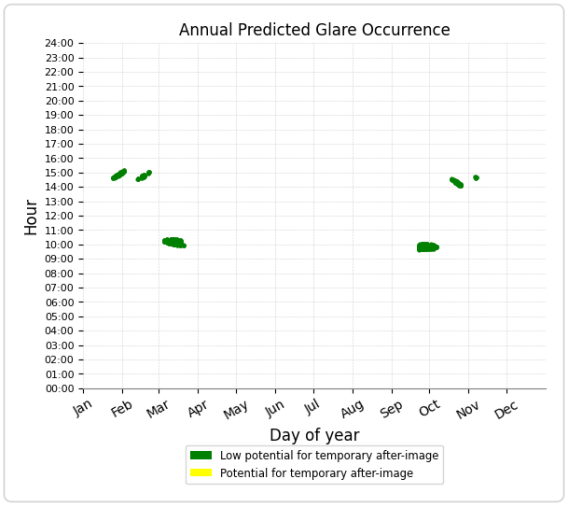


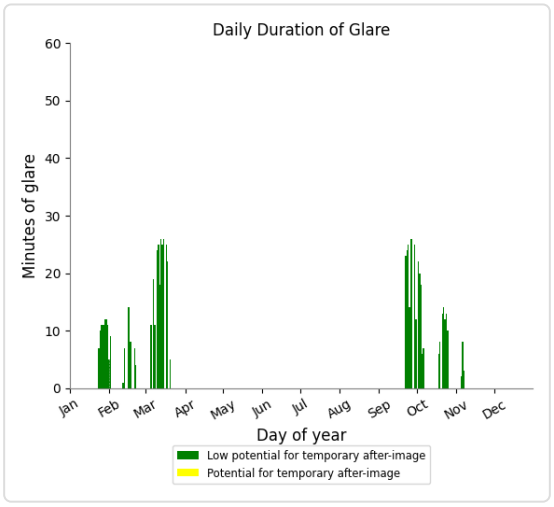


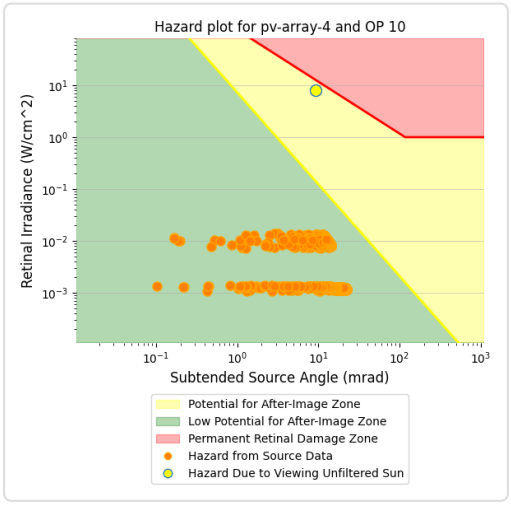
PV array 4 and OP 10

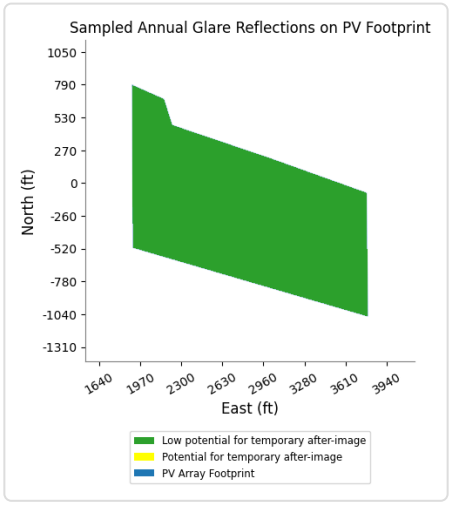
Yellow glare: none

Green glare: 728 min.





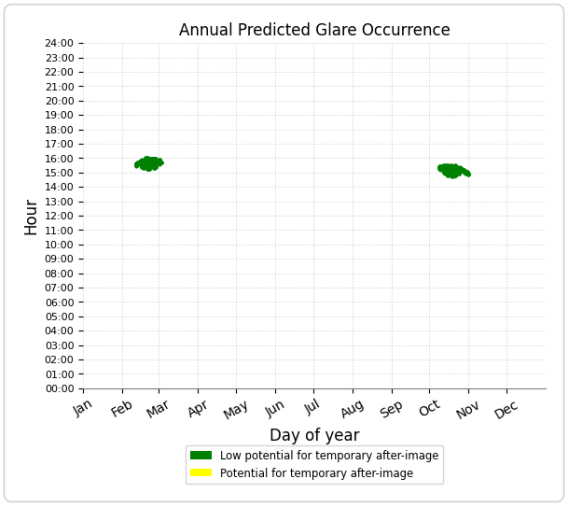


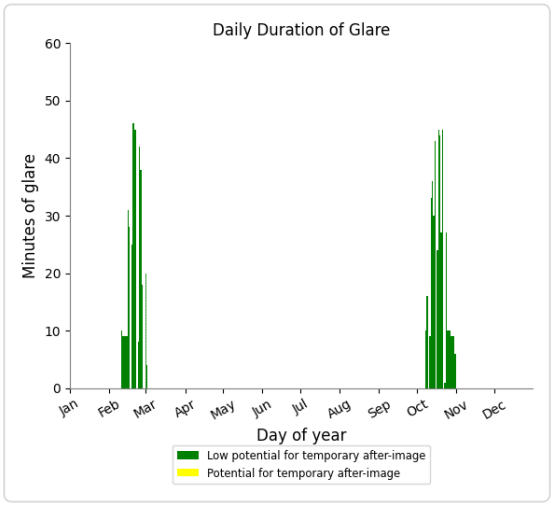


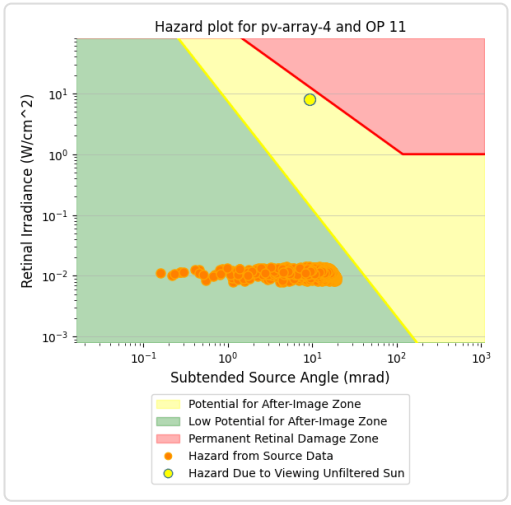
PV array 4 and OP 11

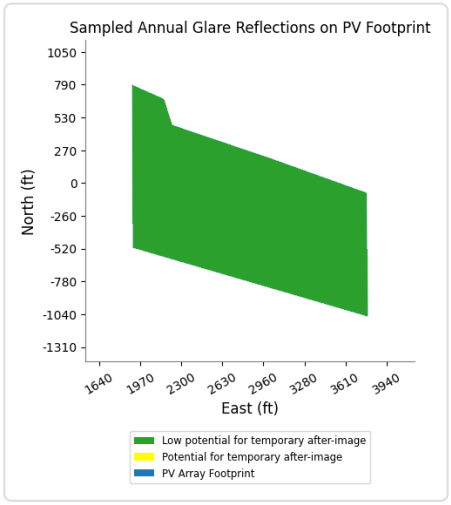
Yellow glare: none

Green glare: 849 min.





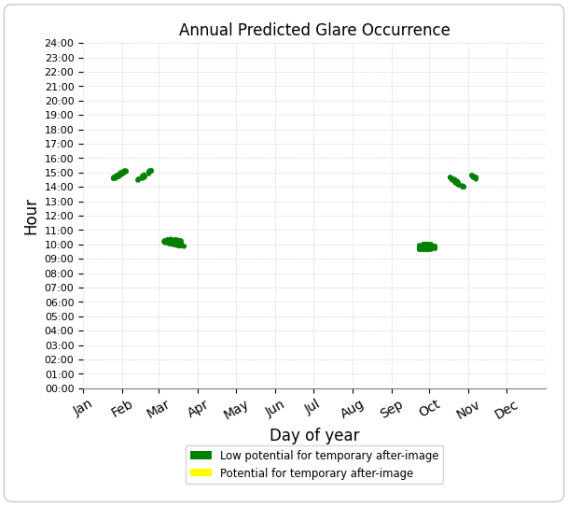


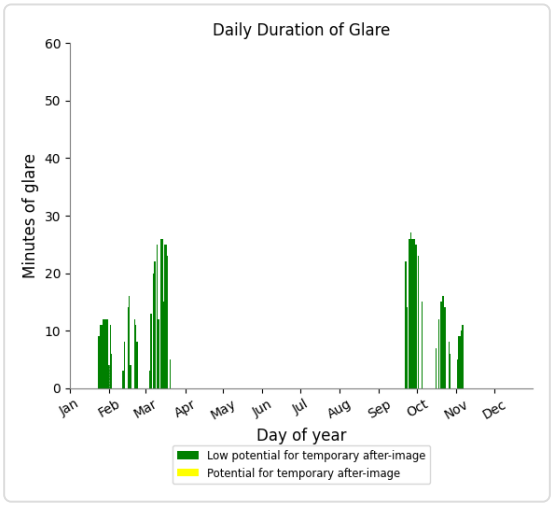


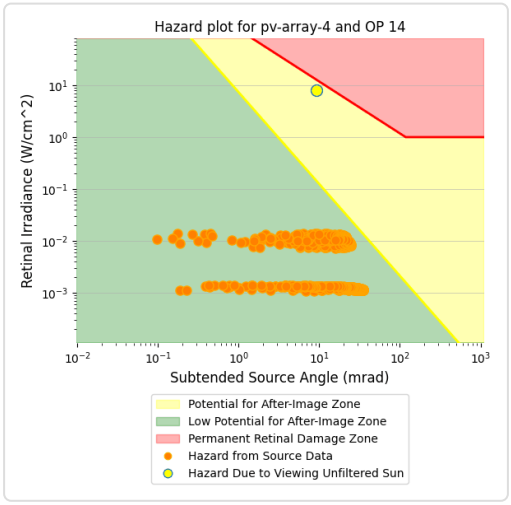
PV array 4 and OP 14

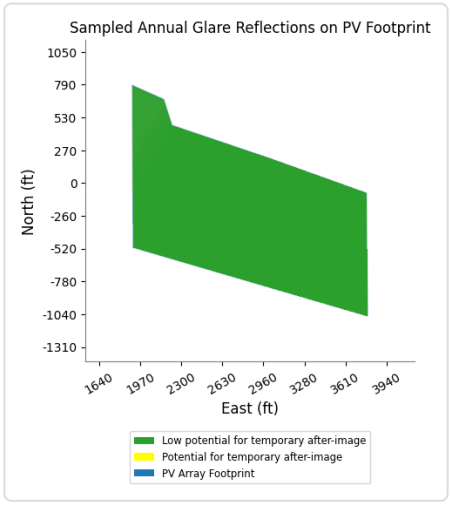
Yellow glare: none

Green glare: 796 min.





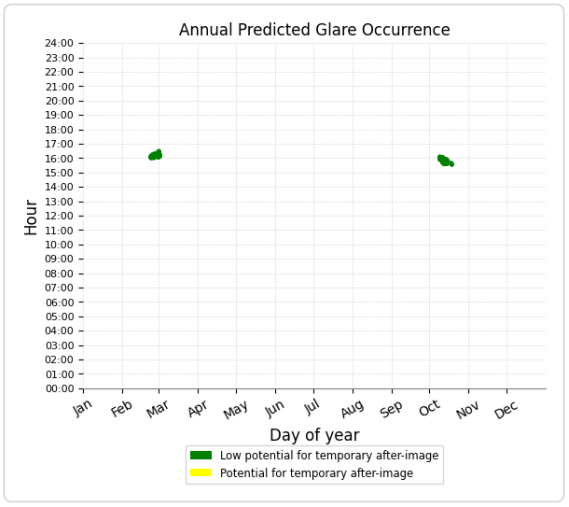


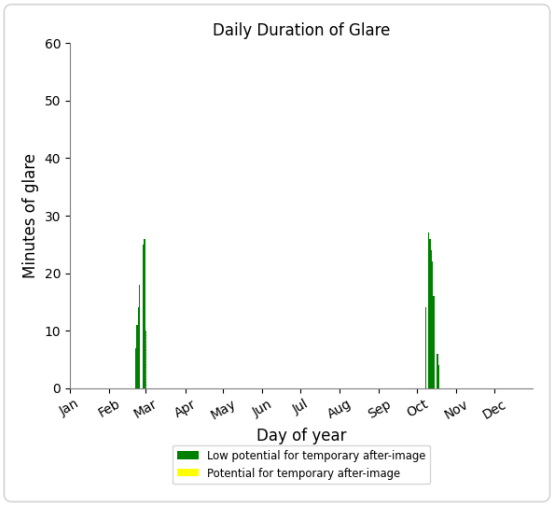


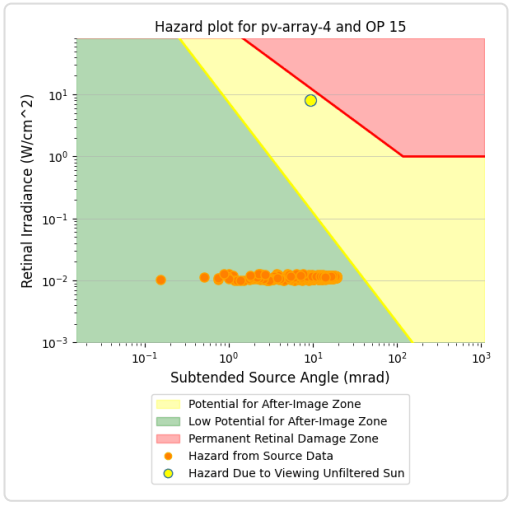
PV array 4 and OP 15

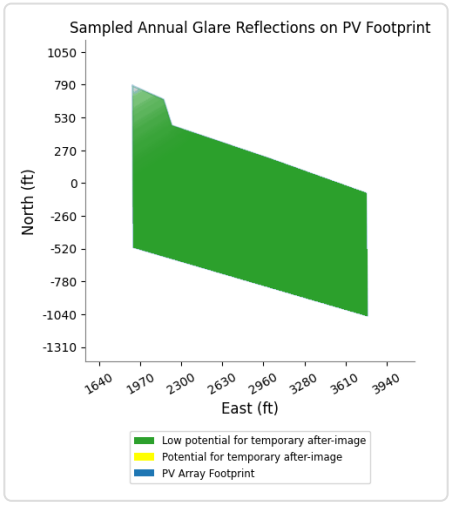
Yellow glare: none

Green glare: 250 min.



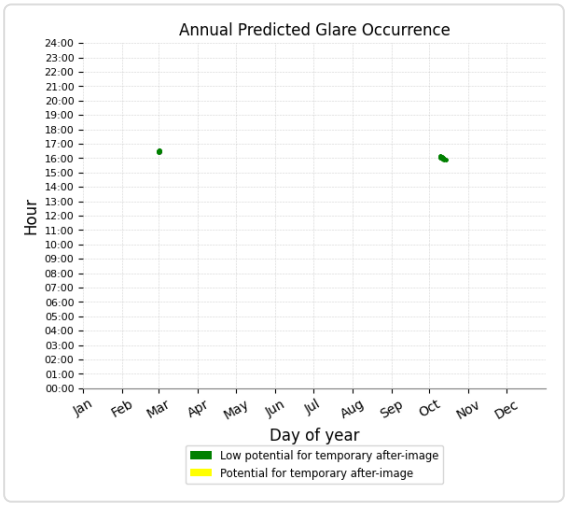


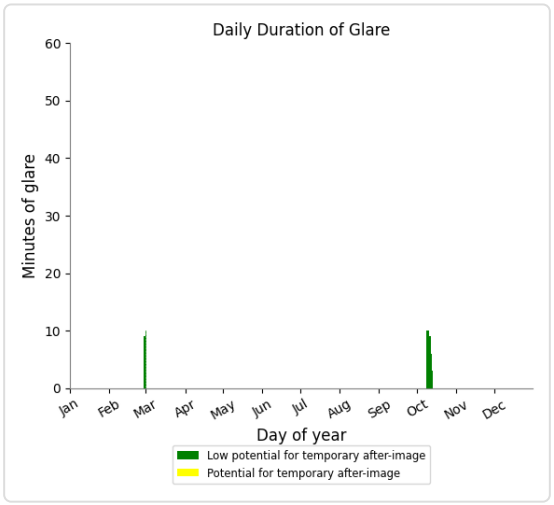


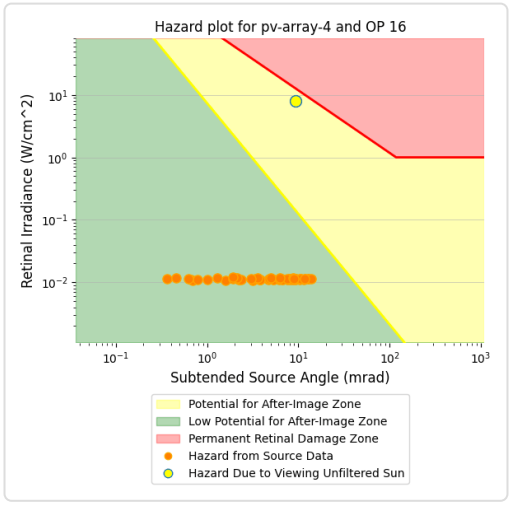


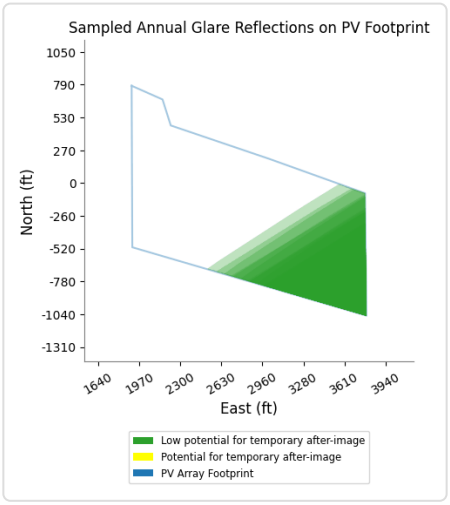
PV array 4 and OP 16

Yellow glare: none
Green glare: 57 min.









PV array 4 and OP 1

No glare found

PV array 4 and OP 2

No glare found

PV array 4 and OP 3

No glare found

PV array 4 and OP 4

No glare found

PV array 4 and OP 12

No glare found

PV array 4 and OP 13

No glare found

PV array 4 and OP 17

No glare found

PV array 4 and OP 18

No glare found

PV array 4 and OP 19

No glare found

PV array 4 and OP 20

No glare found

PV array 4 and OP 21

No glare found

PV: PV array 5 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV array 5 and Route: Emigrant Springs Ln

No glare found

PV array 5 and Route: Herin Ln - 1

No glare found

PV array 5 and Route: Herin Ln - 2

No glare found

PV array 5 and Route: Hwy 206

No glare found

PV array 5 and Route: I97

No glare found

PV array 5 and Route: Klondike Rd

No glare found

PV array 5 and Route: Medler Ln

No glare found

PV array 5 and Route: N Klondike Rd

No glare found

PV array 5 and Route: Oehman Rd

No glare found

PV array 5 and Route: Old Wasco-Heppner Hwy

No glare found

PV array 5 and Route: Webfoot Rd

No glare found

PV array 5 and OP 1

No glare found

PV array 5 and OP 2

No glare found

PV array 5 and OP 3

No glare found

PV array 5 and OP 4

No glare found

PV array 5 and OP 5

No glare found

PV array 5 and OP 6

No glare found

PV array 5 and OP 7

No glare found

PV array 5 and OP 8

No glare found

PV array 5 and OP 9

No glare found

PV array 5 and OP 10

No glare found

PV array 5 and OP 11

No glare found

PV array 5 and OP 12

No glare found

PV array 5 and OP 13

No glare found

PV array 5 and OP 14

No glare found

PV array 5 and OP 15

No glare found

PV array 5 and OP 16

No glare found

PV array 5 and OP 17

No glare found

PV array 5 and OP 18

No glare found

PV array 5 and OP 19

No glare found

PV array 5 and OP 20

No glare found

PV array 5 and OP 21

No glare found

PV: PV array 6 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV array 6 and Route: Emigrant Springs Ln

No glare found

PV array 6 and Route: Herin Ln - 1

No glare found

PV array 6 and Route: Herin Ln - 2

No glare found

PV array 6 and Route: Hwy 206

No glare found

PV array 6 and Route: I97

No glare found

PV array 6 and Route: Klondike Rd

No glare found

PV array 6 and Route: Medler Ln

No glare found

PV array 6 and Route: N Klondike Rd

No glare found

PV array 6 and Route: Oehman Rd

No glare found

PV array 6 and Route: Old Wasco-Heppner Hwy

No glare found

PV array 6 and Route: Webfoot Rd

No glare found

PV array 6 and OP 1

No glare found

PV array 6 and OP 2

No glare found

PV array 6 and OP 3

No glare found

PV array 6 and OP 4

No glare found

PV array 6 and OP 5

No glare found

PV array 6 and OP 6

No glare found

PV array 6 and OP 7

No glare found

PV array 6 and OP 8

No glare found

PV array 6 and OP 9

No glare found

PV array 6 and OP 10

No glare found

PV array 6 and OP 11

No glare found

PV array 6 and OP 12

No glare found

PV array 6 and OP 13

No glare found

PV array 6 and OP 14

No glare found

PV array 6 and OP 15

No glare found

PV array 6 and OP 16

No glare found

PV array 6 and OP 17

No glare found

PV array 6 and OP 18

No glare found

PV array 6 and OP 19

No glare found

PV array 6 and OP 20

No glare found

PV array 6 and OP 21

No glare found

PV: PV array 7 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV array 7 and Route: Emigrant Springs Ln

No glare found

PV array 7 and Route: Herin Ln - 1

No glare found

PV array 7 and Route: Herin Ln - 2

No glare found

PV array 7 and Route: Hwy 206

No glare found

PV array 7 and Route: I97

No glare found

PV array 7 and Route: Klondike Rd

No glare found

PV array 7 and Route: Medler Ln

No glare found

PV array 7 and Route: N Klondike Rd

No glare found

PV array 7 and Route: Oehman Rd

No glare found

PV array 7 and Route: Old Wasco-Heppner Hwy

No glare found

PV array 7 and Route: Webfoot Rd

No glare found

PV array 7 and OP 1

No glare found

PV array 7 and OP 2

No glare found

PV array 7 and OP 3

No glare found

PV array 7 and OP 4

No glare found

PV array 7 and OP 5

No glare found

PV array 7 and OP 6

No glare found

PV array 7 and OP 7

No glare found

PV array 7 and OP 8

No glare found

PV array 7 and OP 9

No glare found

PV array 7 and OP 10

No glare found

PV array 7 and OP 11

No glare found

PV array 7 and OP 12

No glare found

PV array 7 and OP 13

No glare found

PV array 7 and OP 14

No glare found

PV array 7 and OP 15

No glare found

PV array 7 and OP 16

No glare found

PV array 7 and OP 17

No glare found

PV array 7 and OP 18

No glare found

PV array 7 and OP 19

No glare found

PV array 7 and OP 20

No glare found

PV array 7 and OP 21

No glare found

PV: PV array 8 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV array 8 and Route: Emigrant Springs Ln

No glare found

PV array 8 and Route: Herin Ln - 1

No glare found

PV array 8 and Route: Herin Ln - 2

No glare found

PV array 8 and Route: Hwy 206

No glare found

PV array 8 and Route: I97

No glare found

PV array 8 and Route: Klondike Rd

No glare found

PV array 8 and Route: Medler Ln

No glare found

PV array 8 and Route: N Klondike Rd

No glare found

PV array 8 and Route: Oehman Rd

No glare found

PV array 8 and Route: Old Wasco-Heppner Hwy

No glare found

PV array 8 and Route: Webfoot Rd

No glare found

PV array 8 and OP 1

No glare found

PV array 8 and OP 2

No glare found

PV array 8 and OP 3

No glare found

PV array 8 and OP 4

No glare found

PV array 8 and OP 5

No glare found

PV array 8 and OP 6

No glare found

PV array 8 and OP 7

No glare found

PV array 8 and OP 8

No glare found

PV array 8 and OP 9

No glare found

PV array 8 and OP 10

No glare found

PV array 8 and OP 11

No glare found

PV array 8 and OP 12

No glare found

PV array 8 and OP 13

No glare found

PV array 8 and OP 14

No glare found

PV array 8 and OP 15

No glare found

PV array 8 and OP 16

No glare found

PV array 8 and OP 17

No glare found

PV array 8 and OP 18

No glare found

PV array 8 and OP 19

No glare found

PV array 8 and OP 20

No glare found

PV array 8 and OP 21

No glare found

PV: PV array 9 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV array 9 and Route: Emigrant Springs Ln

No glare found

PV array 9 and Route: Herin Ln - 1

No glare found

PV array 9 and Route: Herin Ln - 2

No glare found

PV array 9 and Route: Hwy 206

No glare found

PV array 9 and Route: I97

No glare found

PV array 9 and Route: Klondike Rd

No glare found

PV array 9 and Route: Medler Ln

No glare found

PV array 9 and Route: N Klondike Rd

No glare found

PV array 9 and Route: Oehman Rd

No glare found

PV array 9 and Route: Old Wasco-Heppner Hwy

No glare found

PV array 9 and Route: Webfoot Rd

No glare found

PV array 9 and OP 1

No glare found

PV array 9 and OP 2

No glare found

PV array 9 and OP 3

No glare found

PV array 9 and OP 4

No glare found

PV array 9 and OP 5

No glare found

PV array 9 and OP 6

No glare found

PV array 9 and OP 7

No glare found

PV array 9 and OP 8

No glare found

PV array 9 and OP 9

No glare found

PV array 9 and OP 10

No glare found

PV array 9 and OP 11

No glare found

PV array 9 and OP 12

No glare found

PV array 9 and OP 13

No glare found

PV array 9 and OP 14

No glare found

PV array 9 and OP 15

No glare found

PV array 9 and OP 16

No glare found

PV array 9 and OP 17

No glare found

PV array 9 and OP 18

No glare found

PV array 9 and OP 19

No glare found

PV array 9 and OP 20

No glare found

PV array 9 and OP 21

No glare found

Assumptions

"Green" glare is glare with low potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.
"Yellow" glare is glare with potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.
Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.
The algorithm does not rigorously represent the detailed geometry of a system; detailed features such as gaps between modules, variable height of the PV array, and support structures may impact actual glare results. However, we have validated our models against several systems, including a PV array causing glare to the air-traffic control tower at Manchester-Boston Regional Airport and several sites in Albuquerque, and the tool accurately predicted the occurrence and intensity of glare at different times and days of the year.
Several V1 calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for large PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare. This primarily affects V1 analyses of path receptors.
Random number computations are utilized by various steps of the annual hazard analysis algorithm. Predicted minutes of glare can vary between runs as a result. This limitation primarily affects analyses of Observation Point receptors, including ATCTs. Note that the SGHAT/ ForgeSolar methodology has always relied on an analytical, qualitative approach to accurately determine the overall hazard (i.e. green vs. yellow) of expected glare on an annual basis.
The analysis does not automatically consider obstacles (either man-made or natural) between the observation points and the prescribed solar installation that may obstruct observed glare, such as trees, hills, buildings, etc.
The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)
The variable direct normal irradiance (DNI) feature (if selected) scales the user-prescribed peak DNI using a typical clear-day irradiance profile. This profile has a lower DNI in the mornings and evenings and a maximum at solar noon. The scaling uses a clear-day irradiance profile based on a normalized time relative to sunrise, solar noon, and sunset, which are prescribed by a sun-position algorithm and the latitude and longitude obtained from Google maps. The actual DNI on any given day can be affected by cloud cover, atmospheric attenuation, and other environmental factors.
The ocular hazard predicted by the tool depends on a number of environmental, optical, and human factors, which can be uncertain. We provide input fields and typical ranges of values for these factors so that the user can vary these parameters to see if they have an impact on the results. The speed of SGHAT allows expedited sensitivity and parametric analyses.
The system output calculation is a DNI-based approximation that assumes clear, sunny skies year-round. It should not be used in place of more rigorous modeling methods.
Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid based on aggregated research data. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.
Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.
Refer to the Help page at **www.forgesolar.com/help/** for assumptions and limitations not listed here.

Default glare analysis parameters and observer eye characteristics (for reference only):

- Analysis time interval: 1 minute
- Ocular transmission coefficient: 0.5
- Pupil diameter: 0.002 meters
- Eye focal length: 0.017 meters
- Sun subtended angle: 9.3 milliradians

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FORGESOLAR GLARE ANALYSIS

Project: **Biglow Canyon Solar**
Site configuration: **South Arrays Analysis 3 - FAA Receptors**

Created 09 Aug, 2024
Updated 09 Aug, 2024
Time-step 1 minute
Timezone offset UTC-8
Minimum sun altitude 0.0 deg
DNI peaks at 1,000.0 W/m^2
Category 100 MW to 1 GW
Site ID 126499.21638

Ocular transmission coefficient 0.5
Pupil diameter 0.002 m
Eye focal length 0.017 m
Sun subtended angle 9.3 mrad
PV analysis methodology V2

Summary of Results

Glare with potential for temporary after-image predicted

PV Array	Tilt	Orient	Annual Green Glare		Annual Yellow Glare		Energy
	°	°	min	hr	min	hr	kWh
PV array 1	SA tracking	SA tracking	241	4.0	285	4.8	-
PV array 10	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 11	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 12	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 13	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 14	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 15	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 16	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 17	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 18	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 19	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 2	SA tracking	SA tracking	727	12.1	646	10.8	-
PV array 20	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 3	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 4	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 5	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 6	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 7	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 8	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 9	SA tracking	SA tracking	0	0.0	0	0.0	-

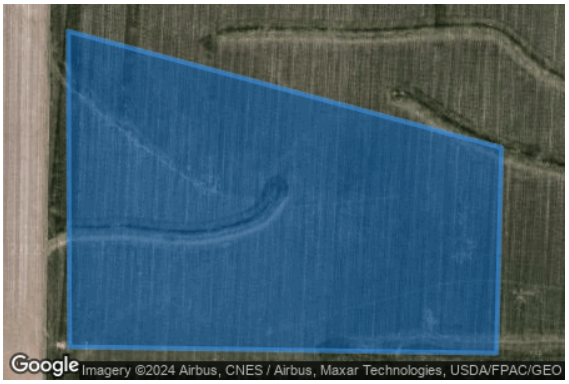
Total glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

35S RWY 07	0	0.0	0	0.0
35S RWY 25	968	16.1	931	15.5

Component Data

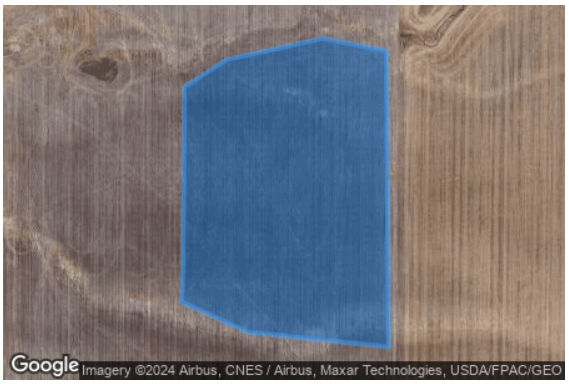
PV Arrays

Name: PV array 1
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



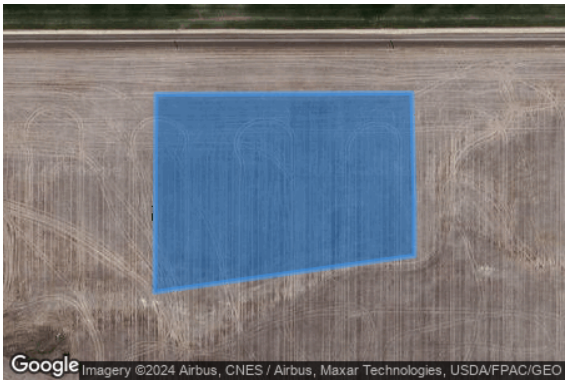
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.596127	-120.650423	1508.33	8.00	1516.33
2	45.592343	-120.650401	1563.44	8.00	1571.44
3	45.592268	-120.643063	1563.27	8.00	1571.27
4	45.594730	-120.642977	1557.76	8.00	1565.76

Name: PV array 10
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.618702	-120.649056	1399.15	8.00	1407.15
2	45.619032	-120.648326	1401.39	8.00	1409.39
3	45.619287	-120.646674	1410.94	8.00	1418.94
4	45.619137	-120.645580	1418.85	8.00	1426.85
5	45.615580	-120.645537	1455.74	8.00	1463.74
6	45.615760	-120.647961	1442.12	8.00	1450.12
7	45.616120	-120.649099	1451.62	8.00	1459.62
8	45.616533	-120.649077	1455.10	8.00	1463.10
9	45.617396	-120.649066	1424.50	8.00	1432.50

Name: PV array 11
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.620443	-120.649453	1423.69	8.00	1431.69
2	45.620450	-120.647253	1436.64	8.00	1444.64
3	45.619790	-120.647232	1411.61	8.00	1419.61
4	45.619475	-120.647232	1406.21	8.00	1414.21
5	45.619257	-120.649463	1404.46	8.00	1412.46

Name: PV array 12
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.620443	-120.647253	1436.24	8.00	1444.24
2	45.620450	-120.645708	1429.27	8.00	1437.27
3	45.619812	-120.645665	1427.74	8.00	1435.74
4	45.619797	-120.647232	1411.85	8.00	1419.85

Name: PV array 13
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



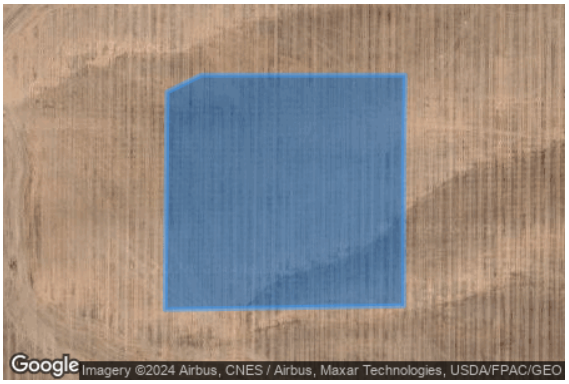
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.620398	-120.659709	1354.98	8.00	1362.98
2	45.620428	-120.657424	1371.94	8.00	1379.94
3	45.617666	-120.657381	1367.55	8.00	1375.55
4	45.617447	-120.658143	1364.98	8.00	1372.98
5	45.616960	-120.659055	1359.33	8.00	1367.33
6	45.616967	-120.659699	1359.39	8.00	1367.39

Name: PV array 14
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



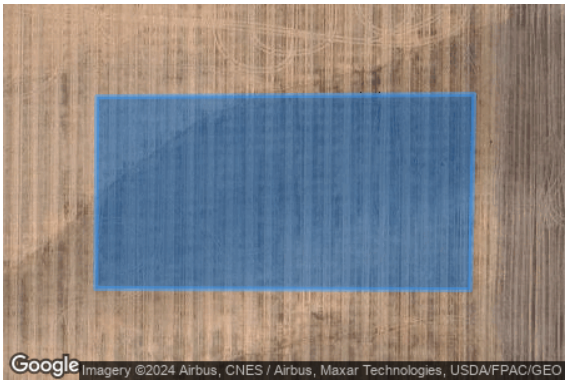
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.620427	-120.657424	1371.94	8.00	1379.94
2	45.620479	-120.653294	1410.82	8.00	1418.82
3	45.619774	-120.653304	1398.01	8.00	1406.01
4	45.619316	-120.654141	1391.14	8.00	1399.14
5	45.618423	-120.656416	1384.46	8.00	1392.46
6	45.617913	-120.656652	1373.10	8.00	1381.10
7	45.617673	-120.657381	1367.55	8.00	1375.55

Name: PV array 15
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



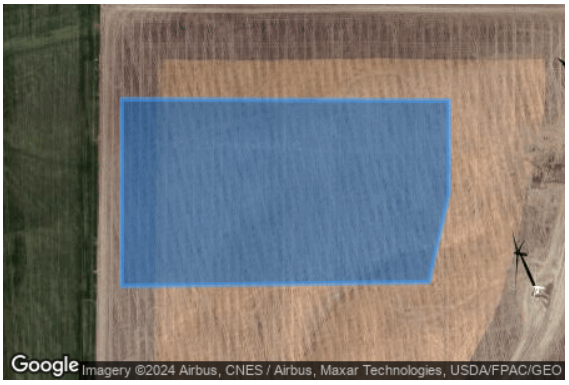
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.615114	-120.632150	1481.51	8.00	1489.51
2	45.617718	-120.632117	1488.60	8.00	1496.60
3	45.617921	-120.631527	1497.82	8.00	1505.82
4	45.617921	-120.628030	1557.55	8.00	1565.55
5	45.616847	-120.628051	1525.53	8.00	1533.53
6	45.615159	-120.628051	1488.26	8.00	1496.26

Name: PV array 16
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



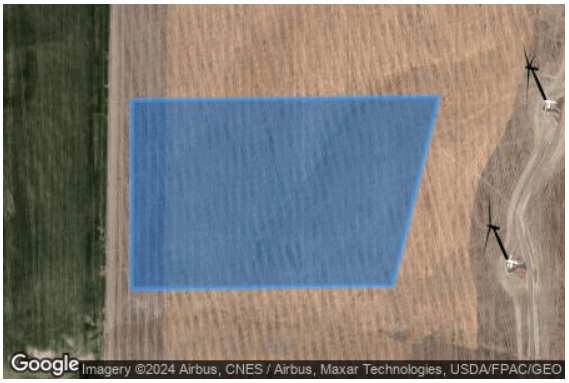
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.616847	-120.628051	1525.53	8.00	1533.53
2	45.616862	-120.624811	1530.67	8.00	1538.67
3	45.615692	-120.624843	1516.76	8.00	1524.76
4	45.615699	-120.628062	1507.12	8.00	1515.12

Name: PV array 17
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.626952	-120.634357	1507.07	8.00	1515.07
2	45.626937	-120.628735	1548.34	8.00	1556.34
3	45.625812	-120.628735	1523.30	8.00	1531.30
4	45.624762	-120.629078	1505.07	8.00	1513.07
5	45.624717	-120.634357	1504.69	8.00	1512.69

Name: PV array 18
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.624717	-120.634378	1504.52	8.00	1512.52
2	45.622450	-120.634378	1456.44	8.00	1464.44
3	45.622496	-120.629894	1463.00	8.00	1471.00
4	45.624762	-120.629100	1504.95	8.00	1512.95

Name: PV array 19
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.602191	-120.621856	1566.69	8.00	1574.69
2	45.602172	-120.619614	1566.27	8.00	1574.27
3	45.613114	-120.619496	1574.44	8.00	1582.44
4	45.613204	-120.622795	1558.28	8.00	1566.28
5	45.603473	-120.622752	1562.98	8.00	1570.98
6	45.603465	-120.621835	1572.30	8.00	1580.30

Name: PV array 2
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.594715	-120.642955	1557.88	8.00	1565.88
2	45.592238	-120.643084	1562.38	8.00	1570.38
3	45.592208	-120.636239	1578.45	8.00	1586.45
4	45.591923	-120.636239	1578.25	8.00	1586.25
5	45.591923	-120.635531	1581.92	8.00	1589.92
6	45.593229	-120.635638	1551.20	8.00	1559.20

Name: PV array 20
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.612665	-120.615036	1570.28	8.00	1578.28
2	45.612661	-120.613942	1560.55	8.00	1568.55
3	45.595340	-120.614075	1552.10	8.00	1560.10
4	45.594484	-120.616880	1564.42	8.00	1572.42
5	45.594496	-120.617873	1563.21	8.00	1571.21
6	45.601078	-120.617626	1572.92	8.00	1580.92
7	45.601067	-120.615437	1578.24	8.00	1586.24
8	45.602763	-120.615185	1586.03	8.00	1594.03

Name: PV array 3
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



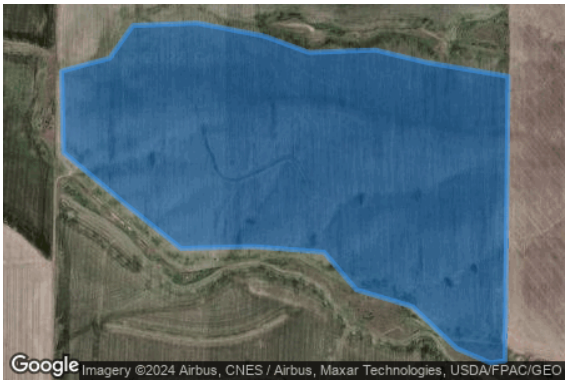
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.600030	-120.650423	1466.80	8.00	1474.80
2	45.596127	-120.650401	1508.72	8.00	1516.72
3	45.594730	-120.642977	1557.76	8.00	1565.76
4	45.598259	-120.642955	1462.53	8.00	1470.53
5	45.598499	-120.643771	1453.23	8.00	1461.23
6	45.598003	-120.645316	1461.02	8.00	1469.02
7	45.598064	-120.646217	1449.24	8.00	1457.24
8	45.598964	-120.647848	1444.02	8.00	1452.02
9	45.599775	-120.648985	1434.58	8.00	1442.58

Name: PV array 4
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.598259	-120.642977	1462.50	8.00	1470.50
2	45.594715	-120.642955	1557.88	8.00	1565.88
3	45.593214	-120.635638	1551.88	8.00	1559.88
4	45.595902	-120.635681	1504.96	8.00	1512.96
5	45.596652	-120.638664	1489.52	8.00	1497.52
6	45.597388	-120.641754	1507.15	8.00	1515.15
7	45.597958	-120.642011	1479.39	8.00	1487.39

Name: PV array 5
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



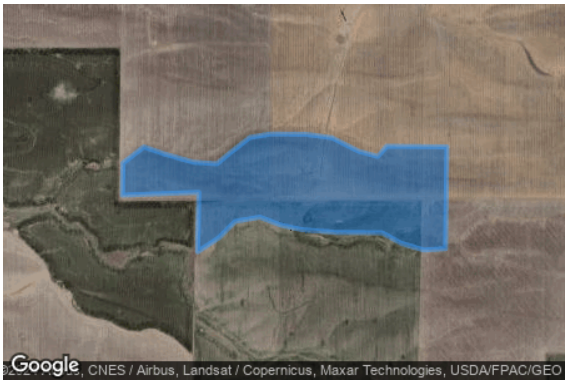
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.603409	-120.650462	1413.57	8.00	1421.57
2	45.601457	-120.650397	1437.97	8.00	1445.97
3	45.600211	-120.648252	1458.19	8.00	1466.19
4	45.599160	-120.646363	1466.44	8.00	1474.44
5	45.599205	-120.643853	1464.09	8.00	1472.09
6	45.599070	-120.641450	1483.76	8.00	1491.76
7	45.598169	-120.640334	1487.17	8.00	1495.17
8	45.597764	-120.638403	1502.84	8.00	1510.84
9	45.596758	-120.636879	1501.21	8.00	1509.21
10	45.596413	-120.635720	1507.98	8.00	1515.98
11	45.596473	-120.635227	1517.91	8.00	1525.91
12	45.603284	-120.635119	1507.67	8.00	1515.67
13	45.603614	-120.637909	1490.22	8.00	1498.22
14	45.603914	-120.639690	1473.96	8.00	1481.96
15	45.603854	-120.641964	1469.22	8.00	1477.22
16	45.604245	-120.643488	1448.93	8.00	1456.93
17	45.604560	-120.645805	1434.05	8.00	1442.05
18	45.604500	-120.648016	1420.90	8.00	1428.90
19	45.603719	-120.648809	1419.97	8.00	1427.97

Name: PV array 6
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.603314	-120.635141	1506.82	8.00	1514.82
2	45.596453	-120.635248	1516.68	8.00	1524.68
3	45.596723	-120.633896	1543.42	8.00	1551.42
4	45.596588	-120.632587	1535.84	8.00	1543.84
5	45.597474	-120.630163	1543.86	8.00	1551.86
6	45.598014	-120.627459	1562.18	8.00	1570.18
7	45.598119	-120.626730	1565.99	8.00	1573.99
8	45.599080	-120.626772	1591.27	8.00	1599.27
9	45.599065	-120.624927	1591.31	8.00	1599.31
10	45.601993	-120.624949	1576.04	8.00	1584.04
11	45.602008	-120.622781	1571.98	8.00	1579.98
12	45.602954	-120.622803	1566.75	8.00	1574.75
13	45.604109	-120.624133	1556.69	8.00	1564.69
14	45.604695	-120.625850	1540.01	8.00	1548.01
15	45.604920	-120.628038	1526.56	8.00	1534.56
16	45.604995	-120.630184	1513.18	8.00	1521.18
17	45.604140	-120.631665	1518.22	8.00	1526.22
18	45.603479	-120.632781	1518.13	8.00	1526.13

Name: PV array 7
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.608005	-120.655579	1402.85	8.00	1410.85
2	45.606474	-120.655622	1419.25	8.00	1427.25
3	45.606609	-120.650365	1455.42	8.00	1463.42
4	45.603757	-120.650451	1415.49	8.00	1423.49
5	45.604432	-120.648992	1424.68	8.00	1432.68
6	45.605213	-120.647876	1434.03	8.00	1442.03
7	45.605423	-120.646181	1434.30	8.00	1442.30
8	45.605048	-120.644786	1443.82	8.00	1451.82
9	45.604823	-120.643327	1450.31	8.00	1458.31
10	45.604687	-120.640902	1463.71	8.00	1471.71
11	45.604672	-120.637770	1492.83	8.00	1500.83
12	45.604162	-120.636439	1480.03	8.00	1488.03
13	45.603847	-120.634916	1499.38	8.00	1507.38
14	45.603907	-120.633414	1503.53	8.00	1511.53
15	45.608786	-120.633328	1529.09	8.00	1537.09
16	45.608816	-120.637448	1521.39	8.00	1529.39
17	45.608320	-120.638070	1506.48	8.00	1514.48
18	45.608575	-120.639400	1503.71	8.00	1511.71
19	45.609221	-120.641224	1483.57	8.00	1491.57
20	45.609386	-120.643027	1468.35	8.00	1476.35
21	45.609401	-120.645430	1452.74	8.00	1460.74
22	45.609236	-120.646846	1442.44	8.00	1450.44
23	45.608590	-120.648048	1434.69	8.00	1442.69
24	45.607975	-120.649121	1427.36	8.00	1435.36
25	45.608050	-120.650751	1418.24	8.00	1426.24
26	45.608440	-120.652726	1414.44	8.00	1422.44
27	45.608786	-120.654142	1407.67	8.00	1415.67

Name: PV array 8
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.617136	-120.655390	1378.51	8.00	1386.51
2	45.608948	-120.655551	1426.44	8.00	1434.44
3	45.608970	-120.654446	1410.07	8.00	1418.07
4	45.608880	-120.652558	1424.45	8.00	1432.45
5	45.608955	-120.648738	1430.89	8.00	1438.89
6	45.609676	-120.647000	1440.81	8.00	1448.81
7	45.609766	-120.645477	1448.97	8.00	1456.97
8	45.614659	-120.645434	1454.19	8.00	1462.19
9	45.615049	-120.647258	1448.61	8.00	1456.61
10	45.615635	-120.649854	1436.16	8.00	1444.16
11	45.616160	-120.651335	1421.75	8.00	1429.75
12	45.616745	-120.652214	1411.00	8.00	1419.00
13	45.617406	-120.654425	1379.39	8.00	1387.39
14	45.617695	-120.654425	1374.70	8.00	1382.70
15	45.617691	-120.655390	1367.82	8.00	1375.82

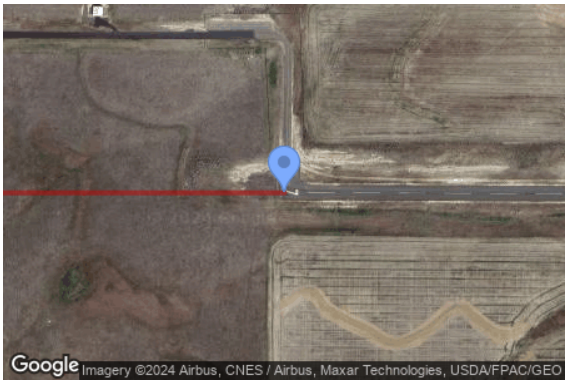
Name: PV array 9
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.612267	-120.645451	1519.38	8.00	1527.38
2	45.609736	-120.645451	1448.30	8.00	1456.30
3	45.609736	-120.641460	1483.70	8.00	1491.70
4	45.608820	-120.637405	1521.81	8.00	1529.81
5	45.608700	-120.622792	1552.00	8.00	1560.00
6	45.613203	-120.622792	1558.21	8.00	1566.21
7	45.613218	-120.625024	1555.55	8.00	1563.55
8	45.614730	-120.624981	1517.30	8.00	1525.30
9	45.614276	-120.632137	1468.75	8.00	1476.75
10	45.612119	-120.632191	1498.24	8.00	1506.24

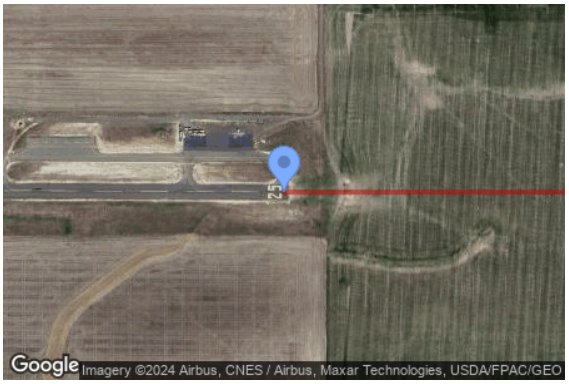
Flight Path Receptors

Name: 35S RWY 07
Description:
Threshold height: 50 ft
Direction: 90.0°
Glide slope: 3.0°
Pilot view restricted? Yes
Vertical view: 30.0°
Azimuthal view: 50.0°



Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	45.589249	-120.680629	1450.18	50.00	1500.18
Two-mile	45.589249	-120.721993	1349.09	704.52	2053.61

Name: 35S RWY 25
Description:
Threshold height: 50 ft
Direction: 270.0°
Glide slope: 3.0°
Pilot view restricted? Yes
Vertical view: 30.0°
Azimuthal view: 50.0°



Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	45.589211	-120.667272	1501.38	50.00	1551.38
Two-mile	45.589211	-120.625908	1591.74	513.07	2104.81

Glare Analysis Results

Summary of Results

Glare with potential for temporary after-image predicted

PV Array	Tilt	Orient	Annual Green Glare		Annual Yellow Glare		Energy
	°	°	min	hr	min	hr	kWh
PV array 1	SA tracking	SA tracking	241	4.0	285	4.8	-
PV array 10	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 11	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 12	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 13	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 14	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 15	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 16	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 17	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 18	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 19	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 2	SA tracking	SA tracking	727	12.1	646	10.8	-
PV array 20	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 3	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 4	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 5	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 6	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 7	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 8	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 9	SA tracking	SA tracking	0	0.0	0	0.0	-

Total glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
35S RWY 07	0	0.0	0	0.0
35S RWY 25	968	16.1	931	15.5

PV: PV array 1 potential temporary after-image

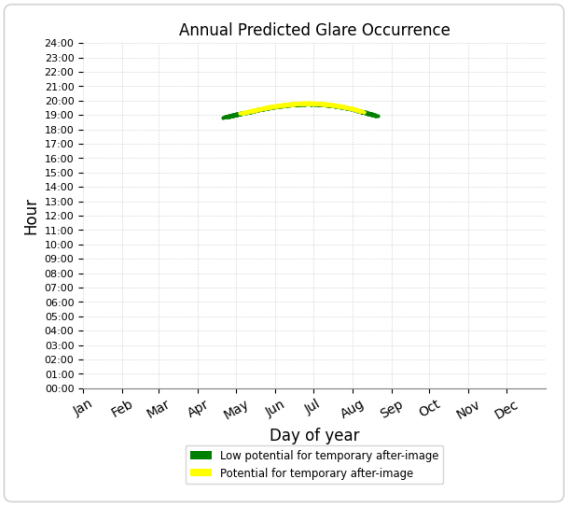
Receptor results ordered by category of glare

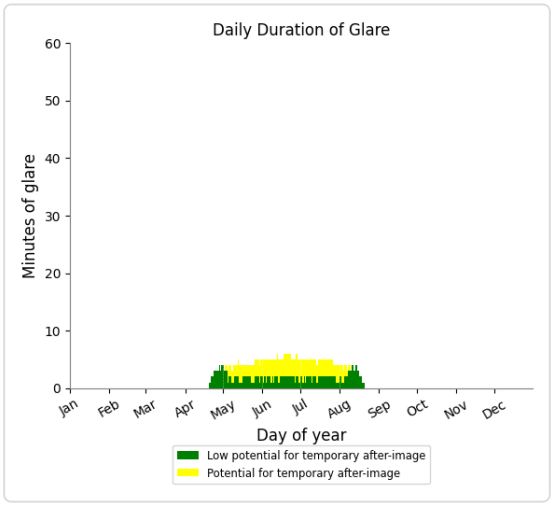
Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
35S RWY 25	241	4.0	285	4.8
35S RWY 07	0	0.0	0	0.0

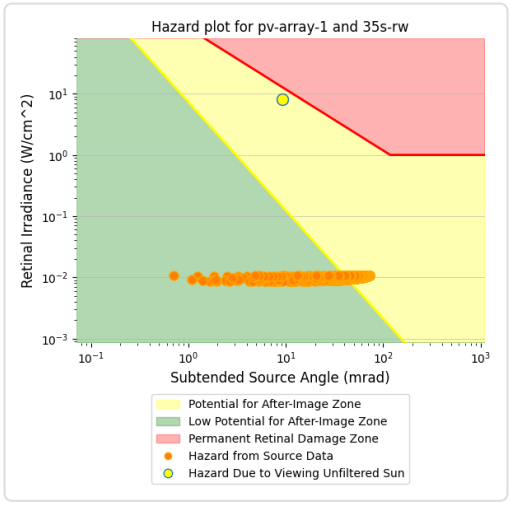
PV array 1 and FP: 35S RWY 25

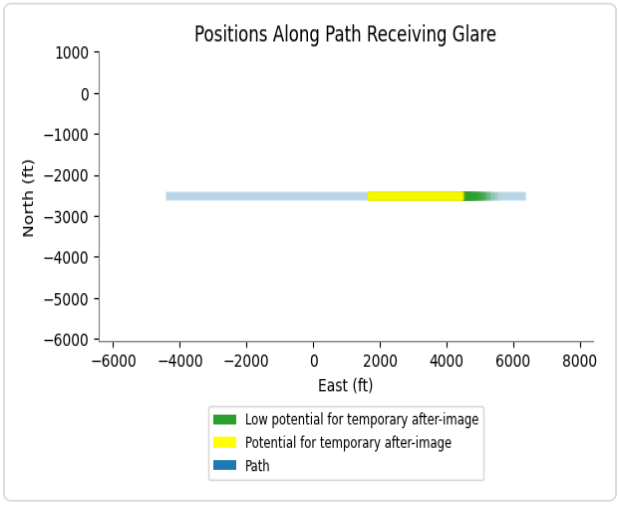
Yellow glare: 285 min.

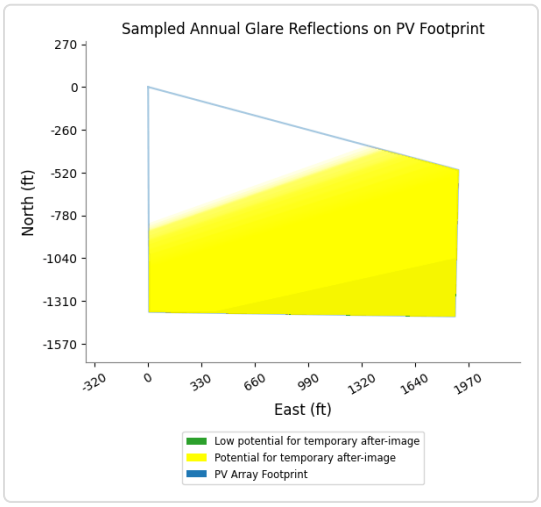
Green glare: 241 min.

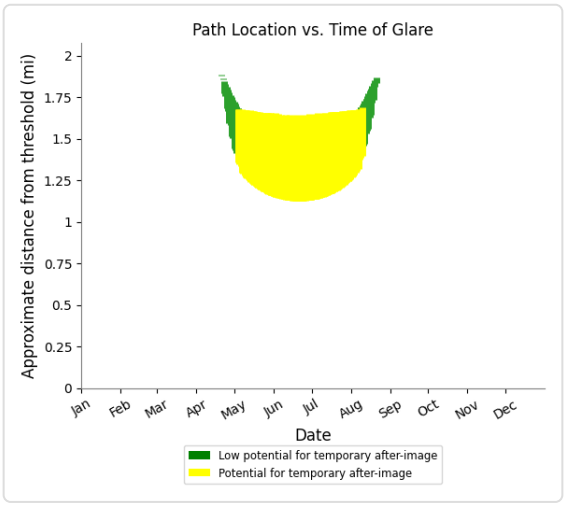












PV array 1 and FP: 35S RWY 07

No glare found

PV: PV array 10 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
35S RWY 07	0	0.0	0	0.0
35S RWY 25	0	0.0	0	0.0

PV array 10 and FP: 35S RWY 07

No glare found

PV array 10 and FP: 35S RWY 25

No glare found

PV: PV array 11 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
35S RWY 07	0	0.0	0	0.0
35S RWY 25	0	0.0	0	0.0

PV array 11 and FP: 35S RWY 07

No glare found

PV array 11 and FP: 35S RWY 25

No glare found

PV: PV array 12 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
35S RWY 07	0	0.0	0	0.0
35S RWY 25	0	0.0	0	0.0

PV array 12 and FP: 35S RWY 07

No glare found

PV array 12 and FP: 35S RWY 25

No glare found

PV: PV array 13 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
35S RWY 07	0	0.0	0	0.0
35S RWY 25	0	0.0	0	0.0

PV array 13 and FP: 35S RWY 07

No glare found

PV array 13 and FP: 35S RWY 25

No glare found

PV: PV array 14 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
35S RWY 07	0	0.0	0	0.0
35S RWY 25	0	0.0	0	0.0

PV array 14 and FP: 35S RWY 07

No glare found

PV array 14 and FP: 35S RWY 25

No glare found

PV: PV array 15 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
35S RWY 07	0	0.0	0	0.0
35S RWY 25	0	0.0	0	0.0

PV array 15 and FP: 35S RWY 07

No glare found

PV array 15 and FP: 35S RWY 25

No glare found

PV: PV array 16 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
35S RWY 07	0	0.0	0	0.0
35S RWY 25	0	0.0	0	0.0

PV array 16 and FP: 35S RWY 07

No glare found

PV array 16 and FP: 35S RWY 25

No glare found

PV: PV array 17 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
35S RWY 07	0	0.0	0	0.0
35S RWY 25	0	0.0	0	0.0

PV array 17 and FP: 35S RWY 07

No glare found

PV array 17 and FP: 35S RWY 25

No glare found

PV: PV array 18 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
35S RWY 07	0	0.0	0	0.0
35S RWY 25	0	0.0	0	0.0

PV array 18 and FP: 35S RWY 07

No glare found

PV array 18 and FP: 35S RWY 25

No glare found

PV: PV array 19 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
35S RWY 07	0	0.0	0	0.0
35S RWY 25	0	0.0	0	0.0

PV array 19 and FP: 35S RWY 07

No glare found

PV array 19 and FP: 35S RWY 25

No glare found

PV: PV array 2 potential temporary after-image

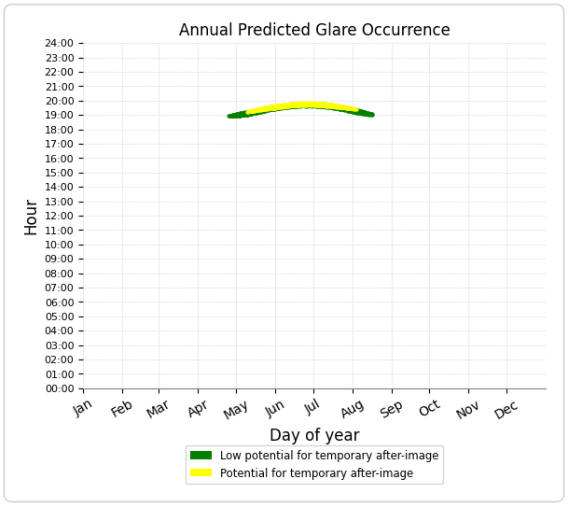
Receptor results ordered by category of glare

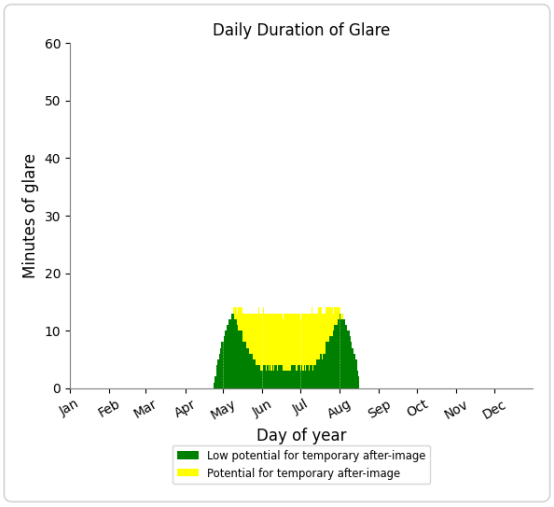
Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
35S RWY 25	727	12.1	646	10.8
35S RWY 07	0	0.0	0	0.0

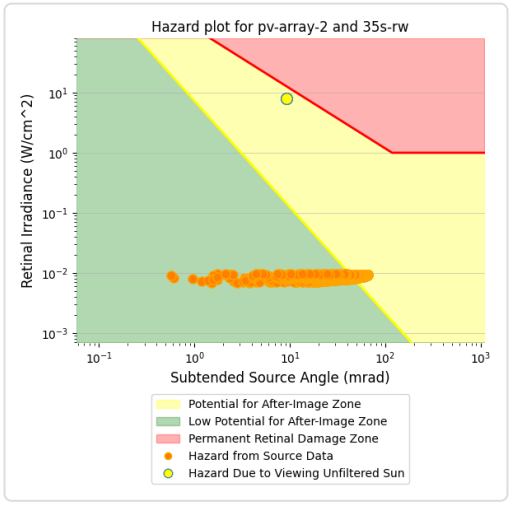
PV array 2 and FP: 35S RWY 25

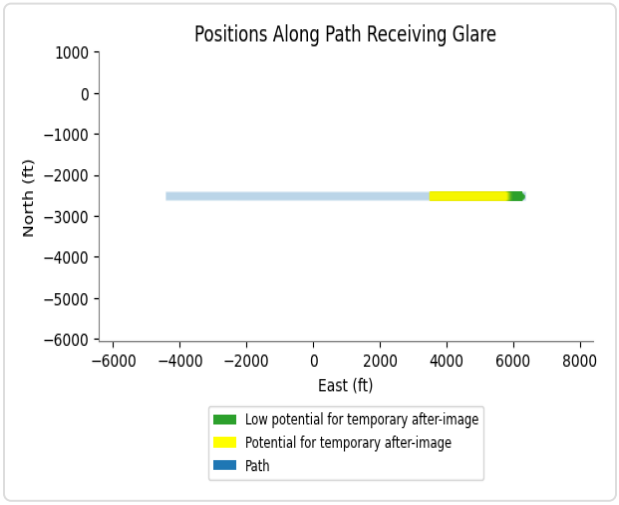
Yellow glare: 646 min.

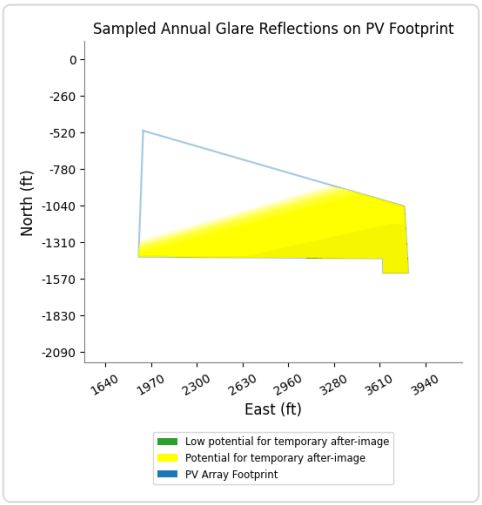
Green glare: 727 min.

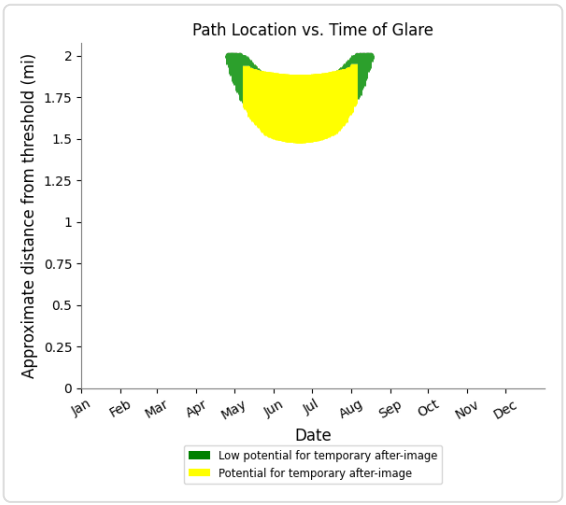












PV array 2 and FP: 35S RWY 07

No glare found

PV: PV array 20 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
35S RWY 07	0	0.0	0	0.0
35S RWY 25	0	0.0	0	0.0

PV array 20 and FP: 35S RWY 07

No glare found

PV array 20 and FP: 35S RWY 25

No glare found

PV: PV array 3 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
35S RWY 07	0	0.0	0	0.0
35S RWY 25	0	0.0	0	0.0

PV array 3 and FP: 35S RWY 07

No glare found

PV array 3 and FP: 35S RWY 25

No glare found

PV: PV array 4 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
35S RWY 07	0	0.0	0	0.0
35S RWY 25	0	0.0	0	0.0

PV array 4 and FP: 35S RWY 07

No glare found

PV array 4 and FP: 35S RWY 25

No glare found

PV: PV array 5 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
35S RWY 07	0	0.0	0	0.0
35S RWY 25	0	0.0	0	0.0

PV array 5 and FP: 35S RWY 07

No glare found

PV array 5 and FP: 35S RWY 25

No glare found

PV: PV array 6 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
35S RWY 07	0	0.0	0	0.0
35S RWY 25	0	0.0	0	0.0

PV array 6 and FP: 35S RWY 07

No glare found

PV array 6 and FP: 35S RWY 25

No glare found

PV: PV array 7 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
35S RWY 07	0	0.0	0	0.0
35S RWY 25	0	0.0	0	0.0

PV array 7 and FP: 35S RWY 07

No glare found

PV array 7 and FP: 35S RWY 25

No glare found

PV: PV array 8 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
35S RWY 07	0	0.0	0	0.0
35S RWY 25	0	0.0	0	0.0

PV array 8 and FP: 35S RWY 07

No glare found

PV array 8 and FP: 35S RWY 25

No glare found

PV: PV array 9 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
35S RWY 07	0	0.0	0	0.0
35S RWY 25	0	0.0	0	0.0

PV array 9 and FP: 35S RWY 07

No glare found

PV array 9 and FP: 35S RWY 25

No glare found

Assumptions

"Green" glare is glare with low potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.
"Yellow" glare is glare with potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.
Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.
The algorithm does not rigorously represent the detailed geometry of a system; detailed features such as gaps between modules, variable height of the PV array, and support structures may impact actual glare results. However, we have validated our models against several systems, including a PV array causing glare to the air-traffic control tower at Manchester-Boston Regional Airport and several sites in Albuquerque, and the tool accurately predicted the occurrence and intensity of glare at different times and days of the year.
Several V1 calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for large PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare. This primarily affects V1 analyses of path receptors.
Random number computations are utilized by various steps of the annual hazard analysis algorithm. Predicted minutes of glare can vary between runs as a result. This limitation primarily affects analyses of Observation Point receptors, including ATCTs. Note that the SGHAT/ ForgeSolar methodology has always relied on an analytical, qualitative approach to accurately determine the overall hazard (i.e. green vs. yellow) of expected glare on an annual basis.
The analysis does not automatically consider obstacles (either man-made or natural) between the observation points and the prescribed solar installation that may obstruct observed glare, such as trees, hills, buildings, etc.
The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)
The variable direct normal irradiance (DNI) feature (if selected) scales the user-prescribed peak DNI using a typical clear-day irradiance profile. This profile has a lower DNI in the mornings and evenings and a maximum at solar noon. The scaling uses a clear-day irradiance profile based on a normalized time relative to sunrise, solar noon, and sunset, which are prescribed by a sun-position algorithm and the latitude and longitude obtained from Google maps. The actual DNI on any given day can be affected by cloud cover, atmospheric attenuation, and other environmental factors.
The ocular hazard predicted by the tool depends on a number of environmental, optical, and human factors, which can be uncertain. We provide input fields and typical ranges of values for these factors so that the user can vary these parameters to see if they have an impact on the results. The speed of SGHAT allows expedited sensitivity and parametric analyses.
The system output calculation is a DNI-based approximation that assumes clear, sunny skies year-round. It should not be used in place of more rigorous modeling methods.
Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid based on aggregated research data. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.
Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.
Refer to the Help page at **www.forgesolar.com/help/** for assumptions and limitations not listed here.

Default glare analysis parameters and observer eye characteristics (for reference only):

- Analysis time interval: 1 minute
- Ocular transmission coefficient: 0.5
- Pupil diameter: 0.002 meters
- Eye focal length: 0.017 meters
- Sun subtended angle: 9.3 milliradians

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FORGESOLAR GLARE ANALYSIS

Project: **Biglow Canyon Solar**
Site configuration: **North Arrays Analysis 1 - 1st Story Receptors**

Created 09 Aug, 2024
Updated 14 Aug, 2024
Time-step 1 minute
Timezone offset UTC-8
Minimum sun altitude 0.0 deg
DNI peaks at 1,000.0 W/m^2
Category 100 MW to 1 GW
Site ID 126470.21638

Ocular transmission coefficient 0.5
Pupil diameter 0.002 m
Eye focal length 0.017 m
Sun subtended angle 9.3 mrad
PV analysis methodology V2

Summary of Results

Glare with potential for temporary after-image predicted

PV Array	Tilt	Orient	Annual Green Glare		Annual Yellow Glare		Energy
	°	°	min	hr	min	hr	kWh
PV array 21	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 22	SA tracking	SA tracking	5,895	98.2	6,763	112.7	-
PV array 23	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 24	SA tracking	SA tracking	3,812	63.5	2,381	39.7	-
PV array 25	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 26	SA tracking	SA tracking	1,387	23.1	12	0.2	-
PV array 27	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 28	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 29	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 30	SA tracking	SA tracking	1,211	20.2	0	0.0	-

Total glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	6,299	105.0	8,398	140.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	2,273	37.9	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	2,875	47.9	758	12.6
OP 9	450	7.5	0	0.0
OP 10	408	6.8	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

Component Data

PV Arrays

Name: PV array 21
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.642846	-120.623403	1553.80	8.00	1561.80
2	45.642835	-120.617915	1522.80	8.00	1530.80
3	45.647327	-120.618296	1483.40	8.00	1491.40
4	45.649663	-120.620935	1525.80	8.00	1533.80
5	45.650831	-120.621681	1496.20	8.00	1504.20
6	45.650772	-120.623482	1484.80	8.00	1492.80

Name: PV array 22
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.654035	-120.619126	1450.00	8.00	1458.00
2	45.652514	-120.613446	1446.70	8.00	1454.70
3	45.646936	-120.613391	1508.10	8.00	1516.10
4	45.646852	-120.614429	1517.10	8.00	1525.10
5	45.649078	-120.614867	1508.90	8.00	1516.90
6	45.649650	-120.615708	1486.80	8.00	1494.80
7	45.651318	-120.617443	1492.00	8.00	1500.00
8	45.652468	-120.619097	1478.00	8.00	1486.00

Name: PV array 23
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.647499	-120.611982	1466.70	8.00	1474.70
2	45.647510	-120.611085	1440.90	8.00	1448.90
3	45.643443	-120.604903	1443.80	8.00	1451.80
4	45.642581	-120.604812	1413.30	8.00	1421.30
5	45.642513	-120.611964	1485.70	8.00	1493.70

Name: PV array 24
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.646733	-120.606734	1357.40	8.00	1365.40
2	45.647767	-120.604788	1343.40	8.00	1351.40
3	45.646820	-120.604268	1365.40	8.00	1373.40
4	45.645600	-120.604306	1398.20	8.00	1406.20
5	45.644768	-120.604728	1443.00	8.00	1451.00
6	45.644699	-120.605433	1453.50	8.00	1461.50
7	45.645842	-120.606734	1381.40	8.00	1389.40

Name: PV array 25
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.655717	-120.612344	1464.40	8.00	1472.40
2	45.656382	-120.611593	1463.80	8.00	1471.80
3	45.656389	-120.605453	1448.20	8.00	1456.20
4	45.655809	-120.602833	1416.80	8.00	1424.80
5	45.654069	-120.602850	1394.40	8.00	1402.40
6	45.653602	-120.605186	1359.50	8.00	1367.50
7	45.653563	-120.606156	1374.10	8.00	1382.10
8	45.652375	-120.607877	1392.40	8.00	1400.40
9	45.651261	-120.609559	1416.60	8.00	1424.60
10	45.650643	-120.610866	1430.20	8.00	1438.20
11	45.650607	-120.611420	1448.50	8.00	1456.50
12	45.651239	-120.612272	1466.20	8.00	1474.20

Name: PV array 26
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.650070	-120.607009	1435.00	8.00	1443.00
2	45.650088	-120.605548	1400.90	8.00	1408.90
3	45.651274	-120.605193	1400.10	8.00	1408.10
4	45.652973	-120.605208	1363.20	8.00	1371.20
5	45.652969	-120.606424	1361.80	8.00	1369.80
6	45.651249	-120.607019	1409.50	8.00	1417.50

Name: PV array 27
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.649904	-120.600907	1337.10	8.00	1345.10
2	45.649648	-120.598222	1316.90	8.00	1324.90
3	45.649614	-120.592771	1268.20	8.00	1276.20
4	45.661179	-120.592200	1363.10	8.00	1371.10
5	45.661124	-120.592744	1381.00	8.00	1389.00
6	45.659178	-120.594909	1385.90	8.00	1393.90
7	45.656944	-120.596347	1378.80	8.00	1386.80
8	45.655523	-120.598207	1365.60	8.00	1373.60
9	45.654138	-120.599092	1386.70	8.00	1394.70
10	45.652774	-120.600564	1348.10	8.00	1356.10
11	45.651090	-120.600954	1377.90	8.00	1385.90

Name: PV array 28
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



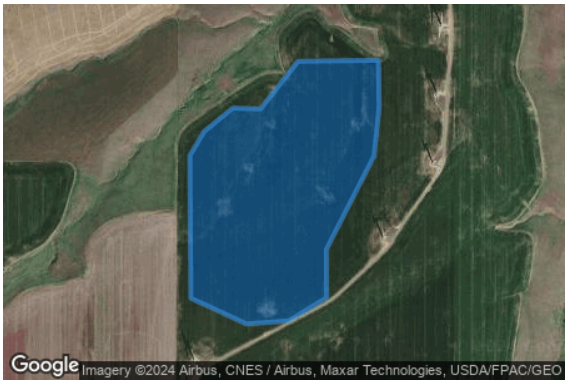
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.653790	-120.592211	1266.90	8.00	1274.90
2	45.652814	-120.591400	1257.40	8.00	1265.40
3	45.652130	-120.586982	1217.10	8.00	1225.10
4	45.656457	-120.582504	1134.80	8.00	1142.80
5	45.663442	-120.582532	1108.40	8.00	1116.40
6	45.663499	-120.591542	1340.30	8.00	1348.30
7	45.661209	-120.592224	1341.40	8.00	1349.40
8	45.653765	-120.592539	1267.90	8.00	1275.90

Name: PV array 29
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.663770	-120.591856	1341.50	8.00	1349.50
2	45.664564	-120.591770	1326.80	8.00	1334.80
3	45.666528	-120.588720	1274.50	8.00	1282.50
4	45.667110	-120.587249	1200.60	8.00	1208.60
5	45.667730	-120.586171	1145.10	8.00	1153.10
6	45.667731	-120.583660	1093.40	8.00	1101.40
7	45.669314	-120.582926	1093.70	8.00	1101.70
8	45.669381	-120.581431	1052.90	8.00	1060.90
9	45.668819	-120.580553	1037.00	8.00	1045.00
10	45.668199	-120.580533	1065.00	8.00	1073.00
11	45.665960	-120.581667	1076.00	8.00	1084.00
12	45.664805	-120.582444	1068.20	8.00	1076.20
13	45.663960	-120.583617	1114.30	8.00	1122.30
14	45.663682	-120.584507	1097.90	8.00	1105.90
15	45.663680	-120.588791	1172.30	8.00	1180.30
16	45.663708	-120.589701	1300.10	8.00	1308.10

Name: PV array 30
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.667149	-120.589944	1268.70	8.00	1276.70
2	45.667766	-120.591865	1281.20	8.00	1289.20
3	45.671183	-120.591899	1105.70	8.00	1113.70
4	45.671759	-120.591404	1078.40	8.00	1086.40
5	45.672318	-120.590421	1045.40	8.00	1053.40
6	45.672295	-120.589473	1039.80	8.00	1047.80
7	45.673437	-120.588178	1018.60	8.00	1026.60
8	45.673462	-120.585414	1059.60	8.00	1067.60
9	45.672314	-120.585392	1087.60	8.00	1095.60
10	45.671169	-120.585566	1094.60	8.00	1102.60
11	45.668932	-120.587208	1130.00	8.00	1138.00
12	45.667778	-120.587198	1180.30	8.00	1188.30
13	45.667225	-120.588498	1230.80	8.00	1238.80

Route Receptors

Name: Emigrant Springs Ln
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.628064	-120.624308	1541.50	5.00	1546.50
2	45.628045	-120.622929	1540.10	5.00	1545.10
3	45.628004	-120.621191	1509.90	5.00	1514.90
4	45.627981	-120.620113	1489.20	5.00	1494.20
5	45.627941	-120.618214	1484.00	5.00	1489.00
6	45.627893	-120.615987	1466.30	5.00	1471.30
7	45.627841	-120.613552	1478.50	5.00	1483.50
8	45.627852	-120.613037	1478.80	5.00	1483.80
9	45.627826	-120.610135	1480.70	5.00	1485.70
10	45.627772	-120.607501	1466.60	5.00	1471.60
11	45.627720	-120.605382	1446.80	5.00	1451.80
12	45.627653	-120.602690	1415.20	5.00	1420.20
13	45.627565	-120.598500	1406.80	5.00	1411.80
14	45.627463	-120.594560	1408.30	5.00	1413.30
15	45.627372	-120.590566	1440.10	5.00	1445.10
16	45.627267	-120.585705	1426.10	5.00	1431.10
17	45.627177	-120.582168	1397.40	5.00	1402.40
18	45.627188	-120.578665	1371.00	5.00	1376.00
19	45.627220	-120.561601	1229.70	5.00	1234.70
20	45.627258	-120.551237	1281.40	5.00	1286.40
21	45.627204	-120.531722	1227.50	5.00	1232.50
22	45.627078	-120.523316	1179.90	5.00	1184.90
23	45.627085	-120.516182	1190.50	5.00	1195.50
24	45.627055	-120.511354	1187.30	5.00	1192.30
25	45.627055	-120.510592	1182.50	5.00	1187.50

Name: Herin Ln - 1
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.658436	-120.623865	1386.00	5.00	1391.00
2	45.658443	-120.622814	1388.50	5.00	1393.50
3	45.658394	-120.621473	1390.30	5.00	1395.30
4	45.658278	-120.620180	1402.70	5.00	1407.70
5	45.658031	-120.619338	1414.60	5.00	1419.60
6	45.657569	-120.617986	1428.00	5.00	1433.00
7	45.657123	-120.616715	1438.60	5.00	1443.60
8	45.656962	-120.616044	1445.20	5.00	1450.20
9	45.656913	-120.615712	1449.50	5.00	1454.50
10	45.656880	-120.614757	1458.20	5.00	1463.20
11	45.656822	-120.613051	1458.00	5.00	1463.00
12	45.656695	-120.612826	1458.40	5.00	1463.40
13	45.656444	-120.612707	1459.30	5.00	1464.30
14	45.655990	-120.612702	1465.20	5.00	1470.20
15	45.653803	-120.612783	1471.20	5.00	1476.20
16	45.650107	-120.612851	1463.70	5.00	1468.70
17	45.649822	-120.612723	1467.70	5.00	1472.70
18	45.649645	-120.612529	1467.40	5.00	1472.40
19	45.649578	-120.612256	1465.30	5.00	1470.30
20	45.649489	-120.609604	1441.70	5.00	1446.70
21	45.649406	-120.605018	1380.40	5.00	1385.40
22	45.649335	-120.600190	1317.70	5.00	1322.70
23	45.649103	-120.592288	1263.80	5.00	1268.80
24	45.649050	-120.590577	1233.30	5.00	1238.30
25	45.649043	-120.589187	1213.80	5.00	1218.80
26	45.649200	-120.588688	1205.70	5.00	1210.70
27	45.650634	-120.586455	1185.90	5.00	1190.90
28	45.652457	-120.584663	1154.50	5.00	1159.50
29	45.653023	-120.584154	1141.20	5.00	1146.20
30	45.653961	-120.583574	1128.90	5.00	1133.90

Name: Herin Ln - 2
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.653976	-120.583548	1128.20	5.00	1133.20
2	45.654253	-120.583312	1124.40	5.00	1129.40
3	45.654482	-120.582974	1116.20	5.00	1121.20
4	45.654954	-120.582587	1105.40	5.00	1110.40
5	45.655700	-120.581954	1086.30	5.00	1091.30
6	45.656117	-120.581552	1079.30	5.00	1084.30
7	45.656503	-120.580989	1063.30	5.00	1068.30
8	45.656776	-120.580624	1051.60	5.00	1056.60
9	45.657020	-120.580468	1046.20	5.00	1051.20
10	45.657313	-120.580383	1042.90	5.00	1047.90
11	45.657909	-120.579980	1035.90	5.00	1040.90
12	45.658299	-120.579583	1038.70	5.00	1043.70
13	45.658535	-120.579326	1040.50	5.00	1045.50
14	45.658805	-120.579130	1032.80	5.00	1037.80
15	45.659195	-120.578980	1021.00	5.00	1026.00
16	45.659487	-120.579023	1011.00	5.00	1016.00
17	45.660023	-120.579125	1004.50	5.00	1009.50
18	45.660368	-120.579372	997.30	5.00	1002.30
19	45.661157	-120.579484	983.70	5.00	988.70
20	45.661693	-120.579479	972.10	5.00	977.10
21	45.662192	-120.579506	961.10	5.00	966.10

Name: Hwy 206
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.546018	-120.625806	1460.10	5.00	1465.10
2	45.547416	-120.626600	1493.80	5.00	1498.80
3	45.548498	-120.627801	1510.40	5.00	1515.40
4	45.549279	-120.629024	1528.30	5.00	1533.30
5	45.552480	-120.635011	1606.60	5.00	1611.60
6	45.554118	-120.638058	1640.00	5.00	1645.00
7	45.555350	-120.640161	1652.20	5.00	1657.20
8	45.556777	-120.641835	1648.50	5.00	1653.50
9	45.562862	-120.648615	1631.50	5.00	1636.50
10	45.564815	-120.650933	1622.40	5.00	1627.40
11	45.567030	-120.654392	1588.70	5.00	1593.70
12	45.571506	-120.661688	1504.30	5.00	1509.30
13	45.577124	-120.670657	1401.10	5.00	1406.10
14	45.583417	-120.680871	1331.60	5.00	1336.60
15	45.584288	-120.682566	1324.20	5.00	1329.20
16	45.586570	-120.687888	1312.60	5.00	1317.60
17	45.588823	-120.693596	1297.50	5.00	1302.50
18	45.589694	-120.695849	1283.70	5.00	1288.70
19	45.590565	-120.697694	1271.60	5.00	1276.60

Name: I97
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.574282	-120.697086	1427.10	5.00	1432.10
2	45.581972	-120.707815	1382.10	5.00	1387.10
3	45.584630	-120.711591	1344.00	5.00	1349.00
4	45.585621	-120.712557	1331.20	5.00	1336.20
5	45.586162	-120.713029	1325.50	5.00	1330.50
6	45.587003	-120.713437	1312.10	5.00	1317.10
7	45.588294	-120.713716	1297.60	5.00	1302.60
8	45.589751	-120.714080	1281.90	5.00	1286.90
9	45.590862	-120.714424	1272.20	5.00	1277.20
10	45.592018	-120.715089	1267.60	5.00	1272.60
11	45.593204	-120.715969	1264.40	5.00	1269.40
12	45.594509	-120.717201	1253.00	5.00	1258.00
13	45.595935	-120.718703	1239.00	5.00	1244.00
14	45.598037	-120.720892	1231.30	5.00	1236.30
15	45.598623	-120.721342	1221.80	5.00	1226.80
16	45.599313	-120.721750	1208.80	5.00	1213.80
17	45.600217	-120.722052	1196.10	5.00	1201.10
18	45.601058	-120.722052	1184.30	5.00	1189.30
19	45.602409	-120.721945	1170.60	5.00	1175.60
20	45.604555	-120.721645	1147.60	5.00	1152.60
21	45.605591	-120.721795	1139.40	5.00	1144.40
22	45.606537	-120.722224	1134.20	5.00	1139.20
23	45.607528	-120.722975	1127.10	5.00	1132.10
24	45.608909	-120.724777	1116.50	5.00	1121.50
25	45.612151	-120.729498	1083.80	5.00	1088.80
26	45.612871	-120.730871	1076.20	5.00	1081.20
27	45.613457	-120.732459	1069.30	5.00	1074.30
28	45.614027	-120.733961	1063.00	5.00	1068.00
29	45.614688	-120.735206	1057.90	5.00	1062.90
30	45.615363	-120.735978	1051.50	5.00	1056.50

Name: Klondike Rd
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.584323	-120.682296	1326.50	5.00	1331.50
2	45.584443	-120.681695	1330.60	5.00	1335.60
3	45.584398	-120.675472	1397.70	5.00	1402.70
4	45.584383	-120.664668	1434.00	5.00	1439.00
5	45.584353	-120.653587	1427.20	5.00	1432.20
6	45.584353	-120.644970	1531.00	5.00	1536.00
7	45.584338	-120.633806	1535.50	5.00	1540.50
8	45.584263	-120.621228	1559.70	5.00	1564.70
9	45.584158	-120.613439	1547.10	5.00	1552.10
10	45.583872	-120.602796	1521.80	5.00	1526.80
11	45.583932	-120.597432	1513.70	5.00	1518.70
12	45.583992	-120.582132	1450.80	5.00	1455.80
13	45.584068	-120.576344	1439.70	5.00	1444.70
14	45.584113	-120.569950	1452.00	5.00	1457.00
15	45.584068	-120.557118	1382.30	5.00	1387.30
16	45.583799	-120.534859	1381.20	5.00	1386.20
17	45.583717	-120.523039	1316.60	5.00	1321.60
18	45.583717	-120.520910	1304.00	5.00	1309.00

Name: Medler Ln
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.620780	-120.697244	1233.10	5.00	1238.10
2	45.620789	-120.690002	1288.50	5.00	1293.50
3	45.620797	-120.684799	1318.10	5.00	1323.10
4	45.620798	-120.678539	1315.90	5.00	1320.90
5	45.620806	-120.676363	1308.60	5.00	1313.60
6	45.620786	-120.669762	1370.20	5.00	1375.20
7	45.620736	-120.662578	1340.40	5.00	1345.40
8	45.620740	-120.655545	1381.80	5.00	1386.80
9	45.620748	-120.645646	1434.90	5.00	1439.90
10	45.620763	-120.638432	1442.40	5.00	1447.40
11	45.620763	-120.626023	1488.70	5.00	1493.70
12	45.620733	-120.625325	1493.00	5.00	1498.00
13	45.620785	-120.624875	1492.00	5.00	1497.00
14	45.620961	-120.624537	1490.40	5.00	1495.40

Name: N Klondike Rd
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.584163	-120.613405	1547.00	5.00	1552.00
2	45.587263	-120.613393	1575.30	5.00	1580.30
3	45.591409	-120.613389	1562.60	5.00	1567.60
4	45.591800	-120.613271	1546.60	5.00	1551.60
5	45.592197	-120.613249	1552.20	5.00	1557.20
6	45.593140	-120.613195	1552.10	5.00	1557.10
7	45.595257	-120.613163	1551.90	5.00	1556.90
8	45.599148	-120.613170	1582.50	5.00	1587.50
9	45.606076	-120.613159	1539.50	5.00	1544.50
10	45.612918	-120.613143	1557.90	5.00	1562.90
11	45.620015	-120.613108	1561.40	5.00	1566.40
12	45.627848	-120.613076	1478.70	5.00	1483.70

Name: Oehman Rd
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.621007	-120.624496	1490.30	5.00	1495.30
2	45.621195	-120.624325	1492.30	5.00	1497.30
3	45.621562	-120.624314	1498.40	5.00	1503.40
4	45.624900	-120.624282	1514.10	5.00	1519.10
5	45.628062	-120.624321	1541.50	5.00	1546.50
6	45.630213	-120.624226	1504.00	5.00	1509.00
7	45.632395	-120.624172	1500.50	5.00	1505.50
8	45.636064	-120.624129	1462.20	5.00	1467.20
9	45.641060	-120.624078	1507.70	5.00	1512.70
10	45.646394	-120.624000	1512.20	5.00	1517.20
11	45.651890	-120.623940	1482.40	5.00	1487.40
12	45.658455	-120.623849	1385.80	5.00	1390.80
13	45.666166	-120.623727	1305.40	5.00	1310.40
14	45.666518	-120.623652	1303.00	5.00	1308.00
15	45.668559	-120.623008	1295.10	5.00	1300.10
16	45.670052	-120.622507	1288.40	5.00	1293.40
17	45.670479	-120.622443	1288.30	5.00	1293.30
18	45.671560	-120.622410	1287.80	5.00	1292.80
19	45.673173	-120.622357	1284.90	5.00	1289.90
20	45.674328	-120.622582	1293.20	5.00	1298.20
21	45.674792	-120.622571	1301.50	5.00	1306.50
22	45.675487	-120.622464	1321.40	5.00	1326.40
23	45.675989	-120.621971	1337.60	5.00	1342.60
24	45.676364	-120.621316	1353.10	5.00	1358.10
25	45.676589	-120.620629	1351.40	5.00	1356.40

Name: Old Wasco-Heppner Hwy
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.591737	-120.695232	1307.40	5.00	1312.40
2	45.591715	-120.686340	1425.00	5.00	1430.00
3	45.591698	-120.677285	1485.90	5.00	1490.90
4	45.591683	-120.664594	1475.50	5.00	1480.50
5	45.591645	-120.649788	1555.40	5.00	1560.40
6	45.591608	-120.635203	1581.70	5.00	1586.70
7	45.591608	-120.626383	1567.50	5.00	1572.50
8	45.591473	-120.615718	1574.30	5.00	1579.30
9	45.591408	-120.613407	1562.50	5.00	1567.50

Name: Webfoot Rd
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.606047	-120.613135	1539.50	5.00	1544.50
2	45.606062	-120.611965	1536.80	5.00	1541.80
3	45.606043	-120.609766	1524.30	5.00	1529.30
4	45.606032	-120.606848	1523.10	5.00	1528.10
5	45.605998	-120.603238	1513.70	5.00	1518.70
6	45.605938	-120.601312	1506.30	5.00	1511.30
7	45.605902	-120.598984	1479.20	5.00	1484.20
8	45.605857	-120.597235	1467.80	5.00	1472.80
9	45.605796	-120.595051	1468.80	5.00	1473.80
10	45.605723	-120.592141	1458.20	5.00	1463.20
11	45.605678	-120.589904	1436.80	5.00	1441.80
12	45.605599	-120.586846	1418.50	5.00	1423.50
13	45.605565	-120.585038	1404.60	5.00	1409.60
14	45.605502	-120.582415	1382.80	5.00	1387.80
15	45.605509	-120.580248	1391.60	5.00	1396.60
16	45.605497	-120.577594	1393.30	5.00	1398.30

Discrete Observation Point Receptors

Name	ID	Latitude (°)	Longitude (°)	Elevation (ft)	Height (ft)
OP 1	1	45.581671	-120.650971	1462.10	6.00
OP 2	2	45.591202	-120.693499	1345.50	6.00
OP 3	3	45.595312	-120.700334	1283.30	6.00
OP 4	4	45.605526	-120.665361	1365.50	6.00
OP 5	5	45.617148	-120.690993	1231.10	6.00
OP 6	6	45.625705	-120.652694	1408.60	6.00
OP 7	7	45.627981	-120.607648	1475.00	6.00
OP 8	8	45.657315	-120.612840	1458.70	6.00
OP 9	9	45.685485	-120.604651	997.80	6.00
OP 10	10	45.699712	-120.546563	983.00	6.00
OP 11	11	45.650975	-120.557140	1098.90	6.00
OP 12	12	45.633880	-120.525643	1191.60	6.00
OP 13	13	45.584821	-120.519879	1309.30	6.00
OP 14	14	45.647816	-120.590278	1236.50	6.00
OP 15	15	45.629485	-120.559316	1191.50	6.00
OP 16	16	45.622847	-120.562188	1256.80	6.00
OP 17	17	45.548417	-120.552628	1485.10	6.00
OP 18	18	45.549640	-120.592761	1590.70	6.00
OP 19	19	45.568232	-120.603758	1535.50	6.00
OP 20	20	45.583640	-120.614099	1557.40	6.00
OP 21	21	45.591961	-120.627507	1560.20	6.00

Glare Analysis Results

Summary of Results

Glare with potential for temporary after-image predicted

PV Array	Tilt	Orient	Annual Green Glare		Annual Yellow Glare		Energy
	°	°	min	hr	min	hr	kWh
PV array 21	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 22	SA tracking	SA tracking	5,895	98.2	6,763	112.7	-
PV array 23	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 24	SA tracking	SA tracking	3,812	63.5	2,381	39.7	-
PV array 25	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 26	SA tracking	SA tracking	1,387	23.1	12	0.2	-
PV array 27	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 28	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 29	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 30	SA tracking	SA tracking	1,211	20.2	0	0.0	-

Total glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	6,299	105.0	8,398	140.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	2,273	37.9	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	2,875	47.9	758	12.6
OP 9	450	7.5	0	0.0
OP 10	408	6.8	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV: PV array 21 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV array 21 and Route: Emigrant Springs Ln

No glare found

PV array 21 and Route: Herin Ln - 1

No glare found

PV array 21 and Route: Herin Ln - 2

No glare found

PV array 21 and Route: Hwy 206

No glare found

PV array 21 and Route: I97

No glare found

PV array 21 and Route: Klondike Rd

No glare found

PV array 21 and Route: Medler Ln

No glare found

PV array 21 and Route: N Klondike Rd

No glare found

PV array 21 and Route: Oehman Rd

No glare found

PV array 21 and Route: Old Wasco-Heppner Hwy

No glare found

PV array 21 and Route: Webfoot Rd

No glare found

PV array 21 and OP 1

No glare found

PV array 21 and OP 2

No glare found

PV array 21 and OP 3

No glare found

PV array 21 and OP 4

No glare found

PV array 21 and OP 5

No glare found

PV array 21 and OP 6

No glare found

PV array 21 and OP 7

No glare found

PV array 21 and OP 8

No glare found

PV array 21 and OP 9

No glare found

PV array 21 and OP 10

No glare found

PV array 21 and OP 11

No glare found

PV array 21 and OP 12

No glare found

PV array 21 and OP 13

No glare found

PV array 21 and OP 14

No glare found

PV array 21 and OP 15

No glare found

PV array 21 and OP 16

No glare found

PV array 21 and OP 17

No glare found

PV array 21 and OP 18

No glare found

PV array 21 and OP 19

No glare found

PV array 21 and OP 20

No glare found

PV array 21 and OP 21

No glare found

PV: PV array 22 potential temporary after-image

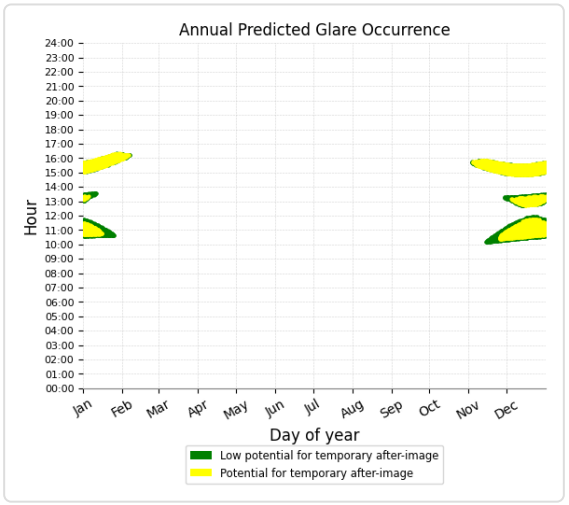
Receptor results ordered by category of glare

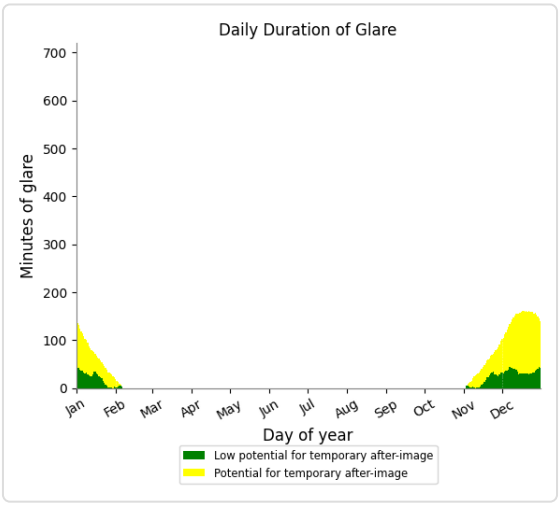
Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Herin Ln - 1	2,230	37.2	6,005	100.1
Oehman Rd	1,027	17.1	0	0.0
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 8	2,638	44.0	758	12.6
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

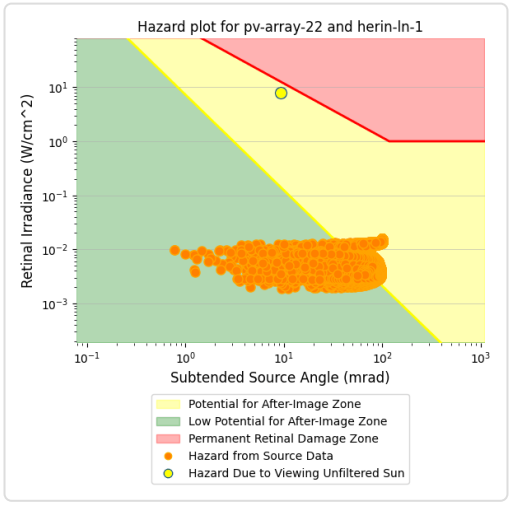
PV array 22 and Route: Herin Ln - 1

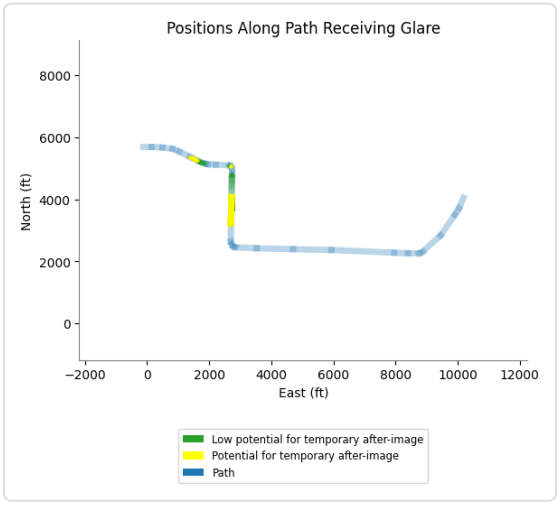
Yellow glare: 6,005 min.

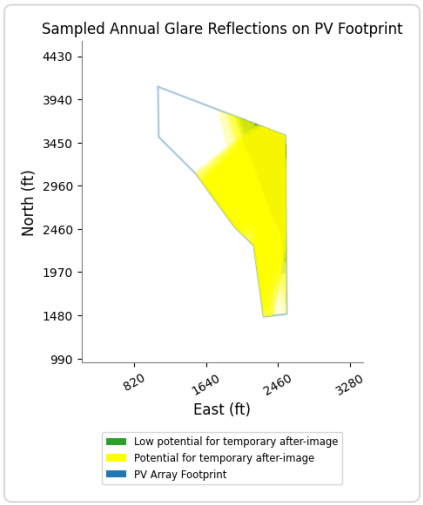
Green glare: 2,230 min.







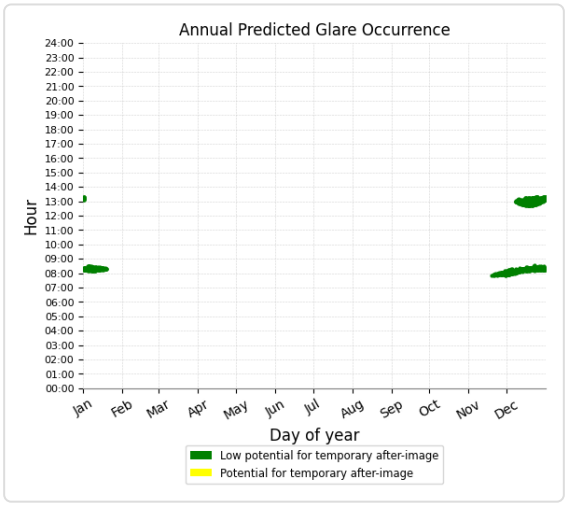


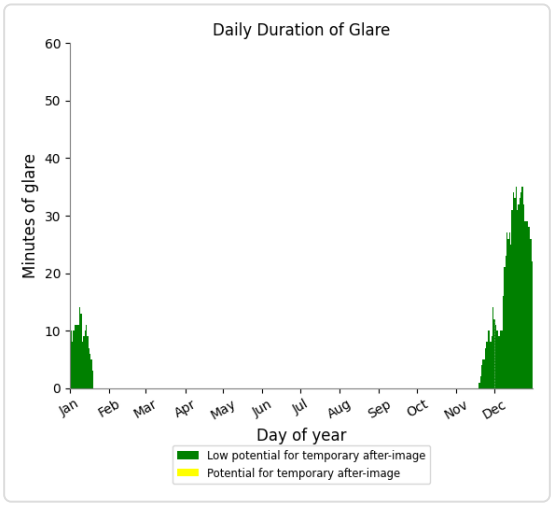


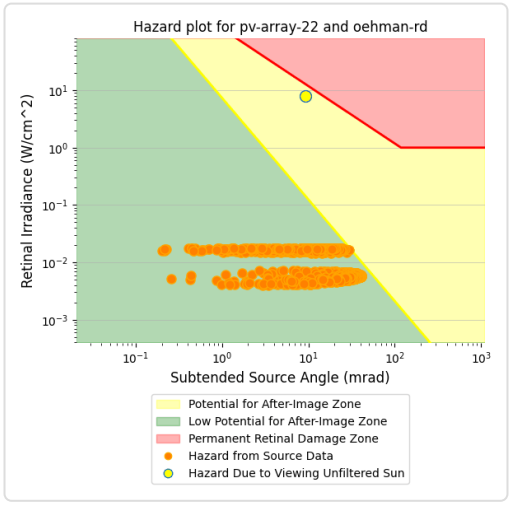
PV array 22 and Route: Oehman Rd

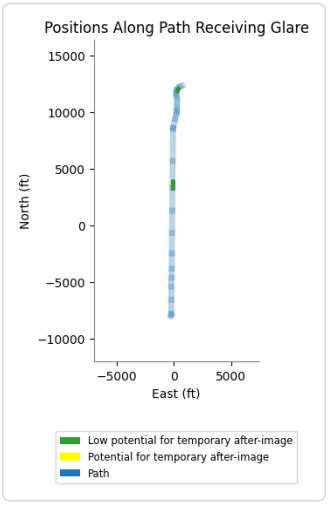
Yellow glare: none

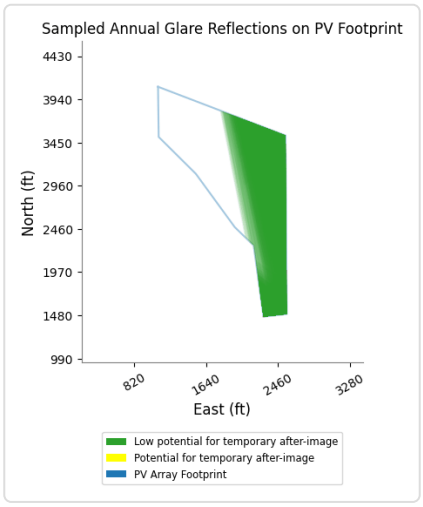
Green glare: 1,027 min.











PV array 22 and Route: Emigrant Springs Ln

No glare found

PV array 22 and Route: Herin Ln - 2

No glare found

PV array 22 and Route: Hwy 206

No glare found

PV array 22 and Route: I97

No glare found

PV array 22 and Route: Klondike Rd

No glare found

PV array 22 and Route: Medler Ln

No glare found

PV array 22 and Route: N Klondike Rd

No glare found

PV array 22 and Route: Old Wasco-Heppner Hwy

No glare found

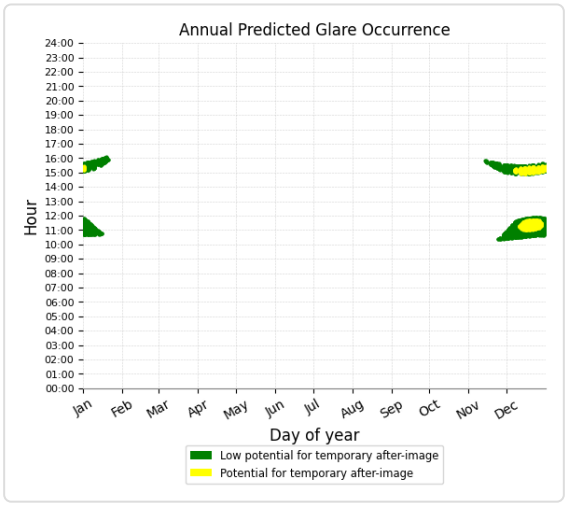
PV array 22 and Route: Webfoot Rd

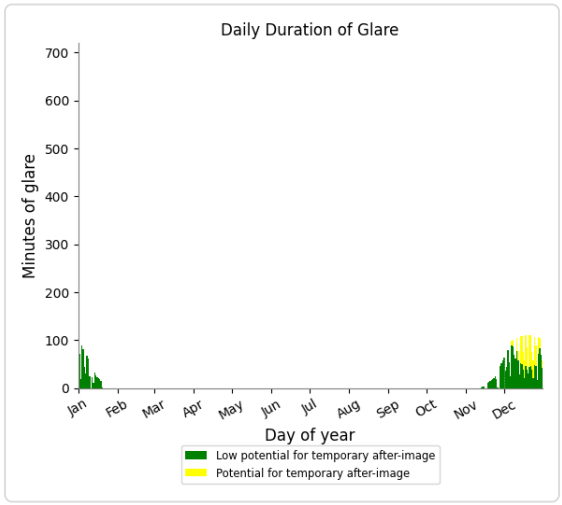
No glare found

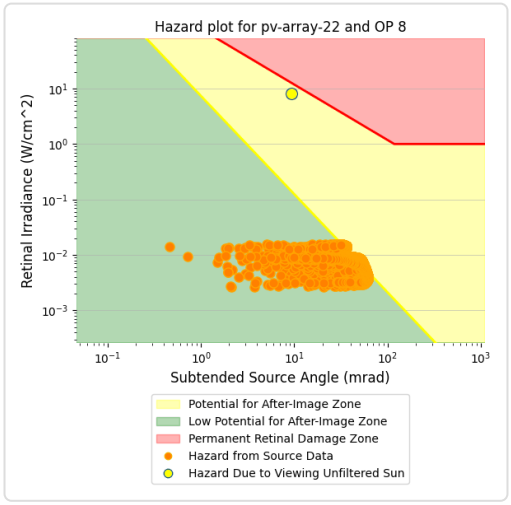
PV array 22 and OP 8

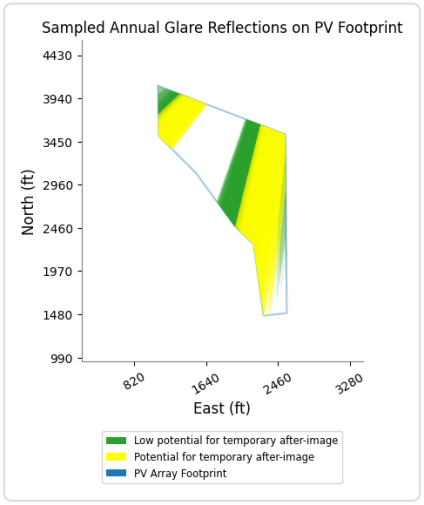
Yellow glare: 758 min.

Green glare: 2,638 min.









PV array 22 and OP 1

No glare found

PV array 22 and OP 2

No glare found

PV array 22 and OP 3

No glare found

PV array 22 and OP 4

No glare found

PV array 22 and OP 5

No glare found

PV array 22 and OP 6

No glare found

PV array 22 and OP 7

No glare found

PV array 22 and OP 9

No glare found

PV array 22 and OP 10

No glare found

PV array 22 and OP 11

No glare found

PV array 22 and OP 12

No glare found

PV array 22 and OP 13

No glare found

PV array 22 and OP 14

No glare found

PV array 22 and OP 15

No glare found

PV array 22 and OP 16

No glare found

PV array 22 and OP 17

No glare found

PV array 22 and OP 18

No glare found

PV array 22 and OP 19

No glare found

PV array 22 and OP 20

No glare found

PV array 22 and OP 21

No glare found

PV: PV array 23 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV array 23 and Route: Emigrant Springs Ln

No glare found

PV array 23 and Route: Herin Ln - 1

No glare found

PV array 23 and Route: Herin Ln - 2

No glare found

PV array 23 and Route: Hwy 206

No glare found

PV array 23 and Route: I97

No glare found

PV array 23 and Route: Klondike Rd

No glare found

PV array 23 and Route: Medler Ln

No glare found

PV array 23 and Route: N Klondike Rd

No glare found

PV array 23 and Route: Oehman Rd

No glare found

PV array 23 and Route: Old Wasco-Heppner Hwy

No glare found

PV array 23 and Route: Webfoot Rd

No glare found

PV array 23 and OP 1

No glare found

PV array 23 and OP 2

No glare found

PV array 23 and OP 3

No glare found

PV array 23 and OP 4

No glare found

PV array 23 and OP 5

No glare found

PV array 23 and OP 6

No glare found

PV array 23 and OP 7

No glare found

PV array 23 and OP 8

No glare found

PV array 23 and OP 9

No glare found

PV array 23 and OP 10

No glare found

PV array 23 and OP 11

No glare found

PV array 23 and OP 12

No glare found

PV array 23 and OP 13

No glare found

PV array 23 and OP 14

No glare found

PV array 23 and OP 15

No glare found

PV array 23 and OP 16

No glare found

PV array 23 and OP 17

No glare found

PV array 23 and OP 18

No glare found

PV array 23 and OP 19

No glare found

PV array 23 and OP 20

No glare found

PV array 23 and OP 21

No glare found

PV: PV array 24 potential temporary after-image

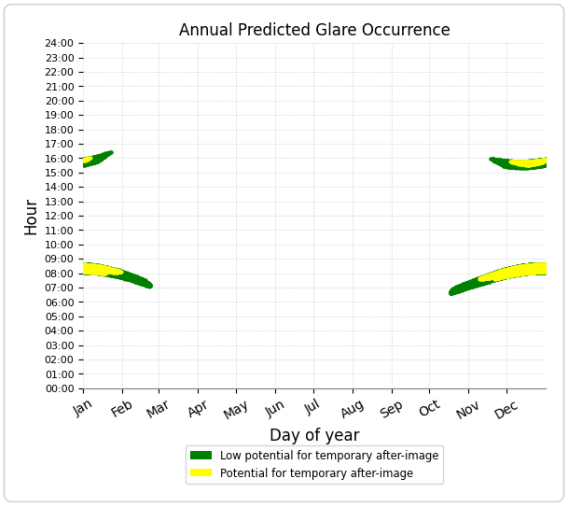
Receptor results ordered by category of glare

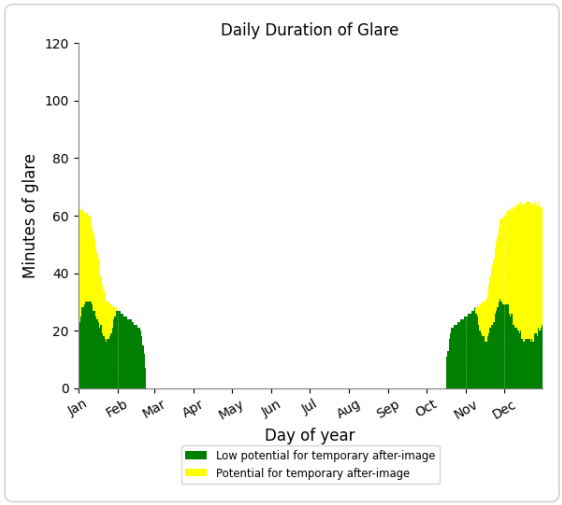
Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Herin Ln - 1	2,919	48.6	2,381	39.7
Oehman Rd	893	14.9	0	0.0
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

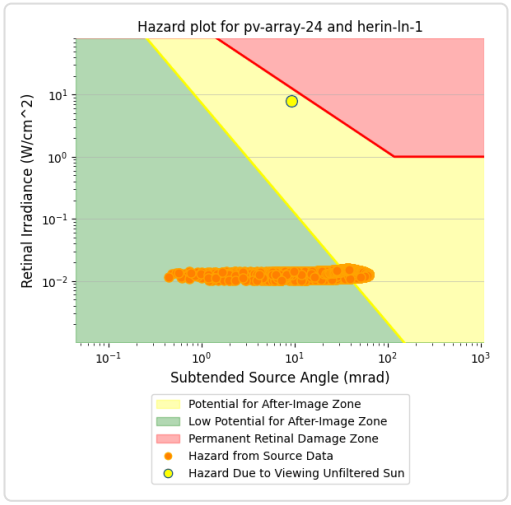
PV array 24 and Route: Herin Ln - 1

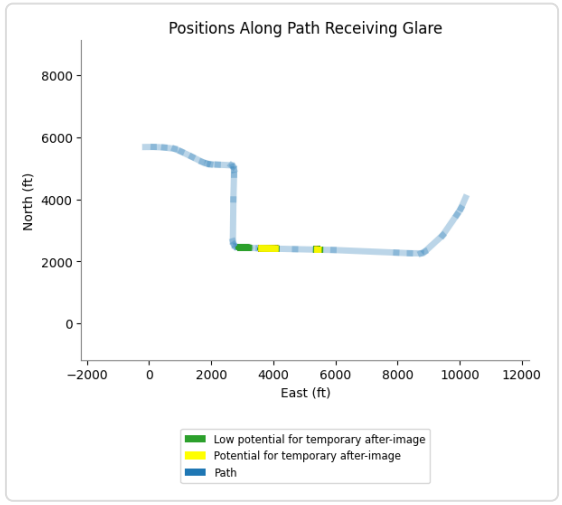
Yellow glare: 2,381 min.

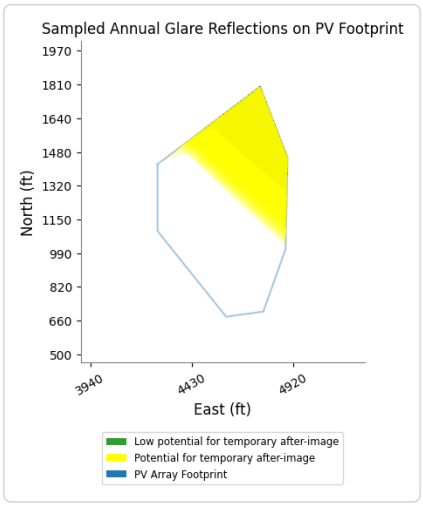
Green glare: 2,919 min.







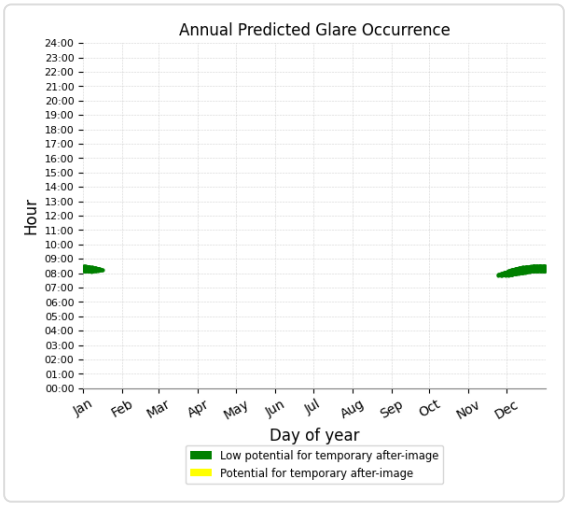


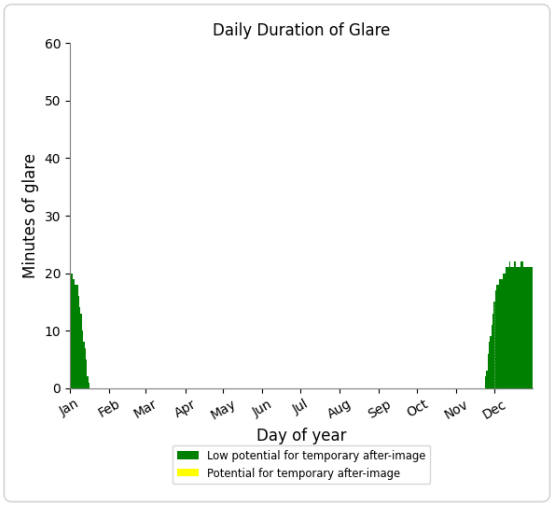


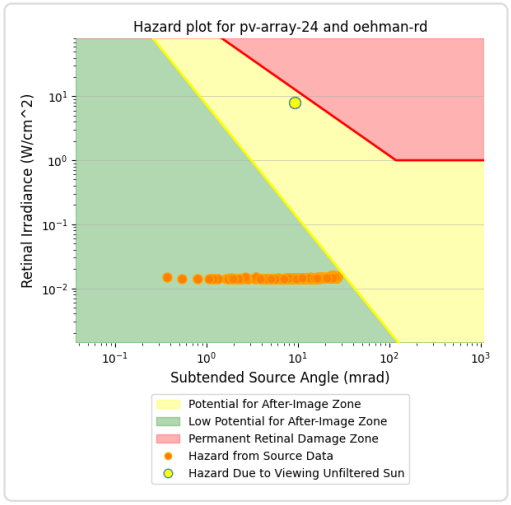
PV array 24 and Route: Oehman Rd

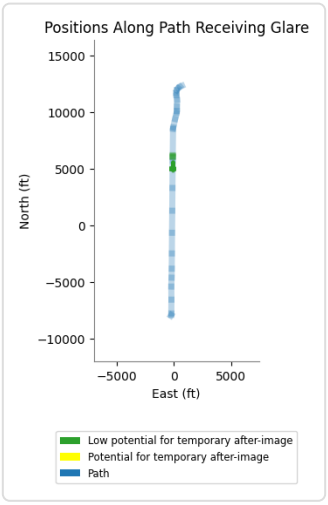
Yellow glare: none

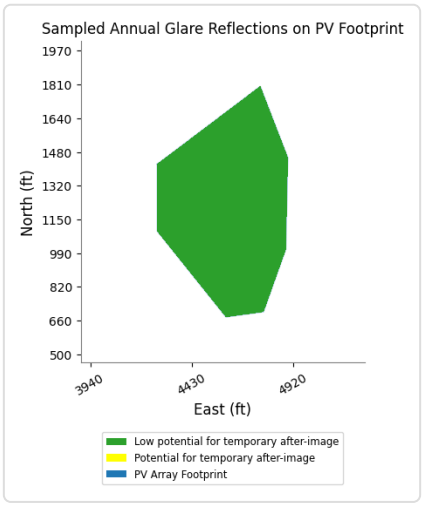
Green glare: 893 min.











PV array 24 and Route: Emigrant Springs Ln

No glare found

PV array 24 and Route: Herin Ln - 2

No glare found

PV array 24 and Route: Hwy 206

No glare found

PV array 24 and Route: I97

No glare found

PV array 24 and Route: Klondike Rd

No glare found

PV array 24 and Route: Medler Ln

No glare found

PV array 24 and Route: N Klondike Rd

No glare found

PV array 24 and Route: Old Wasco-Heppner Hwy

No glare found

PV array 24 and Route: Webfoot Rd

No glare found

PV array 24 and OP 1

No glare found

PV array 24 and OP 2

No glare found

PV array 24 and OP 3

No glare found

PV array 24 and OP 4

No glare found

PV array 24 and OP 5

No glare found

PV array 24 and OP 6

No glare found

PV array 24 and OP 7

No glare found

PV array 24 and OP 8

No glare found

PV array 24 and OP 9

No glare found

PV array 24 and OP 10

No glare found

PV array 24 and OP 11

No glare found

PV array 24 and OP 12

No glare found

PV array 24 and OP 13

No glare found

PV array 24 and OP 14

No glare found

PV array 24 and OP 15

No glare found

PV array 24 and OP 16

No glare found

PV array 24 and OP 17

No glare found

PV array 24 and OP 18

No glare found

PV array 24 and OP 19

No glare found

PV array 24 and OP 20

No glare found

PV array 24 and OP 21

No glare found

PV: PV array 25 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV array 25 and Route: Emigrant Springs Ln

No glare found

PV array 25 and Route: Herin Ln - 1

No glare found

PV array 25 and Route: Herin Ln - 2

No glare found

PV array 25 and Route: Hwy 206

No glare found

PV array 25 and Route: I97

No glare found

PV array 25 and Route: Klondike Rd

No glare found

PV array 25 and Route: Medler Ln

No glare found

PV array 25 and Route: N Klondike Rd

No glare found

PV array 25 and Route: Oehman Rd

No glare found

PV array 25 and Route: Old Wasco-Heppner Hwy

No glare found

PV array 25 and Route: Webfoot Rd

No glare found

PV array 25 and OP 1

No glare found

PV array 25 and OP 2

No glare found

PV array 25 and OP 3

No glare found

PV array 25 and OP 4

No glare found

PV array 25 and OP 5

No glare found

PV array 25 and OP 6

No glare found

PV array 25 and OP 7

No glare found

PV array 25 and OP 8

No glare found

PV array 25 and OP 9

No glare found

PV array 25 and OP 10

No glare found

PV array 25 and OP 11

No glare found

PV array 25 and OP 12

No glare found

PV array 25 and OP 13

No glare found

PV array 25 and OP 14

No glare found

PV array 25 and OP 15

No glare found

PV array 25 and OP 16

No glare found

PV array 25 and OP 17

No glare found

PV array 25 and OP 18

No glare found

PV array 25 and OP 19

No glare found

PV array 25 and OP 20

No glare found

PV array 25 and OP 21

No glare found

PV: PV array 26 potential temporary after-image

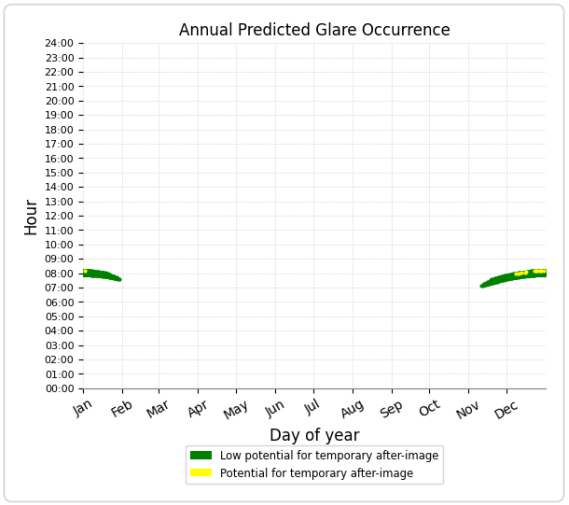
Receptor results ordered by category of glare

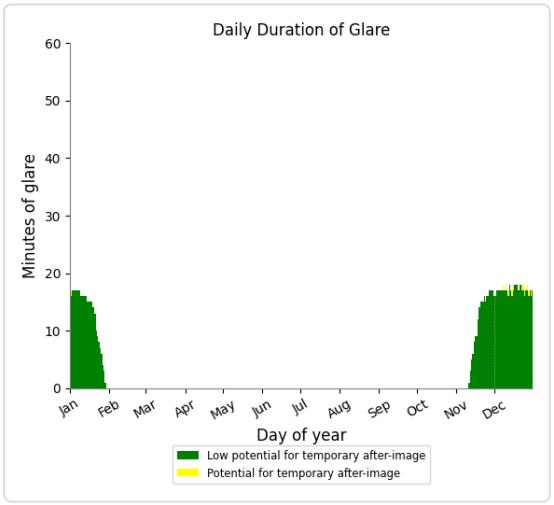
Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Herin Ln - 1	1,150	19.2	12	0.2
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 8	237	4.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

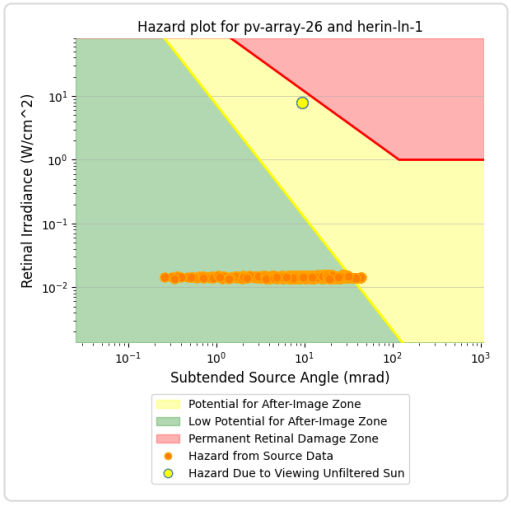
PV array 26 and Route: Herin Ln - 1

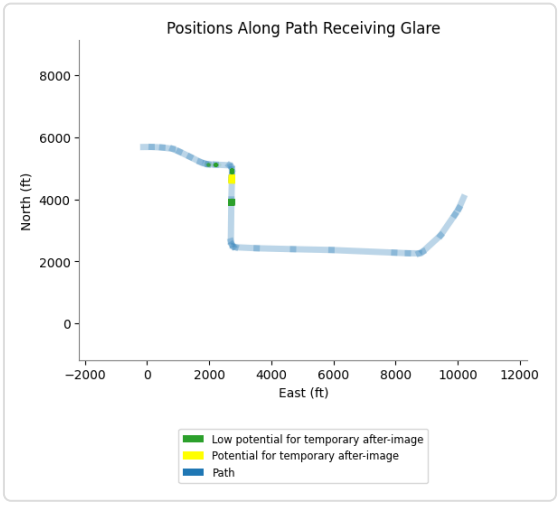
Yellow glare: 12 min.

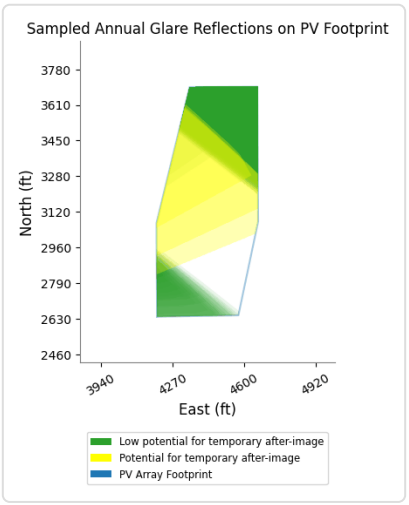
Green glare: 1,150 min.











PV array 26 and Route: Emigrant Springs Ln

No glare found

PV array 26 and Route: Herin Ln - 2

No glare found

PV array 26 and Route: Hwy 206

No glare found

PV array 26 and Route: I97

No glare found

PV array 26 and Route: Klondike Rd

No glare found

PV array 26 and Route: Medler Ln

No glare found

PV array 26 and Route: N Klondike Rd

No glare found

PV array 26 and Route: Oehman Rd

No glare found

PV array 26 and Route: Old Wasco-Heppner Hwy

No glare found

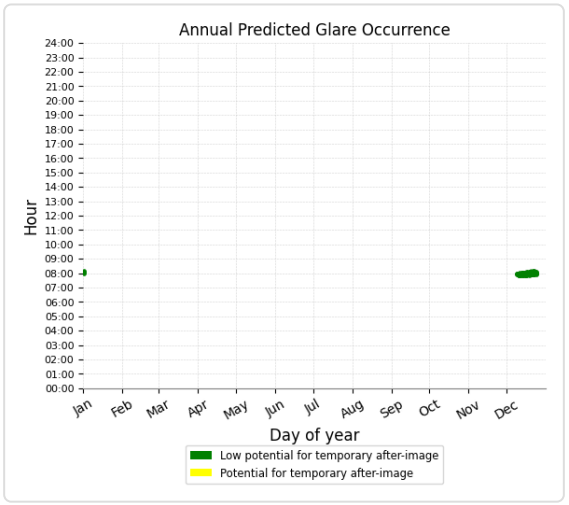
PV array 26 and Route: Webfoot Rd

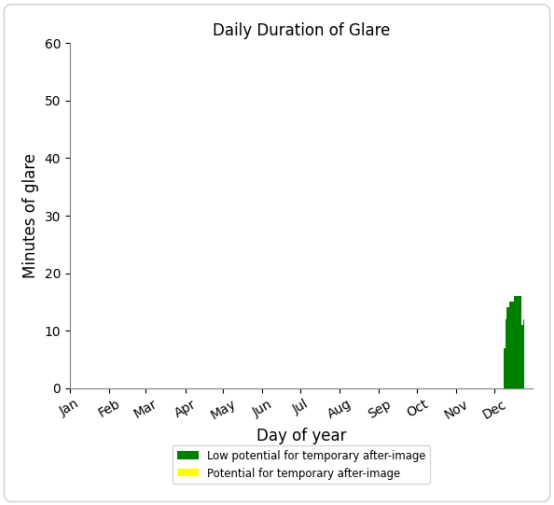
No glare found

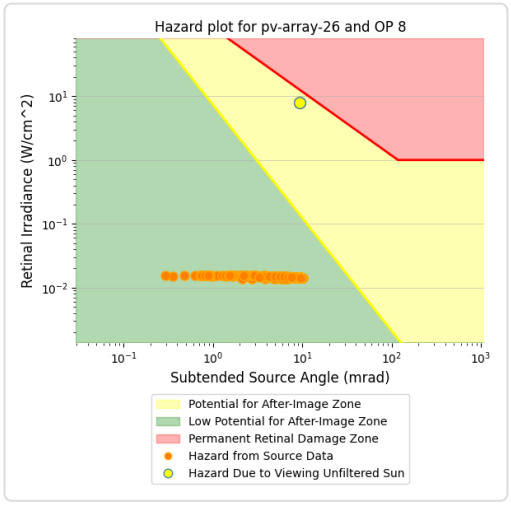
PV array 26 and OP 8

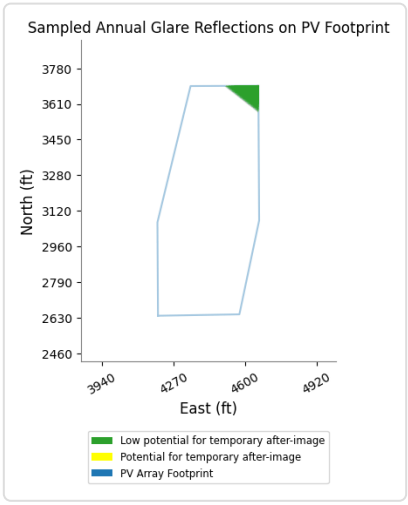
Yellow glare: none

Green glare: 237 min.









PV array 26 and OP 1

No glare found

PV array 26 and OP 2

No glare found

PV array 26 and OP 3

No glare found

PV array 26 and OP 4

No glare found

PV array 26 and OP 5

No glare found

PV array 26 and OP 6

No glare found

PV array 26 and OP 7

No glare found

PV array 26 and OP 9

No glare found

PV array 26 and OP 10

No glare found

PV array 26 and OP 11

No glare found

PV array 26 and OP 12

No glare found

PV array 26 and OP 13

No glare found

PV array 26 and OP 14

No glare found

PV array 26 and OP 15

No glare found

PV array 26 and OP 16

No glare found

PV array 26 and OP 17

No glare found

PV array 26 and OP 18

No glare found

PV array 26 and OP 19

No glare found

PV array 26 and OP 20

No glare found

PV array 26 and OP 21

No glare found

PV: PV array 27 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV array 27 and Route: Emigrant Springs Ln

No glare found

PV array 27 and Route: Herin Ln - 1

No glare found

PV array 27 and Route: Herin Ln - 2

No glare found

PV array 27 and Route: Hwy 206

No glare found

PV array 27 and Route: I97

No glare found

PV array 27 and Route: Klondike Rd

No glare found

PV array 27 and Route: Medler Ln

No glare found

PV array 27 and Route: N Klondike Rd

No glare found

PV array 27 and Route: Oehman Rd

No glare found

PV array 27 and Route: Old Wasco-Heppner Hwy

No glare found

PV array 27 and Route: Webfoot Rd

No glare found

PV array 27 and OP 1

No glare found

PV array 27 and OP 2

No glare found

PV array 27 and OP 3

No glare found

PV array 27 and OP 4

No glare found

PV array 27 and OP 5

No glare found

PV array 27 and OP 6

No glare found

PV array 27 and OP 7

No glare found

PV array 27 and OP 8

No glare found

PV array 27 and OP 9

No glare found

PV array 27 and OP 10

No glare found

PV array 27 and OP 11

No glare found

PV array 27 and OP 12

No glare found

PV array 27 and OP 13

No glare found

PV array 27 and OP 14

No glare found

PV array 27 and OP 15

No glare found

PV array 27 and OP 16

No glare found

PV array 27 and OP 17

No glare found

PV array 27 and OP 18

No glare found

PV array 27 and OP 19

No glare found

PV array 27 and OP 20

No glare found

PV array 27 and OP 21

No glare found

PV: PV array 28 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV array 28 and Route: Emigrant Springs Ln

No glare found

PV array 28 and Route: Herin Ln - 1

No glare found

PV array 28 and Route: Herin Ln - 2

No glare found

PV array 28 and Route: Hwy 206

No glare found

PV array 28 and Route: I97

No glare found

PV array 28 and Route: Klondike Rd

No glare found

PV array 28 and Route: Medler Ln

No glare found

PV array 28 and Route: N Klondike Rd

No glare found

PV array 28 and Route: Oehman Rd

No glare found

PV array 28 and Route: Old Wasco-Heppner Hwy

No glare found

PV array 28 and Route: Webfoot Rd

No glare found

PV array 28 and OP 1

No glare found

PV array 28 and OP 2

No glare found

PV array 28 and OP 3

No glare found

PV array 28 and OP 4

No glare found

PV array 28 and OP 5

No glare found

PV array 28 and OP 6

No glare found

PV array 28 and OP 7

No glare found

PV array 28 and OP 8

No glare found

PV array 28 and OP 9

No glare found

PV array 28 and OP 10

No glare found

PV array 28 and OP 11

No glare found

PV array 28 and OP 12

No glare found

PV array 28 and OP 13

No glare found

PV array 28 and OP 14

No glare found

PV array 28 and OP 15

No glare found

PV array 28 and OP 16

No glare found

PV array 28 and OP 17

No glare found

PV array 28 and OP 18

No glare found

PV array 28 and OP 19

No glare found

PV array 28 and OP 20

No glare found

PV array 28 and OP 21

No glare found

PV: PV array 29 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV array 29 and Route: Emigrant Springs Ln

No glare found

PV array 29 and Route: Herin Ln - 1

No glare found

PV array 29 and Route: Herin Ln - 2

No glare found

PV array 29 and Route: Hwy 206

No glare found

PV array 29 and Route: I97

No glare found

PV array 29 and Route: Klondike Rd

No glare found

PV array 29 and Route: Medler Ln

No glare found

PV array 29 and Route: N Klondike Rd

No glare found

PV array 29 and Route: Oehman Rd

No glare found

PV array 29 and Route: Old Wasco-Heppner Hwy

No glare found

PV array 29 and Route: Webfoot Rd

No glare found

PV array 29 and OP 1

No glare found

PV array 29 and OP 2

No glare found

PV array 29 and OP 3

No glare found

PV array 29 and OP 4

No glare found

PV array 29 and OP 5

No glare found

PV array 29 and OP 6

No glare found

PV array 29 and OP 7

No glare found

PV array 29 and OP 8

No glare found

PV array 29 and OP 9

No glare found

PV array 29 and OP 10

No glare found

PV array 29 and OP 11

No glare found

PV array 29 and OP 12

No glare found

PV array 29 and OP 13

No glare found

PV array 29 and OP 14

No glare found

PV array 29 and OP 15

No glare found

PV array 29 and OP 16

No glare found

PV array 29 and OP 17

No glare found

PV array 29 and OP 18

No glare found

PV array 29 and OP 19

No glare found

PV array 29 and OP 20

No glare found

PV array 29 and OP 21

No glare found

PV: PV array 30 low potential for temporary after-image

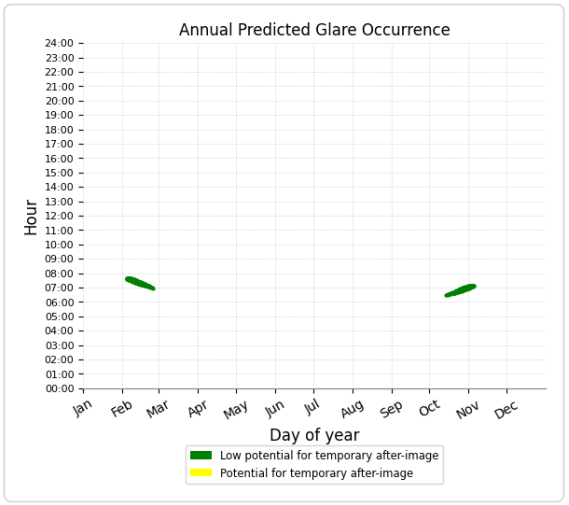
Receptor results ordered by category of glare

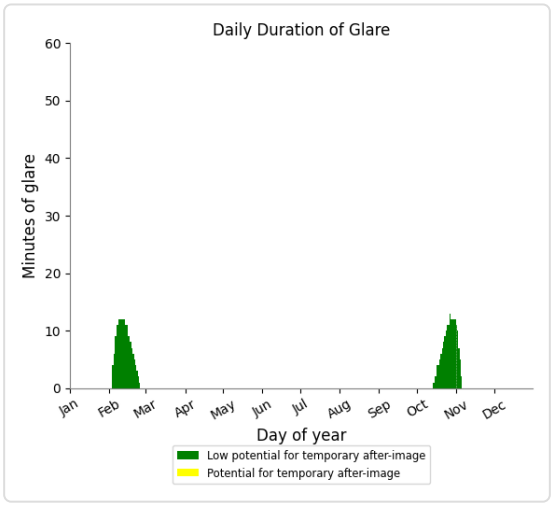
Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Oehman Rd	353	5.9	0	0.0
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 9	450	7.5	0	0.0
OP 10	408	6.8	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

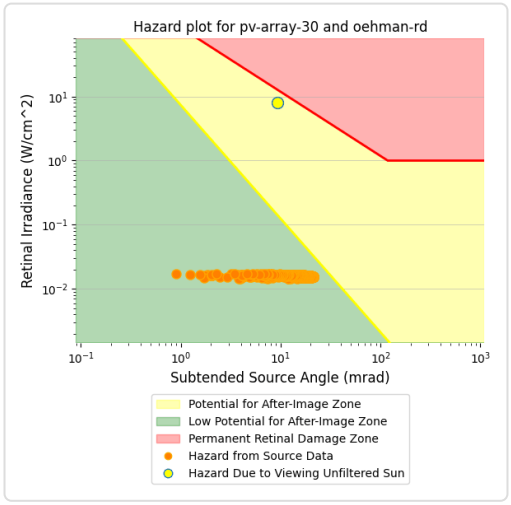
PV array 30 and Route: Oehman Rd

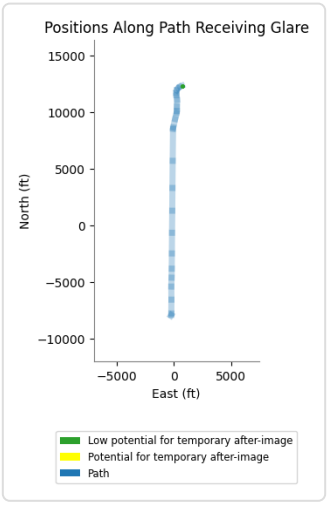
Yellow glare: none

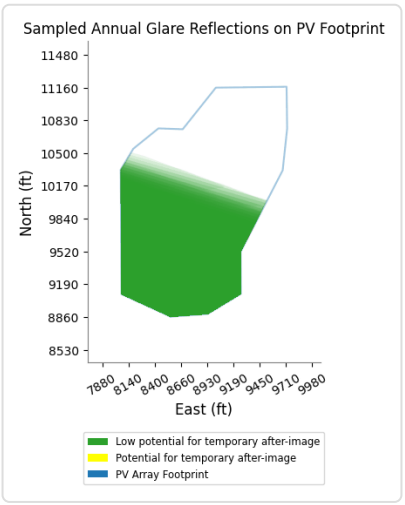
Green glare: 353 min.











PV array 30 and Route: Emigrant Springs Ln

No glare found

PV array 30 and Route: Herin Ln - 1

No glare found

PV array 30 and Route: Herin Ln - 2

No glare found

PV array 30 and Route: Hwy 206

No glare found

PV array 30 and Route: I97

No glare found

PV array 30 and Route: Klondike Rd

No glare found

PV array 30 and Route: Medler Ln

No glare found

PV array 30 and Route: N Klondike Rd

No glare found

PV array 30 and Route: Old Wasco-Heppner Hwy

No glare found

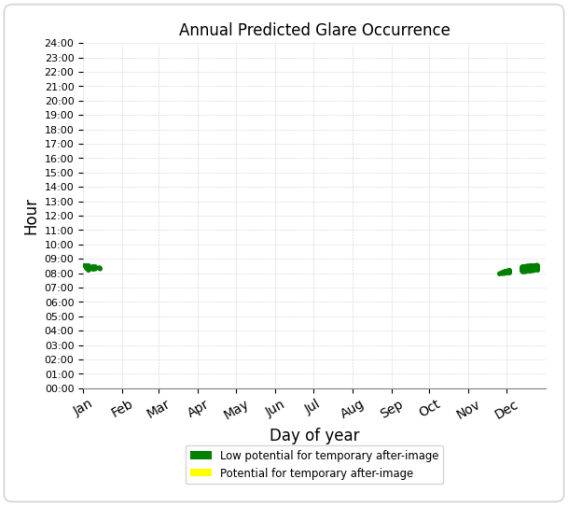
PV array 30 and Route: Webfoot Rd

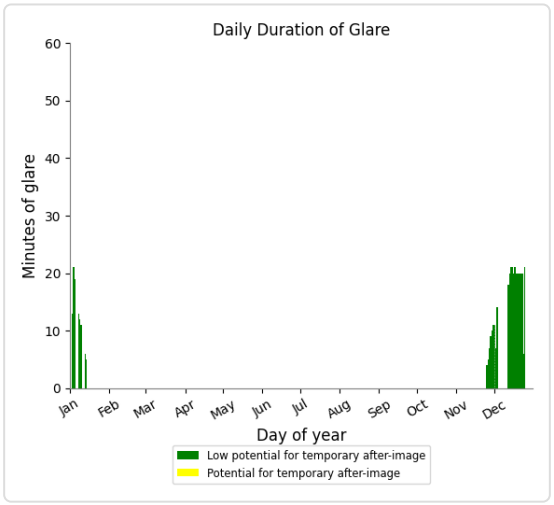
No glare found

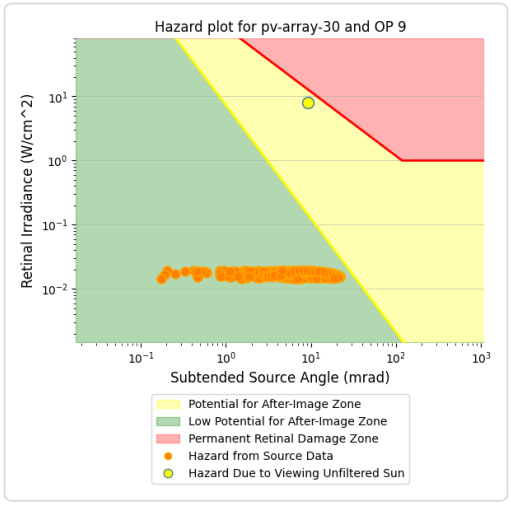
PV array 30 and OP 9

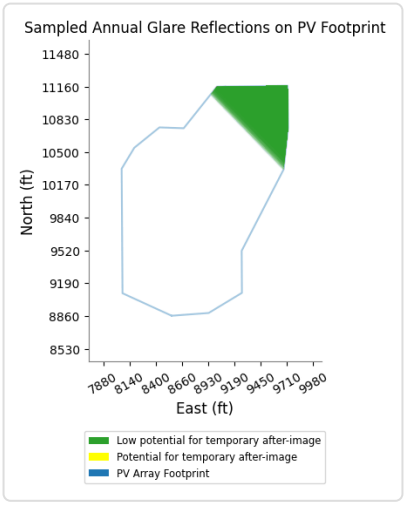
Yellow glare: none

Green glare: 450 min.





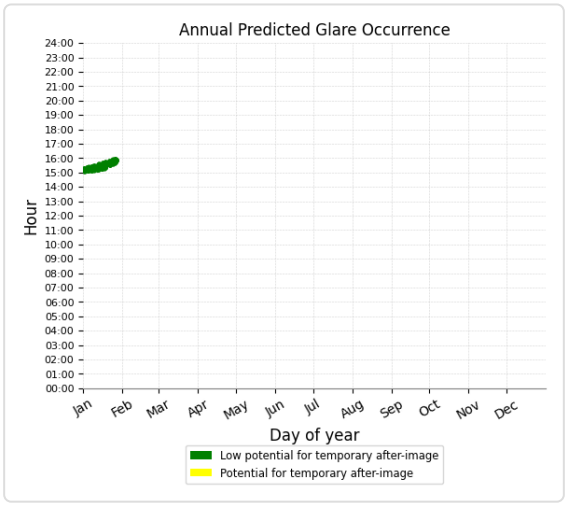


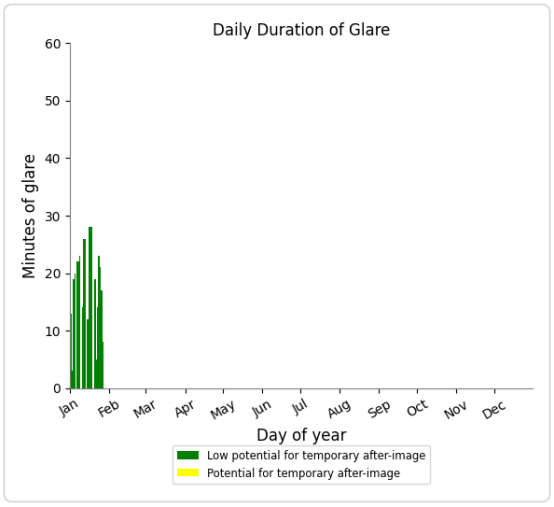


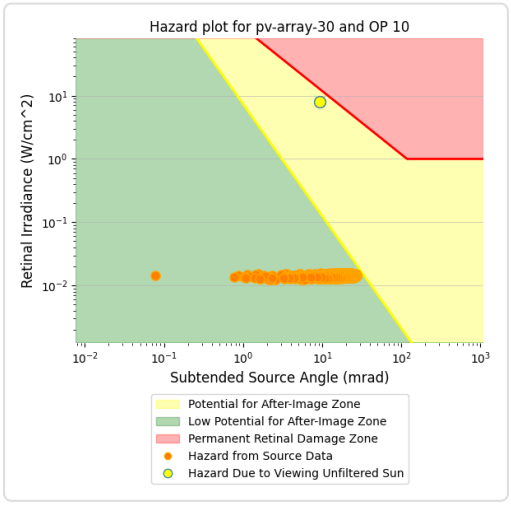
PV array 30 and OP 10

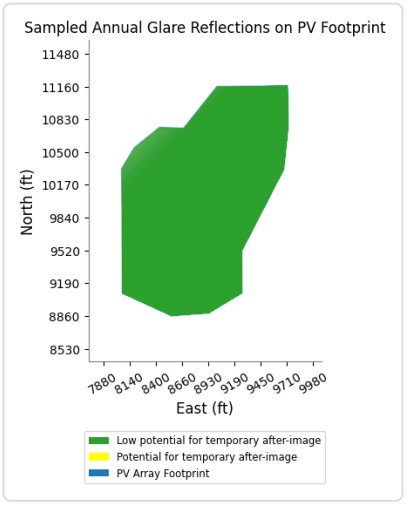
Yellow glare: none

Green glare: 408 min.









PV array 30 and OP 1

No glare found

PV array 30 and OP 2

No glare found

PV array 30 and OP 3

No glare found

PV array 30 and OP 4

No glare found

PV array 30 and OP 5

No glare found

PV array 30 and OP 6

No glare found

PV array 30 and OP 7

No glare found

PV array 30 and OP 8

No glare found

PV array 30 and OP 11

No glare found

PV array 30 and OP 12

No glare found

PV array 30 and OP 13

No glare found

PV array 30 and OP 14

No glare found

PV array 30 and OP 15

No glare found

PV array 30 and OP 16

No glare found

PV array 30 and OP 17

No glare found

PV array 30 and OP 18

No glare found

PV array 30 and OP 19

No glare found

PV array 30 and OP 20

No glare found

PV array 30 and OP 21

No glare found

Assumptions

"Green" glare is glare with low potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.
"Yellow" glare is glare with potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.
Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.
The algorithm does not rigorously represent the detailed geometry of a system; detailed features such as gaps between modules, variable height of the PV array, and support structures may impact actual glare results. However, we have validated our models against several systems, including a PV array causing glare to the air-traffic control tower at Manchester-Boston Regional Airport and several sites in Albuquerque, and the tool accurately predicted the occurrence and intensity of glare at different times and days of the year.
Several V1 calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for large PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare. This primarily affects V1 analyses of path receptors.
Random number computations are utilized by various steps of the annual hazard analysis algorithm. Predicted minutes of glare can vary between runs as a result. This limitation primarily affects analyses of Observation Point receptors, including ATCTs. Note that the SGHAT/ ForgeSolar methodology has always relied on an analytical, qualitative approach to accurately determine the overall hazard (i.e. green vs. yellow) of expected glare on an annual basis.
The analysis does not automatically consider obstacles (either man-made or natural) between the observation points and the prescribed solar installation that may obstruct observed glare, such as trees, hills, buildings, etc.
The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)
The variable direct normal irradiance (DNI) feature (if selected) scales the user-prescribed peak DNI using a typical clear-day irradiance profile. This profile has a lower DNI in the mornings and evenings and a maximum at solar noon. The scaling uses a clear-day irradiance profile based on a normalized time relative to sunrise, solar noon, and sunset, which are prescribed by a sun-position algorithm and the latitude and longitude obtained from Google maps. The actual DNI on any given day can be affected by cloud cover, atmospheric attenuation, and other environmental factors.
The ocular hazard predicted by the tool depends on a number of environmental, optical, and human factors, which can be uncertain. We provide input fields and typical ranges of values for these factors so that the user can vary these parameters to see if they have an impact on the results. The speed of SGHAT allows expedited sensitivity and parametric analyses.
The system output calculation is a DNI-based approximation that assumes clear, sunny skies year-round. It should not be used in place of more rigorous modeling methods.
Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid based on aggregated research data. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.
Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.
Refer to the Help page at **www.forgesolar.com/help/** for assumptions and limitations not listed here.

Default glare analysis parameters and observer eye characteristics (for reference only):

- Analysis time interval: 1 minute
- Ocular transmission coefficient: 0.5
- Pupil diameter: 0.002 meters
- Eye focal length: 0.017 meters
- Sun subtended angle: 9.3 milliradians

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FORGESOLAR GLARE ANALYSIS

Project: **Biglow Canyon Solar**
Site configuration: **North Arrays Analysis 2 - 2nd Story Receptors**

Created 09 Aug, 2024
Updated 14 Aug, 2024
Time-step 1 minute
Timezone offset UTC-8
Minimum sun altitude 0.0 deg
DNI peaks at 1,000.0 W/m^2
Category 100 MW to 1 GW
Site ID 126471.21638

Ocular transmission coefficient 0.5
Pupil diameter 0.002 m
Eye focal length 0.017 m
Sun subtended angle 9.3 mrad
PV analysis methodology V2

Summary of Results

Glare with potential for temporary after-image predicted

PV Array	Tilt	Orient	Annual Green Glare		Annual Yellow Glare		Energy
	°	°	min	hr	min	hr	kWh
PV array 21	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 22	SA tracking	SA tracking	6,750	112.5	8,206	136.8	-
PV array 23	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 24	SA tracking	SA tracking	3,797	63.3	2,661	44.4	-
PV array 25	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 26	SA tracking	SA tracking	1,408	23.5	9	0.1	-
PV array 27	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 28	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 29	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 30	SA tracking	SA tracking	1,200	20.0	0	0.0	-

Total glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	6,416	106.9	9,595	159.9

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	2,595	43.2	27	0.5
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	3,301	55.0	1,254	20.9
OP 9	426	7.1	0	0.0
OP 10	417	7.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

Component Data

PV Arrays

Name: PV array 21
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.642846	-120.623403	1553.80	8.00	1561.80
2	45.642835	-120.617915	1522.80	8.00	1530.80
3	45.647327	-120.618296	1483.40	8.00	1491.40
4	45.649663	-120.620935	1525.80	8.00	1533.80
5	45.650831	-120.621681	1496.20	8.00	1504.20
6	45.650772	-120.623482	1484.80	8.00	1492.80

Name: PV array 22
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.654035	-120.619126	1450.00	8.00	1458.00
2	45.652514	-120.613446	1446.70	8.00	1454.70
3	45.646936	-120.613391	1508.10	8.00	1516.10
4	45.646852	-120.614429	1517.10	8.00	1525.10
5	45.649078	-120.614867	1508.90	8.00	1516.90
6	45.649650	-120.615708	1486.80	8.00	1494.80
7	45.651318	-120.617443	1492.00	8.00	1500.00
8	45.652468	-120.619097	1478.00	8.00	1486.00

Name: PV array 23
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.647499	-120.611982	1466.70	8.00	1474.70
2	45.647510	-120.611085	1440.90	8.00	1448.90
3	45.643443	-120.604903	1443.80	8.00	1451.80
4	45.642581	-120.604812	1413.30	8.00	1421.30
5	45.642513	-120.611964	1485.70	8.00	1493.70

Name: PV array 24
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.646733	-120.606734	1357.40	8.00	1365.40
2	45.647767	-120.604788	1343.40	8.00	1351.40
3	45.646820	-120.604268	1365.40	8.00	1373.40
4	45.645600	-120.604306	1398.20	8.00	1406.20
5	45.644768	-120.604728	1443.00	8.00	1451.00
6	45.644699	-120.605433	1453.50	8.00	1461.50
7	45.645842	-120.606734	1381.40	8.00	1389.40

Name: PV array 25
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.655717	-120.612344	1464.40	8.00	1472.40
2	45.656382	-120.611593	1463.80	8.00	1471.80
3	45.656389	-120.605453	1448.20	8.00	1456.20
4	45.655809	-120.602833	1416.80	8.00	1424.80
5	45.654069	-120.602850	1394.40	8.00	1402.40
6	45.653602	-120.605186	1359.50	8.00	1367.50
7	45.653563	-120.606156	1374.10	8.00	1382.10
8	45.652375	-120.607877	1392.40	8.00	1400.40
9	45.651261	-120.609559	1416.60	8.00	1424.60
10	45.650643	-120.610866	1430.20	8.00	1438.20
11	45.650607	-120.611420	1448.50	8.00	1456.50
12	45.651239	-120.612272	1466.20	8.00	1474.20

Name: PV array 26
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.650070	-120.607009	1435.00	8.00	1443.00
2	45.650088	-120.605548	1400.90	8.00	1408.90
3	45.651274	-120.605193	1400.10	8.00	1408.10
4	45.652973	-120.605208	1363.20	8.00	1371.20
5	45.652969	-120.606424	1361.80	8.00	1369.80
6	45.651249	-120.607019	1409.50	8.00	1417.50

Name: PV array 27
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.649904	-120.600907	1337.10	8.00	1345.10
2	45.649648	-120.598222	1316.90	8.00	1324.90
3	45.649614	-120.592771	1268.20	8.00	1276.20
4	45.661179	-120.592200	1363.10	8.00	1371.10
5	45.661124	-120.592744	1381.00	8.00	1389.00
6	45.659178	-120.594909	1385.90	8.00	1393.90
7	45.656944	-120.596347	1378.80	8.00	1386.80
8	45.655523	-120.598207	1365.60	8.00	1373.60
9	45.654138	-120.599092	1386.70	8.00	1394.70
10	45.652774	-120.600564	1348.10	8.00	1356.10
11	45.651090	-120.600954	1377.90	8.00	1385.90

Name: PV array 28
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



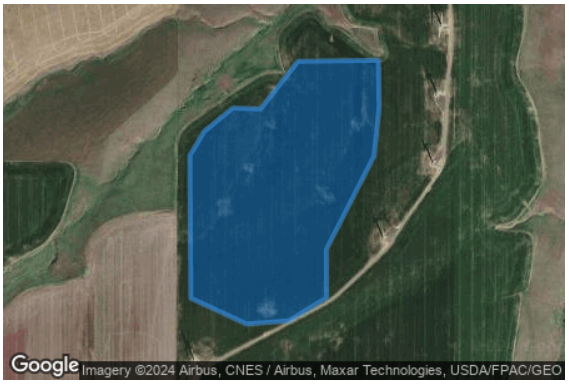
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.653790	-120.592211	1266.90	8.00	1274.90
2	45.652814	-120.591400	1257.40	8.00	1265.40
3	45.652130	-120.586982	1217.10	8.00	1225.10
4	45.656457	-120.582504	1134.80	8.00	1142.80
5	45.663442	-120.582532	1108.40	8.00	1116.40
6	45.663499	-120.591542	1340.30	8.00	1348.30
7	45.661209	-120.592224	1341.40	8.00	1349.40
8	45.653765	-120.592539	1267.90	8.00	1275.90

Name: PV array 29
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.663770	-120.591856	1341.50	8.00	1349.50
2	45.664564	-120.591770	1326.80	8.00	1334.80
3	45.666528	-120.588720	1274.50	8.00	1282.50
4	45.667110	-120.587249	1200.60	8.00	1208.60
5	45.667730	-120.586171	1145.10	8.00	1153.10
6	45.667731	-120.583660	1093.40	8.00	1101.40
7	45.669314	-120.582926	1093.70	8.00	1101.70
8	45.669381	-120.581431	1052.90	8.00	1060.90
9	45.668819	-120.580553	1037.00	8.00	1045.00
10	45.668199	-120.580533	1065.00	8.00	1073.00
11	45.665960	-120.581667	1076.00	8.00	1084.00
12	45.664805	-120.582444	1068.20	8.00	1076.20
13	45.663960	-120.583617	1114.30	8.00	1122.30
14	45.663682	-120.584507	1097.90	8.00	1105.90
15	45.663680	-120.588791	1172.30	8.00	1180.30
16	45.663708	-120.589701	1300.10	8.00	1308.10

Name: PV array 30
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.667149	-120.589944	1268.70	8.00	1276.70
2	45.667766	-120.591865	1281.20	8.00	1289.20
3	45.671183	-120.591899	1105.70	8.00	1113.70
4	45.671759	-120.591404	1078.40	8.00	1086.40
5	45.672318	-120.590421	1045.40	8.00	1053.40
6	45.672295	-120.589473	1039.80	8.00	1047.80
7	45.673437	-120.588178	1018.60	8.00	1026.60
8	45.673462	-120.585414	1059.60	8.00	1067.60
9	45.672314	-120.585392	1087.60	8.00	1095.60
10	45.671169	-120.585566	1094.60	8.00	1102.60
11	45.668932	-120.587208	1130.00	8.00	1138.00
12	45.667778	-120.587198	1180.30	8.00	1188.30
13	45.667225	-120.588498	1230.80	8.00	1238.80

Route Receptors

Name: Emigrant Springs Ln
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.628064	-120.624308	1541.50	9.00	1550.50
2	45.628045	-120.622929	1540.10	9.00	1549.10
3	45.628004	-120.621191	1509.90	9.00	1518.90
4	45.627981	-120.620113	1489.20	9.00	1498.20
5	45.627941	-120.618214	1484.00	9.00	1493.00
6	45.627893	-120.615987	1466.30	9.00	1475.30
7	45.627841	-120.613552	1478.50	9.00	1487.50
8	45.627852	-120.613037	1478.80	9.00	1487.80
9	45.627826	-120.610135	1480.70	9.00	1489.70
10	45.627772	-120.607501	1466.60	9.00	1475.60
11	45.627720	-120.605382	1446.80	9.00	1455.80
12	45.627653	-120.602690	1415.20	9.00	1424.20
13	45.627565	-120.598500	1406.80	9.00	1415.80
14	45.627463	-120.594560	1408.30	9.00	1417.30
15	45.627372	-120.590566	1440.10	9.00	1449.10
16	45.627267	-120.585705	1426.10	9.00	1435.10
17	45.627177	-120.582168	1397.40	9.00	1406.40
18	45.627188	-120.578665	1371.00	9.00	1380.00
19	45.627220	-120.561601	1229.70	9.00	1238.70
20	45.627258	-120.551237	1281.40	9.00	1290.40
21	45.627204	-120.531722	1227.50	9.00	1236.50
22	45.627078	-120.523316	1179.90	9.00	1188.90
23	45.627085	-120.516182	1190.50	9.00	1199.50
24	45.627055	-120.511354	1187.30	9.00	1196.30
25	45.627055	-120.510592	1182.50	9.00	1191.50

Name: Herin Ln - 1
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.658436	-120.623865	1386.00	9.00	1395.00
2	45.658443	-120.622814	1388.50	9.00	1397.50
3	45.658394	-120.621473	1390.30	9.00	1399.30
4	45.658278	-120.620180	1402.70	9.00	1411.70
5	45.658031	-120.619338	1414.60	9.00	1423.60
6	45.657569	-120.617986	1428.00	9.00	1437.00
7	45.657123	-120.616715	1438.60	9.00	1447.60
8	45.656962	-120.616044	1445.20	9.00	1454.20
9	45.656913	-120.615712	1449.50	9.00	1458.50
10	45.656880	-120.614757	1458.20	9.00	1467.20
11	45.656822	-120.613051	1458.00	9.00	1467.00
12	45.656695	-120.612826	1458.40	9.00	1467.40
13	45.656444	-120.612707	1459.30	9.00	1468.30
14	45.655990	-120.612702	1465.20	9.00	1474.20
15	45.653803	-120.612783	1471.20	9.00	1480.20
16	45.650107	-120.612851	1463.70	9.00	1472.70
17	45.649822	-120.612723	1467.70	9.00	1476.70
18	45.649645	-120.612529	1467.40	9.00	1476.40
19	45.649578	-120.612256	1465.30	9.00	1474.30
20	45.649489	-120.609604	1441.70	9.00	1450.70
21	45.649406	-120.605018	1380.40	9.00	1389.40
22	45.649335	-120.600190	1317.70	9.00	1326.70
23	45.649103	-120.592288	1263.80	9.00	1272.80
24	45.649050	-120.590577	1233.30	9.00	1242.30
25	45.649043	-120.589187	1213.80	9.00	1222.80
26	45.649200	-120.588688	1205.70	9.00	1214.70
27	45.650634	-120.586455	1185.90	9.00	1194.90
28	45.652457	-120.584663	1154.50	9.00	1163.50
29	45.653023	-120.584154	1141.20	9.00	1150.20
30	45.653961	-120.583574	1128.90	9.00	1137.90

Name: Herin Ln - 2
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.653976	-120.583548	1128.20	9.00	1137.20
2	45.654253	-120.583312	1124.40	9.00	1133.40
3	45.654482	-120.582974	1116.20	9.00	1125.20
4	45.654954	-120.582587	1105.40	9.00	1114.40
5	45.655700	-120.581954	1086.30	9.00	1095.30
6	45.656117	-120.581552	1079.30	9.00	1088.30
7	45.656503	-120.580989	1063.30	9.00	1072.30
8	45.656776	-120.580624	1051.60	9.00	1060.60
9	45.657020	-120.580468	1046.20	9.00	1055.20
10	45.657313	-120.580383	1042.90	9.00	1051.90
11	45.657909	-120.579980	1035.90	9.00	1044.90
12	45.658299	-120.579583	1038.70	9.00	1047.70
13	45.658535	-120.579326	1040.50	9.00	1049.50
14	45.658805	-120.579130	1032.80	9.00	1041.80
15	45.659195	-120.578980	1021.00	9.00	1030.00
16	45.659487	-120.579023	1011.00	9.00	1020.00
17	45.660023	-120.579125	1004.50	9.00	1013.50
18	45.660368	-120.579372	997.30	9.00	1006.30
19	45.661157	-120.579484	983.70	9.00	992.70
20	45.661693	-120.579479	972.10	9.00	981.10
21	45.662192	-120.579506	961.10	9.00	970.10

Name: Hwy 206
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.546018	-120.625806	1460.10	9.00	1469.10
2	45.547416	-120.626600	1493.80	9.00	1502.80
3	45.548498	-120.627801	1510.40	9.00	1519.40
4	45.549279	-120.629024	1528.30	9.00	1537.30
5	45.552480	-120.635011	1606.60	9.00	1615.60
6	45.554118	-120.638058	1640.00	9.00	1649.00
7	45.555350	-120.640161	1652.20	9.00	1661.20
8	45.556777	-120.641835	1648.50	9.00	1657.50
9	45.562862	-120.648615	1631.50	9.00	1640.50
10	45.564815	-120.650933	1622.40	9.00	1631.40
11	45.567030	-120.654392	1588.70	9.00	1597.70
12	45.571506	-120.661688	1504.30	9.00	1513.30
13	45.577124	-120.670657	1401.10	9.00	1410.10
14	45.583417	-120.680871	1331.60	9.00	1340.60
15	45.584288	-120.682566	1324.20	9.00	1333.20
16	45.586570	-120.687888	1312.60	9.00	1321.60
17	45.588823	-120.693596	1297.50	9.00	1306.50
18	45.589694	-120.695849	1283.70	9.00	1292.70
19	45.590565	-120.697694	1271.60	9.00	1280.60

Name: I97
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.574282	-120.697086	1427.10	9.00	1436.10
2	45.581972	-120.707815	1382.10	9.00	1391.10
3	45.584630	-120.711591	1344.00	9.00	1353.00
4	45.585621	-120.712557	1331.20	9.00	1340.20
5	45.586162	-120.713029	1325.50	9.00	1334.50
6	45.587003	-120.713437	1312.10	9.00	1321.10
7	45.588294	-120.713716	1297.60	9.00	1306.60
8	45.589751	-120.714080	1281.90	9.00	1290.90
9	45.590862	-120.714424	1272.20	9.00	1281.20
10	45.592018	-120.715089	1267.60	9.00	1276.60
11	45.593204	-120.715969	1264.40	9.00	1273.40
12	45.594509	-120.717201	1253.00	9.00	1262.00
13	45.595935	-120.718703	1239.00	9.00	1248.00
14	45.598037	-120.720892	1231.30	9.00	1240.30
15	45.598623	-120.721342	1221.80	9.00	1230.80
16	45.599313	-120.721750	1208.80	9.00	1217.80
17	45.600217	-120.722052	1196.10	9.00	1205.10
18	45.601058	-120.722052	1184.30	9.00	1193.30
19	45.602409	-120.721945	1170.60	9.00	1179.60
20	45.604555	-120.721645	1147.60	9.00	1156.60
21	45.605591	-120.721795	1139.40	9.00	1148.40
22	45.606537	-120.722224	1134.20	9.00	1143.20
23	45.607528	-120.722975	1127.10	9.00	1136.10
24	45.608909	-120.724777	1116.50	9.00	1125.50
25	45.612151	-120.729498	1083.80	9.00	1092.80
26	45.612871	-120.730871	1076.20	9.00	1085.20
27	45.613457	-120.732459	1069.30	9.00	1078.30
28	45.614027	-120.733961	1063.00	9.00	1072.00
29	45.614688	-120.735206	1057.90	9.00	1066.90
30	45.615363	-120.735978	1051.50	9.00	1060.50

Name: Klondike Rd
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.584323	-120.682296	1326.50	9.00	1335.50
2	45.584443	-120.681695	1330.60	9.00	1339.60
3	45.584398	-120.675472	1397.70	9.00	1406.70
4	45.584383	-120.664668	1434.00	9.00	1443.00
5	45.584353	-120.653587	1427.20	9.00	1436.20
6	45.584353	-120.644970	1531.00	9.00	1540.00
7	45.584338	-120.633806	1535.50	9.00	1544.50
8	45.584263	-120.621228	1559.70	9.00	1568.70
9	45.584158	-120.613439	1547.10	9.00	1556.10
10	45.583872	-120.602796	1521.80	9.00	1530.80
11	45.583932	-120.597432	1513.70	9.00	1522.70
12	45.583992	-120.582132	1450.80	9.00	1459.80
13	45.584068	-120.576344	1439.70	9.00	1448.70
14	45.584113	-120.569950	1452.00	9.00	1461.00
15	45.584068	-120.557118	1382.30	9.00	1391.30
16	45.583799	-120.534859	1381.20	9.00	1390.20
17	45.583717	-120.523039	1316.60	9.00	1325.60
18	45.583717	-120.520910	1304.00	9.00	1313.00

Name: Medler Ln
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.620780	-120.697244	1233.10	9.00	1242.10
2	45.620789	-120.690002	1288.50	9.00	1297.50
3	45.620797	-120.684799	1318.10	9.00	1327.10
4	45.620798	-120.678539	1315.90	9.00	1324.90
5	45.620806	-120.676363	1308.60	9.00	1317.60
6	45.620786	-120.669762	1370.20	9.00	1379.20
7	45.620736	-120.662578	1340.40	9.00	1349.40
8	45.620740	-120.655545	1381.80	9.00	1390.80
9	45.620748	-120.645646	1434.90	9.00	1443.90
10	45.620763	-120.638432	1442.40	9.00	1451.40
11	45.620763	-120.626023	1488.70	9.00	1497.70
12	45.620733	-120.625325	1493.00	9.00	1502.00
13	45.620785	-120.624875	1492.00	9.00	1501.00
14	45.620961	-120.624537	1490.40	9.00	1499.40

Name: N Klondike Rd
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.584163	-120.613405	1547.00	9.00	1556.00
2	45.587263	-120.613393	1575.30	9.00	1584.30
3	45.591409	-120.613389	1562.60	9.00	1571.60
4	45.591800	-120.613271	1546.60	9.00	1555.60
5	45.592197	-120.613249	1552.20	9.00	1561.20
6	45.593140	-120.613195	1552.10	9.00	1561.10
7	45.595257	-120.613163	1551.90	9.00	1560.90
8	45.599148	-120.613170	1582.50	9.00	1591.50
9	45.606076	-120.613159	1539.50	9.00	1548.50
10	45.612918	-120.613143	1557.90	9.00	1566.90
11	45.620015	-120.613108	1561.40	9.00	1570.40
12	45.627848	-120.613076	1478.70	9.00	1487.70

Name: Oehman Rd
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.621007	-120.624496	1490.30	9.00	1499.30
2	45.621195	-120.624325	1492.30	9.00	1501.30
3	45.621562	-120.624314	1498.40	9.00	1507.40
4	45.624900	-120.624282	1514.10	9.00	1523.10
5	45.628062	-120.624321	1541.50	9.00	1550.50
6	45.630213	-120.624226	1504.00	9.00	1513.00
7	45.632395	-120.624172	1500.50	9.00	1509.50
8	45.636064	-120.624129	1462.20	9.00	1471.20
9	45.641060	-120.624078	1507.70	9.00	1516.70
10	45.646394	-120.624000	1512.20	9.00	1521.20
11	45.651890	-120.623940	1482.40	9.00	1491.40
12	45.658455	-120.623849	1385.80	9.00	1394.80
13	45.666166	-120.623727	1305.40	9.00	1314.40
14	45.666518	-120.623652	1303.00	9.00	1312.00
15	45.668559	-120.623008	1295.10	9.00	1304.10
16	45.670052	-120.622507	1288.40	9.00	1297.40
17	45.670479	-120.622443	1288.30	9.00	1297.30
18	45.671560	-120.622410	1287.80	9.00	1296.80
19	45.673173	-120.622357	1284.90	9.00	1293.90
20	45.674328	-120.622582	1293.20	9.00	1302.20
21	45.674792	-120.622571	1301.50	9.00	1310.50
22	45.675487	-120.622464	1321.40	9.00	1330.40
23	45.675989	-120.621971	1337.60	9.00	1346.60
24	45.676364	-120.621316	1353.10	9.00	1362.10
25	45.676589	-120.620629	1351.40	9.00	1360.40

Name: Old Wasco-Heppner Hwy
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.591737	-120.695232	1307.40	9.00	1316.40
2	45.591715	-120.686340	1425.00	9.00	1434.00
3	45.591698	-120.677285	1485.90	9.00	1494.90
4	45.591683	-120.664594	1475.50	9.00	1484.50
5	45.591645	-120.649788	1555.40	9.00	1564.40
6	45.591608	-120.635203	1581.70	9.00	1590.70
7	45.591608	-120.626383	1567.50	9.00	1576.50
8	45.591473	-120.615718	1574.30	9.00	1583.30
9	45.591408	-120.613407	1562.50	9.00	1571.50

Name: Webfoot Rd
Path type: Two-way
Observer view angle: 50.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.606047	-120.613135	1539.50	9.00	1548.50
2	45.606062	-120.611965	1536.80	9.00	1545.80
3	45.606043	-120.609766	1524.30	9.00	1533.30
4	45.606032	-120.606848	1523.10	9.00	1532.10
5	45.605998	-120.603238	1513.70	9.00	1522.70
6	45.605938	-120.601312	1506.30	9.00	1515.30
7	45.605902	-120.598984	1479.20	9.00	1488.20
8	45.605857	-120.597235	1467.80	9.00	1476.80
9	45.605796	-120.595051	1468.80	9.00	1477.80
10	45.605723	-120.592141	1458.20	9.00	1467.20
11	45.605678	-120.589904	1436.80	9.00	1445.80
12	45.605599	-120.586846	1418.50	9.00	1427.50
13	45.605565	-120.585038	1404.60	9.00	1413.60
14	45.605502	-120.582415	1382.80	9.00	1391.80
15	45.605509	-120.580248	1391.60	9.00	1400.60
16	45.605497	-120.577594	1393.30	9.00	1402.30

Discrete Observation Point Receptors

Name	ID	Latitude (°)	Longitude (°)	Elevation (ft)	Height (ft)
OP 1	1	45.581671	-120.650971	1462.10	16.00
OP 2	2	45.591202	-120.693499	1345.50	16.00
OP 3	3	45.595312	-120.700334	1283.30	16.00
OP 4	4	45.605526	-120.665361	1365.50	16.00
OP 5	5	45.617148	-120.690993	1231.10	16.00
OP 6	6	45.625705	-120.652694	1408.60	16.00
OP 7	7	45.627981	-120.607648	1475.00	16.00
OP 8	8	45.657315	-120.612840	1458.70	16.00
OP 9	9	45.685485	-120.604651	997.80	16.00
OP 10	10	45.699712	-120.546563	983.00	16.00
OP 11	11	45.650975	-120.557140	1098.90	16.00
OP 12	12	45.633880	-120.525643	1191.60	16.00
OP 13	13	45.584821	-120.519879	1309.30	16.00
OP 14	14	45.647816	-120.590278	1236.50	16.00
OP 15	15	45.629485	-120.559316	1191.50	16.00
OP 16	16	45.622847	-120.562188	1256.80	16.00
OP 17	17	45.548417	-120.552628	1485.10	16.00
OP 18	18	45.549640	-120.592761	1590.70	16.00
OP 19	19	45.568232	-120.603758	1535.50	16.00
OP 20	20	45.583640	-120.614099	1557.40	16.00
OP 21	21	45.591961	-120.627507	1560.20	16.00

Glare Analysis Results

Summary of Results

Glare with potential for temporary after-image predicted

PV Array	Tilt	Orient	Annual Green Glare		Annual Yellow Glare		Energy
	°	°	min	hr	min	hr	kWh
PV array 21	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 22	SA tracking	SA tracking	6,750	112.5	8,206	136.8	-
PV array 23	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 24	SA tracking	SA tracking	3,797	63.3	2,661	44.4	-
PV array 25	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 26	SA tracking	SA tracking	1,408	23.5	9	0.1	-
PV array 27	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 28	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 29	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 30	SA tracking	SA tracking	1,200	20.0	0	0.0	-

Total glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	6,416	106.9	9,595	159.9
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	2,595	43.2	27	0.5
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	3,301	55.0	1,254	20.9
OP 9	426	7.1	0	0.0
OP 10	417	7.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV: PV array 21 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV array 21 and Route: Emigrant Springs Ln

No glare found

PV array 21 and Route: Herin Ln - 1

No glare found

PV array 21 and Route: Herin Ln - 2

No glare found

PV array 21 and Route: Hwy 206

No glare found

PV array 21 and Route: I97

No glare found

PV array 21 and Route: Klondike Rd

No glare found

PV array 21 and Route: Medler Ln

No glare found

PV array 21 and Route: N Klondike Rd

No glare found

PV array 21 and Route: Oehman Rd

No glare found

PV array 21 and Route: Old Wasco-Heppner Hwy

No glare found

PV array 21 and Route: Webfoot Rd

No glare found

PV array 21 and OP 1

No glare found

PV array 21 and OP 2

No glare found

PV array 21 and OP 3

No glare found

PV array 21 and OP 4

No glare found

PV array 21 and OP 5

No glare found

PV array 21 and OP 6

No glare found

PV array 21 and OP 7

No glare found

PV array 21 and OP 8

No glare found

PV array 21 and OP 9

No glare found

PV array 21 and OP 10

No glare found

PV array 21 and OP 11

No glare found

PV array 21 and OP 12

No glare found

PV array 21 and OP 13

No glare found

PV array 21 and OP 14

No glare found

PV array 21 and OP 15

No glare found

PV array 21 and OP 16

No glare found

PV array 21 and OP 17

No glare found

PV array 21 and OP 18

No glare found

PV array 21 and OP 19

No glare found

PV array 21 and OP 20

No glare found

PV array 21 and OP 21

No glare found

PV: PV array 22 potential temporary after-image

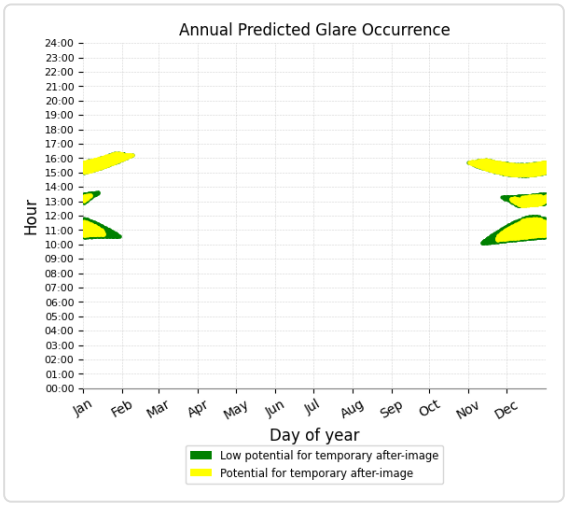
Receptor results ordered by category of glare

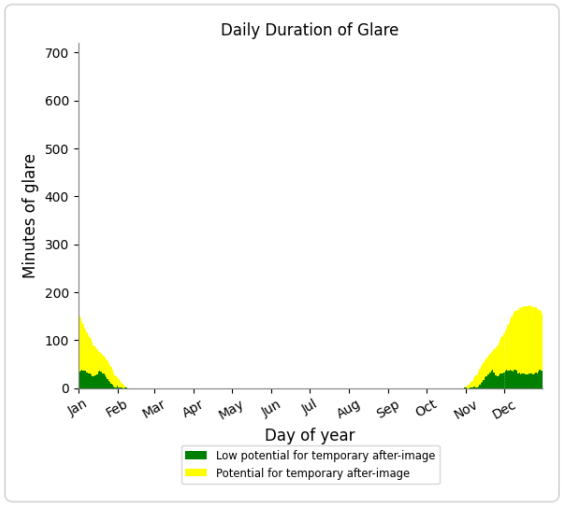
Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Herin Ln - 1	2,340	39.0	6,925	115.4
Oehman Rd	1,331	22.2	27	0.5
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 8	3,079	51.3	1,254	20.9
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

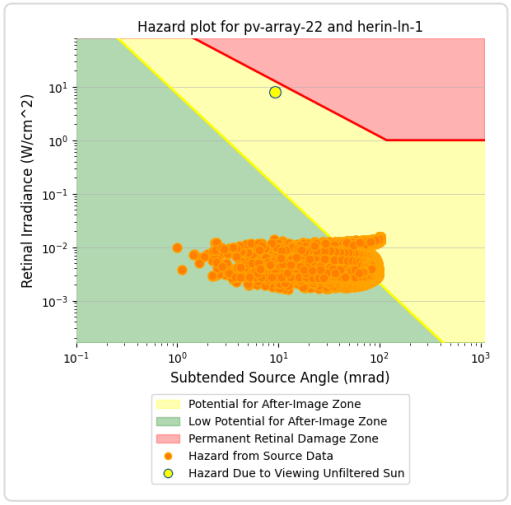
PV array 22 and Route: Herin Ln - 1

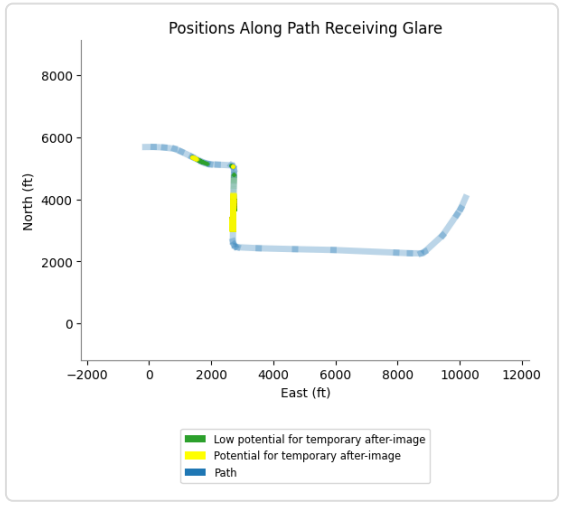
Yellow glare: 6,925 min.

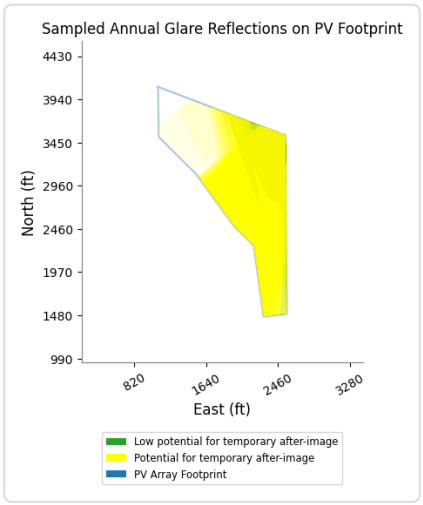
Green glare: 2,340 min.







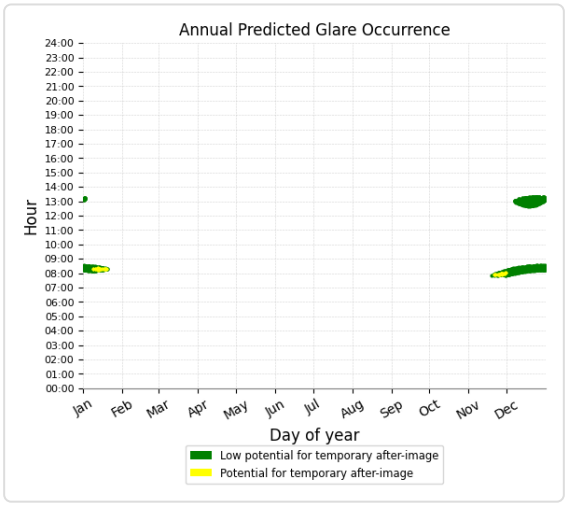


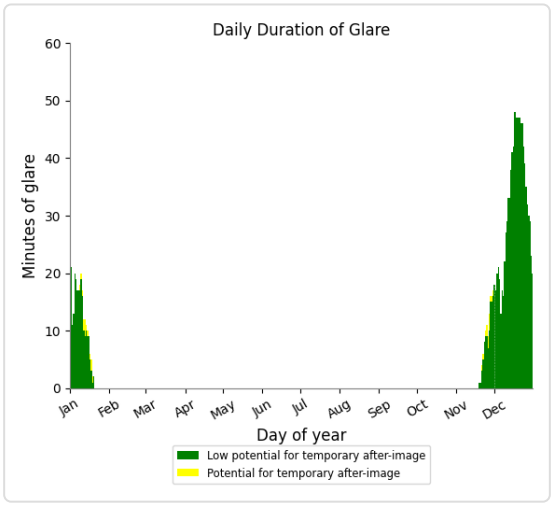


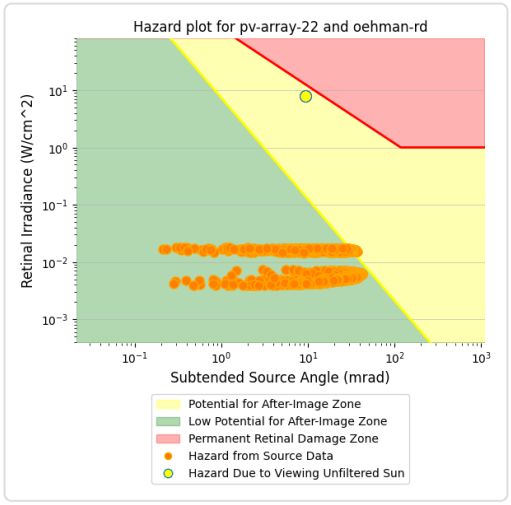
PV array 22 and Route: Oehman Rd

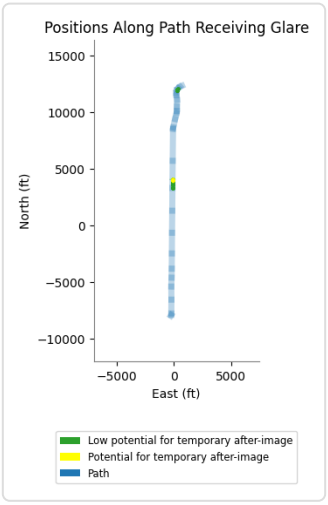
Yellow glare: 27 min.

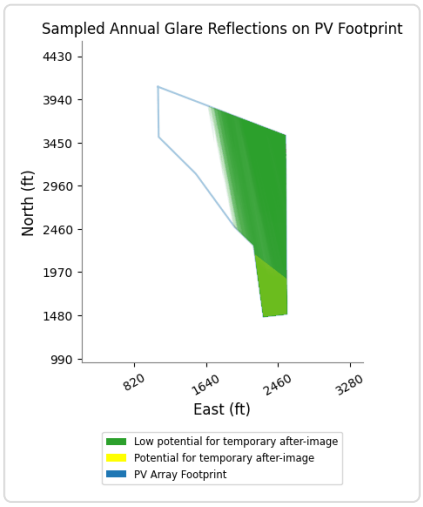
Green glare: 1,331 min.











PV array 22 and Route: Emigrant Springs Ln

No glare found

PV array 22 and Route: Herin Ln - 2

No glare found

PV array 22 and Route: Hwy 206

No glare found

PV array 22 and Route: I97

No glare found

PV array 22 and Route: Klondike Rd

No glare found

PV array 22 and Route: Medler Ln

No glare found

PV array 22 and Route: N Klondike Rd

No glare found

PV array 22 and Route: Old Wasco-Heppner Hwy

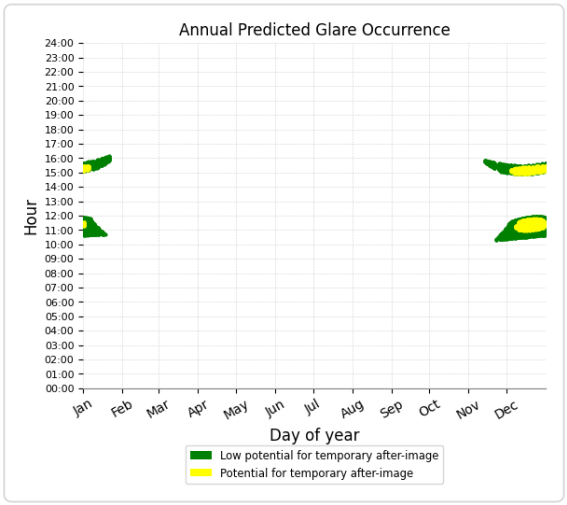
No glare found

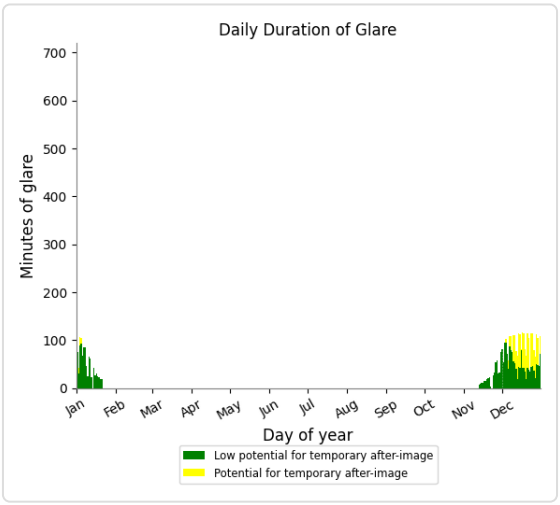
PV array 22 and Route: Webfoot Rd

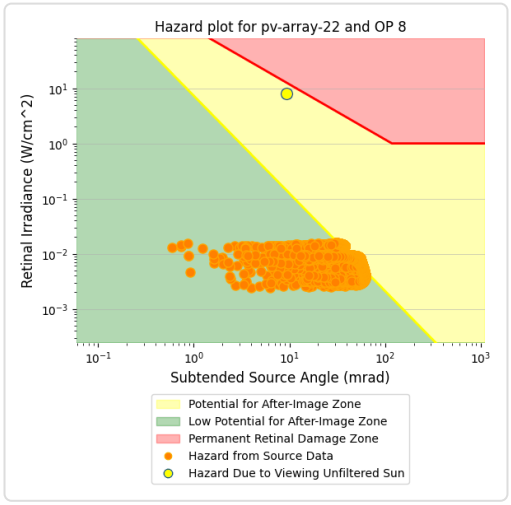
No glare found

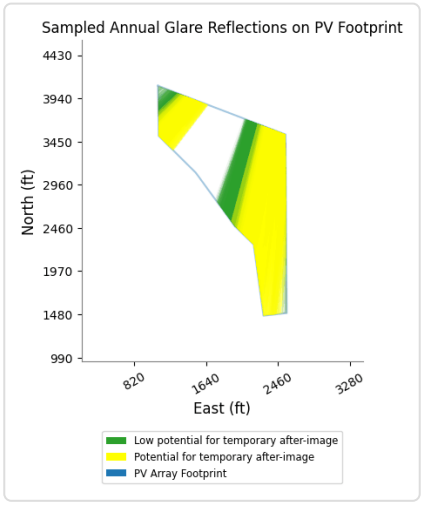
PV array 22 and OP 8

Yellow glare: 1,254 min.
Green glare: 3,079 min.









PV array 22 and OP 1

No glare found

PV array 22 and OP 2

No glare found

PV array 22 and OP 3

No glare found

PV array 22 and OP 4

No glare found

PV array 22 and OP 5

No glare found

PV array 22 and OP 6

No glare found

PV array 22 and OP 7

No glare found

PV array 22 and OP 9

No glare found

PV array 22 and OP 10

No glare found

PV array 22 and OP 11

No glare found

PV array 22 and OP 12

No glare found

PV array 22 and OP 13

No glare found

PV array 22 and OP 14

No glare found

PV array 22 and OP 15

No glare found

PV array 22 and OP 16

No glare found

PV array 22 and OP 17

No glare found

PV array 22 and OP 18

No glare found

PV array 22 and OP 19

No glare found

PV array 22 and OP 20

No glare found

PV array 22 and OP 21

No glare found

PV: PV array 23 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV array 23 and Route: Emigrant Springs Ln

No glare found

PV array 23 and Route: Herin Ln - 1

No glare found

PV array 23 and Route: Herin Ln - 2

No glare found

PV array 23 and Route: Hwy 206

No glare found

PV array 23 and Route: I97

No glare found

PV array 23 and Route: Klondike Rd

No glare found

PV array 23 and Route: Medler Ln

No glare found

PV array 23 and Route: N Klondike Rd

No glare found

PV array 23 and Route: Oehman Rd

No glare found

PV array 23 and Route: Old Wasco-Heppner Hwy

No glare found

PV array 23 and Route: Webfoot Rd

No glare found

PV array 23 and OP 1

No glare found

PV array 23 and OP 2

No glare found

PV array 23 and OP 3

No glare found

PV array 23 and OP 4

No glare found

PV array 23 and OP 5

No glare found

PV array 23 and OP 6

No glare found

PV array 23 and OP 7

No glare found

PV array 23 and OP 8

No glare found

PV array 23 and OP 9

No glare found

PV array 23 and OP 10

No glare found

PV array 23 and OP 11

No glare found

PV array 23 and OP 12

No glare found

PV array 23 and OP 13

No glare found

PV array 23 and OP 14

No glare found

PV array 23 and OP 15

No glare found

PV array 23 and OP 16

No glare found

PV array 23 and OP 17

No glare found

PV array 23 and OP 18

No glare found

PV array 23 and OP 19

No glare found

PV array 23 and OP 20

No glare found

PV array 23 and OP 21

No glare found

PV: PV array 24 potential temporary after-image

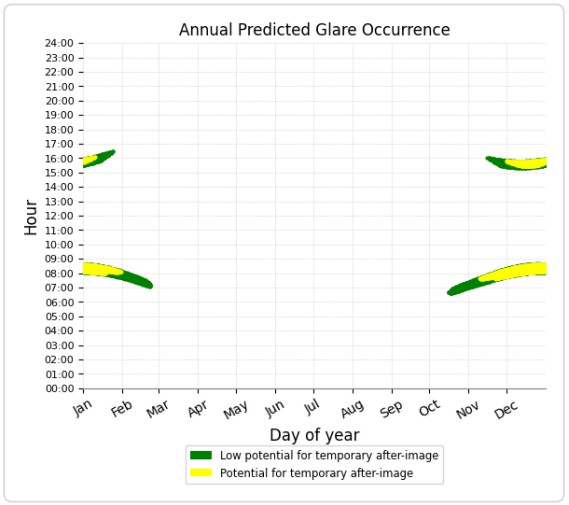
Receptor results ordered by category of glare

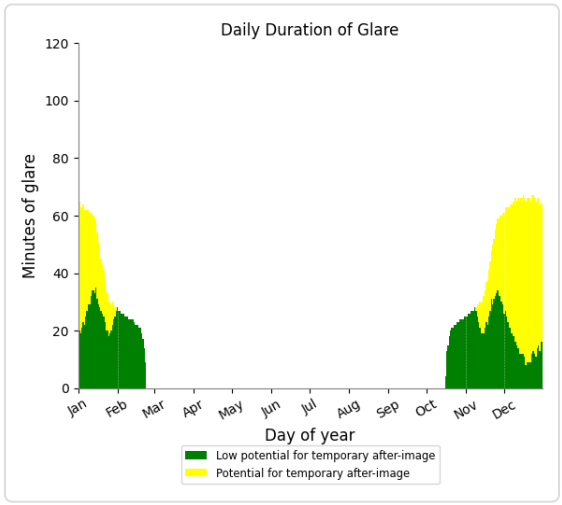
Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Herin Ln - 1	2,890	48.2	2,661	44.4
Oehman Rd	907	15.1	0	0.0
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

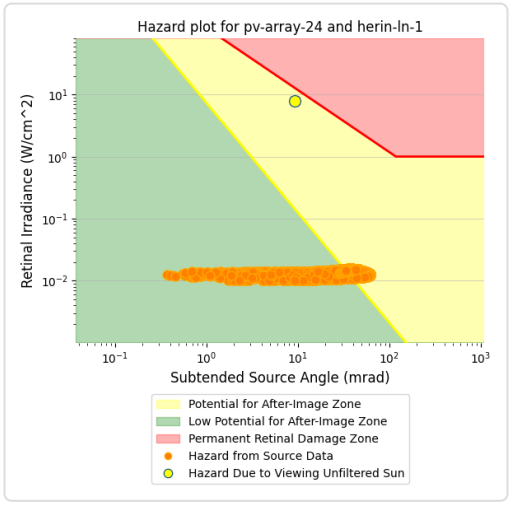
PV array 24 and Route: Herin Ln - 1

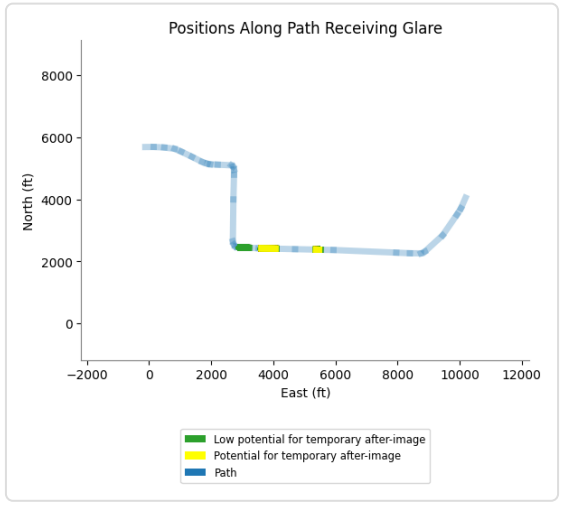
Yellow glare: 2,661 min.

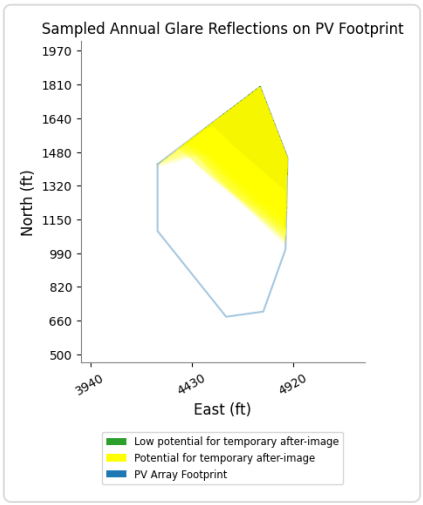
Green glare: 2,890 min.







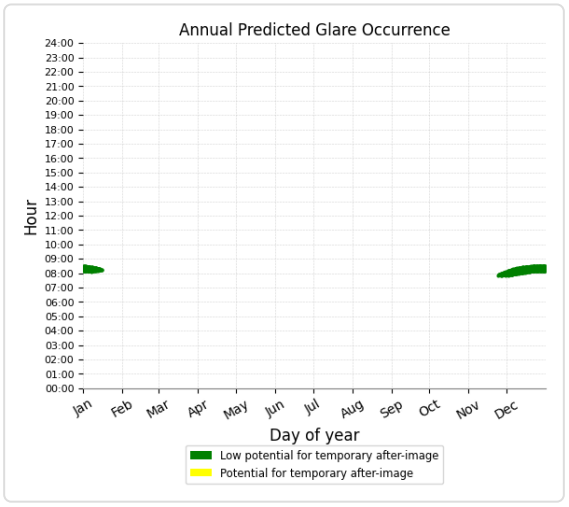


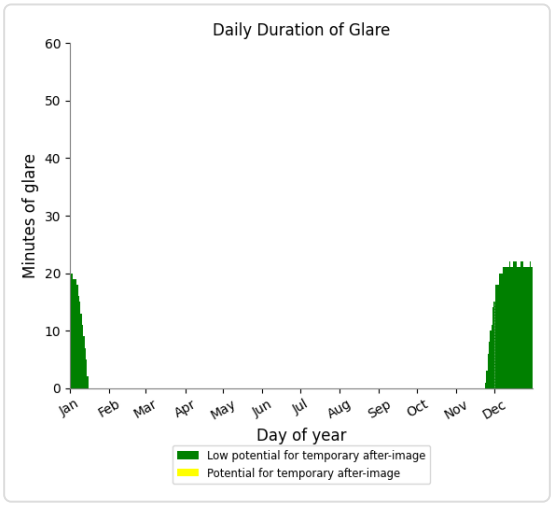


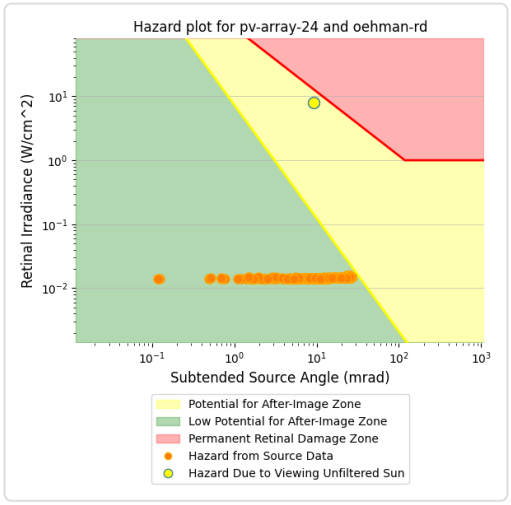
PV array 24 and Route: Oehman Rd

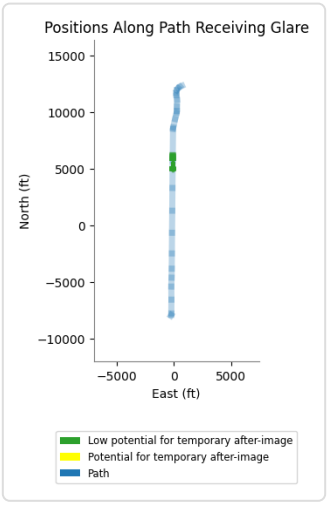
Yellow glare: none

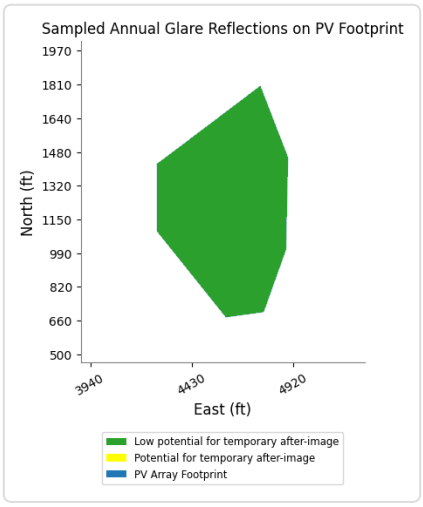
Green glare: 907 min.











PV array 24 and Route: Emigrant Springs Ln

No glare found

PV array 24 and Route: Herin Ln - 2

No glare found

PV array 24 and Route: Hwy 206

No glare found

PV array 24 and Route: I97

No glare found

PV array 24 and Route: Klondike Rd

No glare found

PV array 24 and Route: Medler Ln

No glare found

PV array 24 and Route: N Klondike Rd

No glare found

PV array 24 and Route: Old Wasco-Heppner Hwy

No glare found

PV array 24 and Route: Webfoot Rd

No glare found

PV array 24 and OP 1

No glare found

PV array 24 and OP 2

No glare found

PV array 24 and OP 3

No glare found

PV array 24 and OP 4

No glare found

PV array 24 and OP 5

No glare found

PV array 24 and OP 6

No glare found

PV array 24 and OP 7

No glare found

PV array 24 and OP 8

No glare found

PV array 24 and OP 9

No glare found

PV array 24 and OP 10

No glare found

PV array 24 and OP 11

No glare found

PV array 24 and OP 12

No glare found

PV array 24 and OP 13

No glare found

PV array 24 and OP 14

No glare found

PV array 24 and OP 15

No glare found

PV array 24 and OP 16

No glare found

PV array 24 and OP 17

No glare found

PV array 24 and OP 18

No glare found

PV array 24 and OP 19

No glare found

PV array 24 and OP 20

No glare found

PV array 24 and OP 21

No glare found

PV: PV array 25 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV array 25 and Route: Emigrant Springs Ln

No glare found

PV array 25 and Route: Herin Ln - 1

No glare found

PV array 25 and Route: Herin Ln - 2

No glare found

PV array 25 and Route: Hwy 206

No glare found

PV array 25 and Route: I97

No glare found

PV array 25 and Route: Klondike Rd

No glare found

PV array 25 and Route: Medler Ln

No glare found

PV array 25 and Route: N Klondike Rd

No glare found

PV array 25 and Route: Oehman Rd

No glare found

PV array 25 and Route: Old Wasco-Heppner Hwy

No glare found

PV array 25 and Route: Webfoot Rd

No glare found

PV array 25 and OP 1

No glare found

PV array 25 and OP 2

No glare found

PV array 25 and OP 3

No glare found

PV array 25 and OP 4

No glare found

PV array 25 and OP 5

No glare found

PV array 25 and OP 6

No glare found

PV array 25 and OP 7

No glare found

PV array 25 and OP 8

No glare found

PV array 25 and OP 9

No glare found

PV array 25 and OP 10

No glare found

PV array 25 and OP 11

No glare found

PV array 25 and OP 12

No glare found

PV array 25 and OP 13

No glare found

PV array 25 and OP 14

No glare found

PV array 25 and OP 15

No glare found

PV array 25 and OP 16

No glare found

PV array 25 and OP 17

No glare found

PV array 25 and OP 18

No glare found

PV array 25 and OP 19

No glare found

PV array 25 and OP 20

No glare found

PV array 25 and OP 21

No glare found

PV: PV array 26 potential temporary after-image

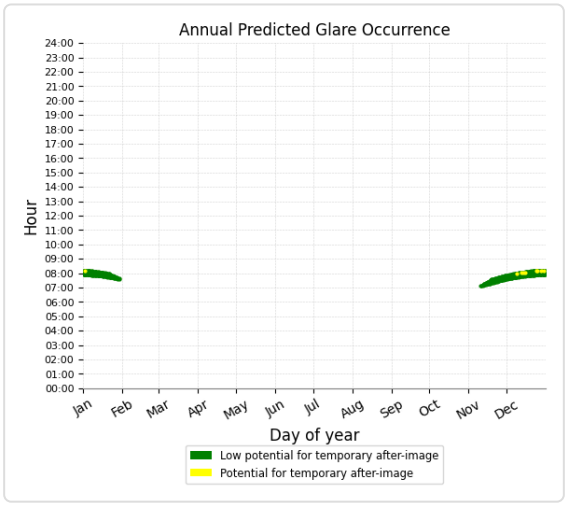
Receptor results ordered by category of glare

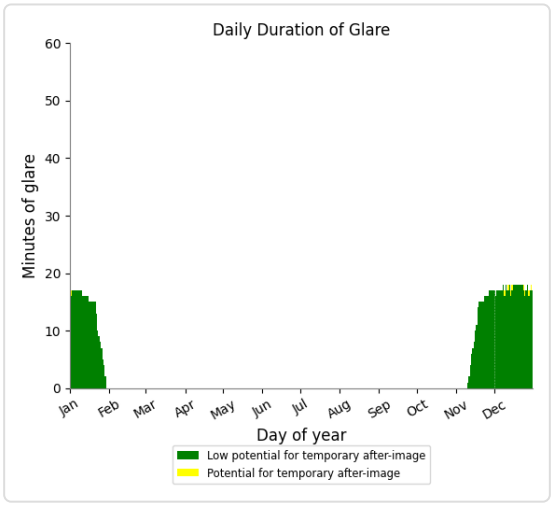
Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Herin Ln - 1	1,186	19.8	9	0.1
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 8	222	3.7	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

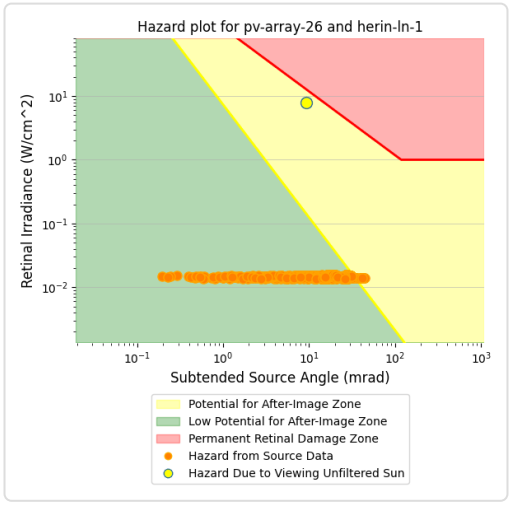
PV array 26 and Route: Herin Ln - 1

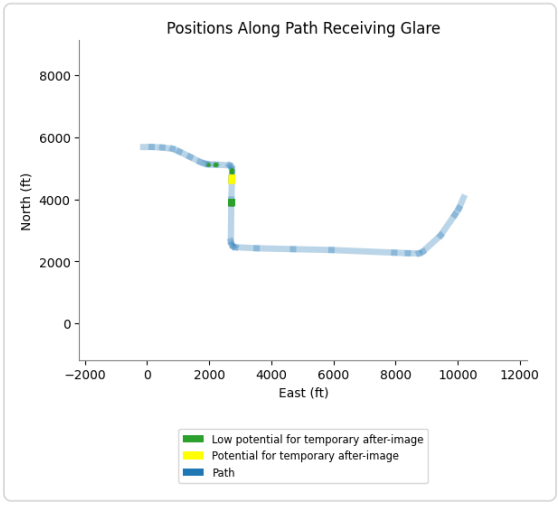
Yellow glare: 9 min.

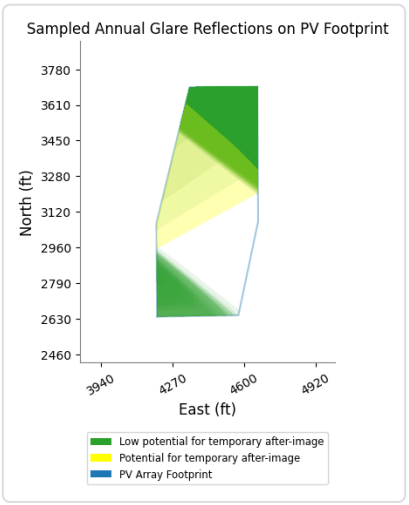
Green glare: 1,186 min.











PV array 26 and Route: Emigrant Springs Ln

No glare found

PV array 26 and Route: Herin Ln - 2

No glare found

PV array 26 and Route: Hwy 206

No glare found

PV array 26 and Route: I97

No glare found

PV array 26 and Route: Klondike Rd

No glare found

PV array 26 and Route: Medler Ln

No glare found

PV array 26 and Route: N Klondike Rd

No glare found

PV array 26 and Route: Oehman Rd

No glare found

PV array 26 and Route: Old Wasco-Heppner Hwy

No glare found

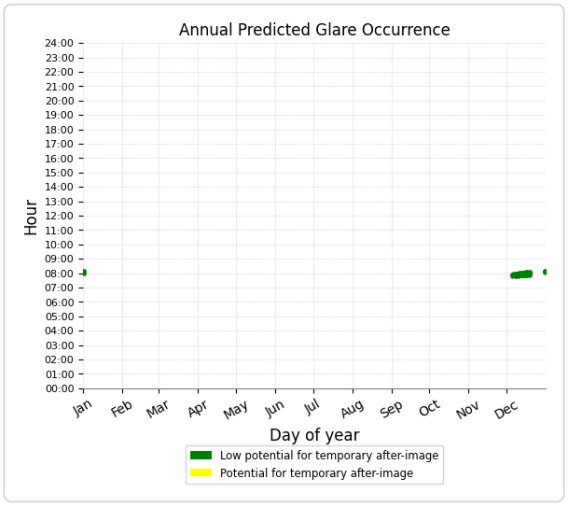
PV array 26 and Route: Webfoot Rd

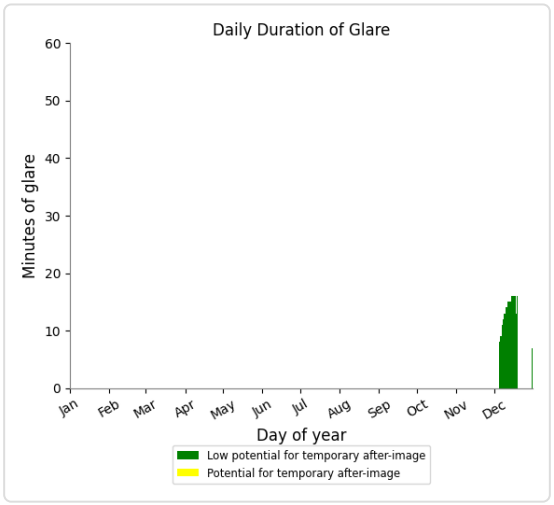
No glare found

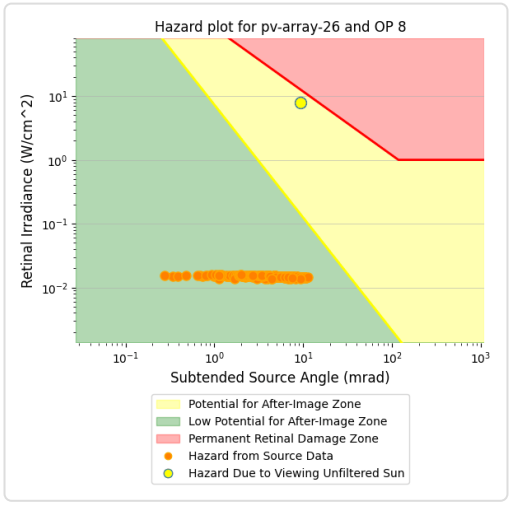
PV array 26 and OP 8

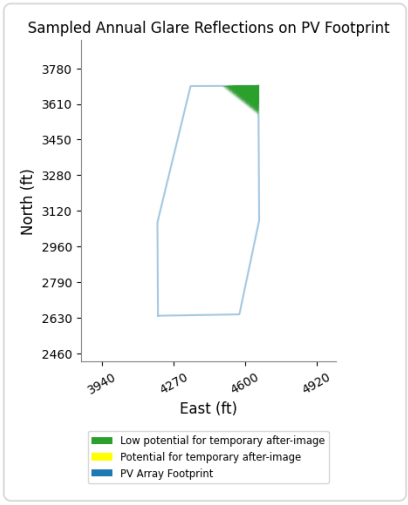
Yellow glare: none

Green glare: 222 min.









PV array 26 and OP 1

No glare found

PV array 26 and OP 2

No glare found

PV array 26 and OP 3

No glare found

PV array 26 and OP 4

No glare found

PV array 26 and OP 5

No glare found

PV array 26 and OP 6

No glare found

PV array 26 and OP 7

No glare found

PV array 26 and OP 9

No glare found

PV array 26 and OP 10

No glare found

PV array 26 and OP 11

No glare found

PV array 26 and OP 12

No glare found

PV array 26 and OP 13

No glare found

PV array 26 and OP 14

No glare found

PV array 26 and OP 15

No glare found

PV array 26 and OP 16

No glare found

PV array 26 and OP 17

No glare found

PV array 26 and OP 18

No glare found

PV array 26 and OP 19

No glare found

PV array 26 and OP 20

No glare found

PV array 26 and OP 21

No glare found

PV: PV array 27 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV array 27 and Route: Emigrant Springs Ln

No glare found

PV array 27 and Route: Herin Ln - 1

No glare found

PV array 27 and Route: Herin Ln - 2

No glare found

PV array 27 and Route: Hwy 206

No glare found

PV array 27 and Route: I97

No glare found

PV array 27 and Route: Klondike Rd

No glare found

PV array 27 and Route: Medler Ln

No glare found

PV array 27 and Route: N Klondike Rd

No glare found

PV array 27 and Route: Oehman Rd

No glare found

PV array 27 and Route: Old Wasco-Heppner Hwy

No glare found

PV array 27 and Route: Webfoot Rd

No glare found

PV array 27 and OP 1

No glare found

PV array 27 and OP 2

No glare found

PV array 27 and OP 3

No glare found

PV array 27 and OP 4

No glare found

PV array 27 and OP 5

No glare found

PV array 27 and OP 6

No glare found

PV array 27 and OP 7

No glare found

PV array 27 and OP 8

No glare found

PV array 27 and OP 9

No glare found

PV array 27 and OP 10

No glare found

PV array 27 and OP 11

No glare found

PV array 27 and OP 12

No glare found

PV array 27 and OP 13

No glare found

PV array 27 and OP 14

No glare found

PV array 27 and OP 15

No glare found

PV array 27 and OP 16

No glare found

PV array 27 and OP 17

No glare found

PV array 27 and OP 18

No glare found

PV array 27 and OP 19

No glare found

PV array 27 and OP 20

No glare found

PV array 27 and OP 21

No glare found

PV: PV array 28 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV array 28 and Route: Emigrant Springs Ln

No glare found

PV array 28 and Route: Herin Ln - 1

No glare found

PV array 28 and Route: Herin Ln - 2

No glare found

PV array 28 and Route: Hwy 206

No glare found

PV array 28 and Route: I97

No glare found

PV array 28 and Route: Klondike Rd

No glare found

PV array 28 and Route: Medler Ln

No glare found

PV array 28 and Route: N Klondike Rd

No glare found

PV array 28 and Route: Oehman Rd

No glare found

PV array 28 and Route: Old Wasco-Heppner Hwy

No glare found

PV array 28 and Route: Webfoot Rd

No glare found

PV array 28 and OP 1

No glare found

PV array 28 and OP 2

No glare found

PV array 28 and OP 3

No glare found

PV array 28 and OP 4

No glare found

PV array 28 and OP 5

No glare found

PV array 28 and OP 6

No glare found

PV array 28 and OP 7

No glare found

PV array 28 and OP 8

No glare found

PV array 28 and OP 9

No glare found

PV array 28 and OP 10

No glare found

PV array 28 and OP 11

No glare found

PV array 28 and OP 12

No glare found

PV array 28 and OP 13

No glare found

PV array 28 and OP 14

No glare found

PV array 28 and OP 15

No glare found

PV array 28 and OP 16

No glare found

PV array 28 and OP 17

No glare found

PV array 28 and OP 18

No glare found

PV array 28 and OP 19

No glare found

PV array 28 and OP 20

No glare found

PV array 28 and OP 21

No glare found

PV: PV array 29 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Oehman Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 9	0	0.0	0	0.0
OP 10	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

PV array 29 and Route: Emigrant Springs Ln

No glare found

PV array 29 and Route: Herin Ln - 1

No glare found

PV array 29 and Route: Herin Ln - 2

No glare found

PV array 29 and Route: Hwy 206

No glare found

PV array 29 and Route: I97

No glare found

PV array 29 and Route: Klondike Rd

No glare found

PV array 29 and Route: Medler Ln

No glare found

PV array 29 and Route: N Klondike Rd

No glare found

PV array 29 and Route: Oehman Rd

No glare found

PV array 29 and Route: Old Wasco-Heppner Hwy

No glare found

PV array 29 and Route: Webfoot Rd

No glare found

PV array 29 and OP 1

No glare found

PV array 29 and OP 2

No glare found

PV array 29 and OP 3

No glare found

PV array 29 and OP 4

No glare found

PV array 29 and OP 5

No glare found

PV array 29 and OP 6

No glare found

PV array 29 and OP 7

No glare found

PV array 29 and OP 8

No glare found

PV array 29 and OP 9

No glare found

PV array 29 and OP 10

No glare found

PV array 29 and OP 11

No glare found

PV array 29 and OP 12

No glare found

PV array 29 and OP 13

No glare found

PV array 29 and OP 14

No glare found

PV array 29 and OP 15

No glare found

PV array 29 and OP 16

No glare found

PV array 29 and OP 17

No glare found

PV array 29 and OP 18

No glare found

PV array 29 and OP 19

No glare found

PV array 29 and OP 20

No glare found

PV array 29 and OP 21

No glare found

PV: PV array 30 low potential for temporary after-image

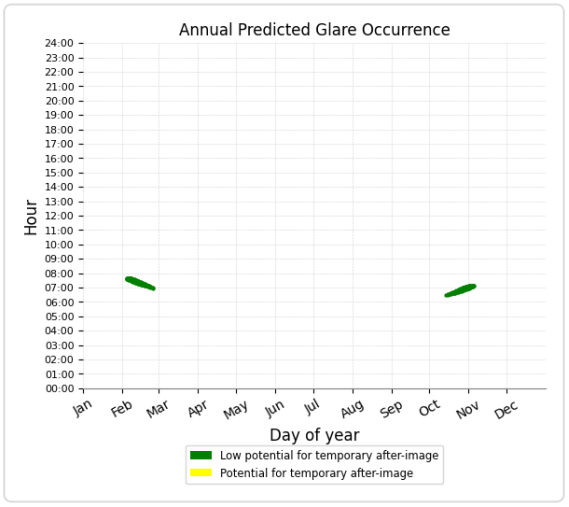
Receptor results ordered by category of glare

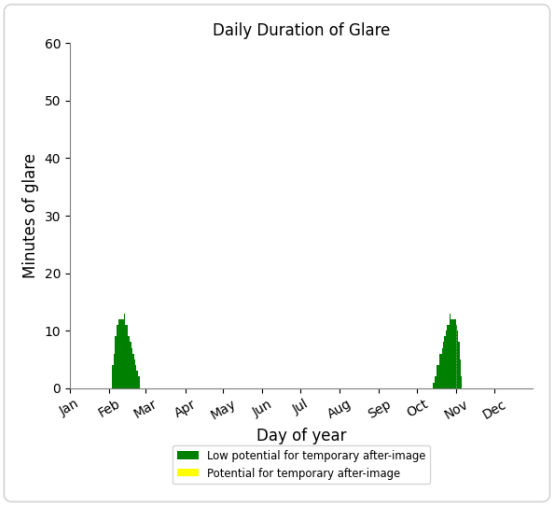
Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Oehman Rd	357	6.0	0	0.0
Emigrant Springs Ln	0	0.0	0	0.0
Herin Ln - 1	0	0.0	0	0.0
Herin Ln - 2	0	0.0	0	0.0
Hwy 206	0	0.0	0	0.0
I97	0	0.0	0	0.0
Klondike Rd	0	0.0	0	0.0
Medler Ln	0	0.0	0	0.0
N Klondike Rd	0	0.0	0	0.0
Old Wasco-Heppner Hwy	0	0.0	0	0.0
Webfoot Rd	0	0.0	0	0.0
OP 9	426	7.1	0	0.0
OP 10	417	7.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0
OP 7	0	0.0	0	0.0
OP 8	0	0.0	0	0.0
OP 11	0	0.0	0	0.0
OP 12	0	0.0	0	0.0
OP 13	0	0.0	0	0.0
OP 14	0	0.0	0	0.0
OP 15	0	0.0	0	0.0
OP 16	0	0.0	0	0.0
OP 17	0	0.0	0	0.0
OP 18	0	0.0	0	0.0
OP 19	0	0.0	0	0.0
OP 20	0	0.0	0	0.0
OP 21	0	0.0	0	0.0

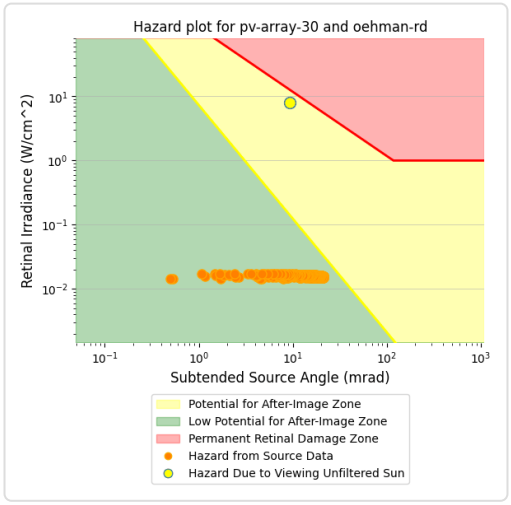
PV array 30 and Route: Oehman Rd

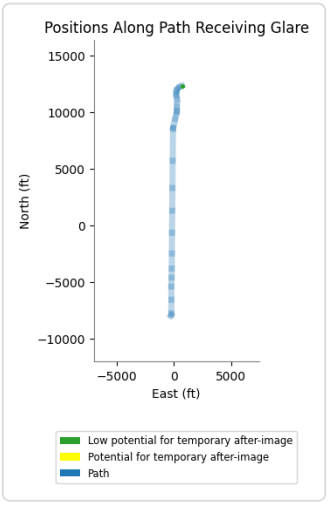
Yellow glare: none

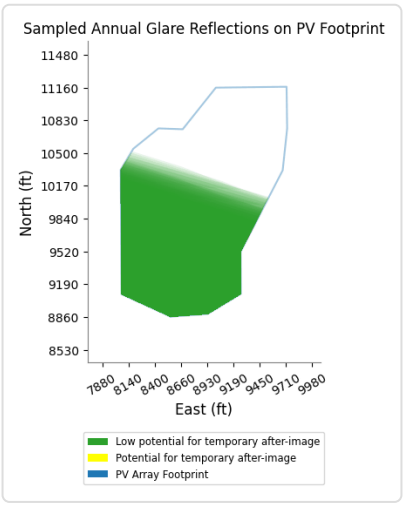
Green glare: 357 min.











PV array 30 and Route: Emigrant Springs Ln

No glare found

PV array 30 and Route: Herin Ln - 1

No glare found

PV array 30 and Route: Herin Ln - 2

No glare found

PV array 30 and Route: Hwy 206

No glare found

PV array 30 and Route: I97

No glare found

PV array 30 and Route: Klondike Rd

No glare found

PV array 30 and Route: Medler Ln

No glare found

PV array 30 and Route: N Klondike Rd

No glare found

PV array 30 and Route: Old Wasco-Heppner Hwy

No glare found

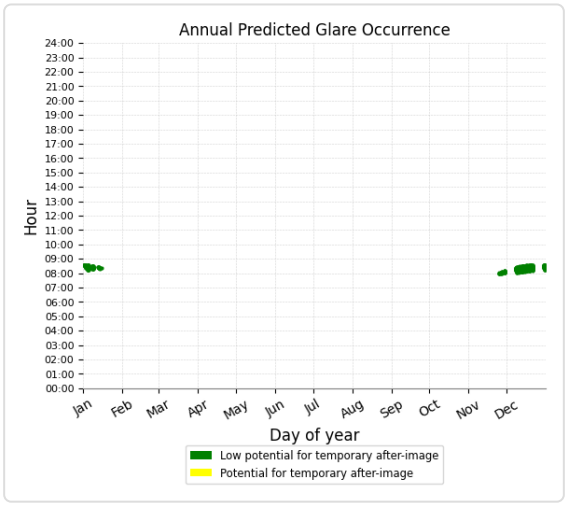
PV array 30 and Route: Webfoot Rd

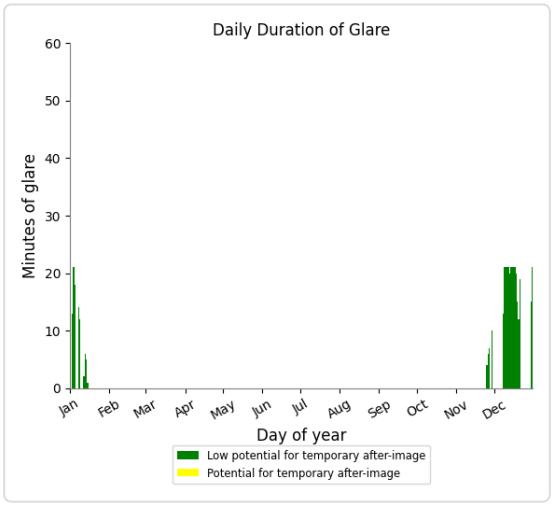
No glare found

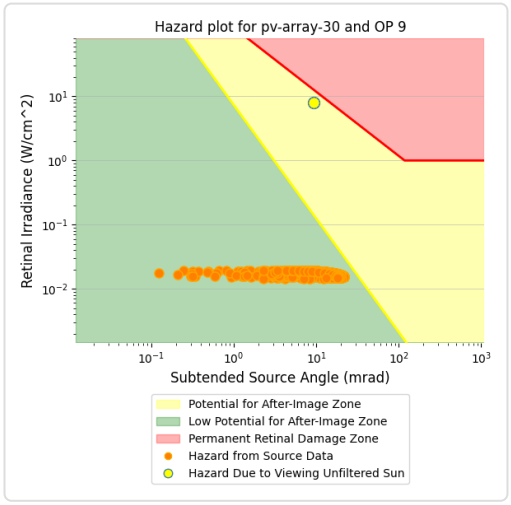
PV array 30 and OP 9

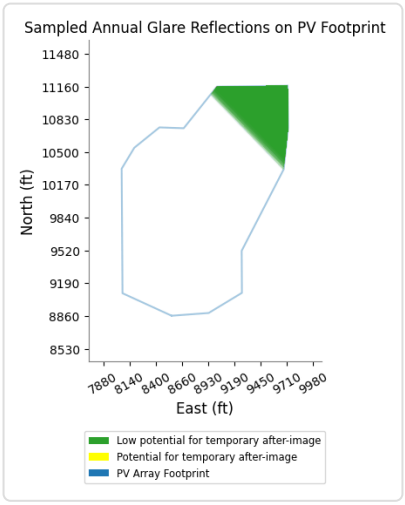
Yellow glare: none

Green glare: 426 min.



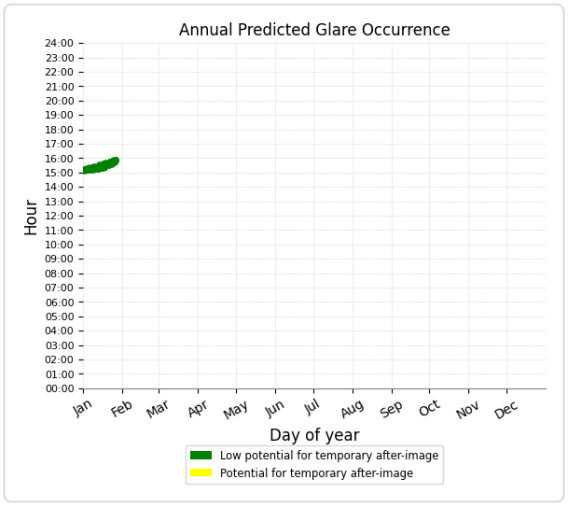


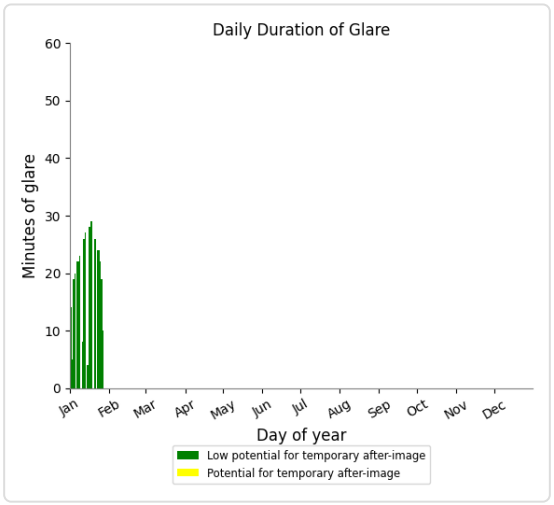


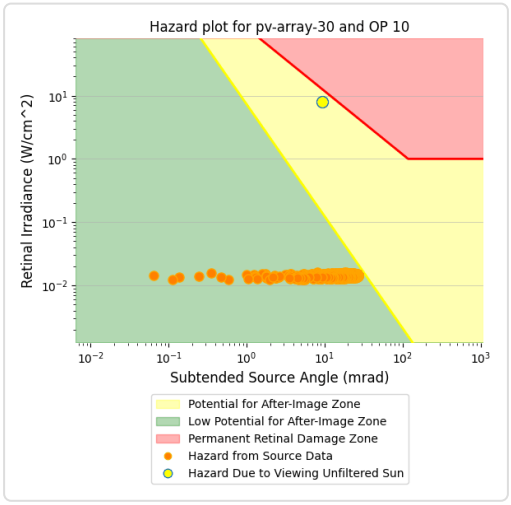


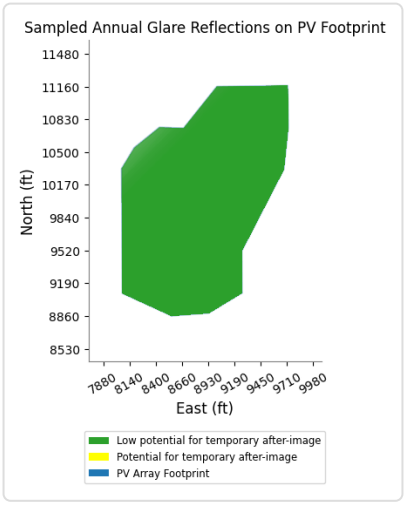
PV array 30 and OP 10

Yellow glare: none
Green glare: 417 min.









PV array 30 and OP 1

No glare found

PV array 30 and OP 2

No glare found

PV array 30 and OP 3

No glare found

PV array 30 and OP 4

No glare found

PV array 30 and OP 5

No glare found

PV array 30 and OP 6

No glare found

PV array 30 and OP 7

No glare found

PV array 30 and OP 8

No glare found

PV array 30 and OP 11

No glare found

PV array 30 and OP 12

No glare found

PV array 30 and OP 13

No glare found

PV array 30 and OP 14

No glare found

PV array 30 and OP 15

No glare found

PV array 30 and OP 16

No glare found

PV array 30 and OP 17

No glare found

PV array 30 and OP 18

No glare found

PV array 30 and OP 19

No glare found

PV array 30 and OP 20

No glare found

PV array 30 and OP 21

No glare found

Assumptions

"Green" glare is glare with low potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.
"Yellow" glare is glare with potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.
Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.
The algorithm does not rigorously represent the detailed geometry of a system; detailed features such as gaps between modules, variable height of the PV array, and support structures may impact actual glare results. However, we have validated our models against several systems, including a PV array causing glare to the air-traffic control tower at Manchester-Boston Regional Airport and several sites in Albuquerque, and the tool accurately predicted the occurrence and intensity of glare at different times and days of the year.
Several V1 calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for large PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare. This primarily affects V1 analyses of path receptors.
Random number computations are utilized by various steps of the annual hazard analysis algorithm. Predicted minutes of glare can vary between runs as a result. This limitation primarily affects analyses of Observation Point receptors, including ATCTs. Note that the SGHAT/ ForgeSolar methodology has always relied on an analytical, qualitative approach to accurately determine the overall hazard (i.e. green vs. yellow) of expected glare on an annual basis.
The analysis does not automatically consider obstacles (either man-made or natural) between the observation points and the prescribed solar installation that may obstruct observed glare, such as trees, hills, buildings, etc.
The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)
The variable direct normal irradiance (DNI) feature (if selected) scales the user-prescribed peak DNI using a typical clear-day irradiance profile. This profile has a lower DNI in the mornings and evenings and a maximum at solar noon. The scaling uses a clear-day irradiance profile based on a normalized time relative to sunrise, solar noon, and sunset, which are prescribed by a sun-position algorithm and the latitude and longitude obtained from Google maps. The actual DNI on any given day can be affected by cloud cover, atmospheric attenuation, and other environmental factors.
The ocular hazard predicted by the tool depends on a number of environmental, optical, and human factors, which can be uncertain. We provide input fields and typical ranges of values for these factors so that the user can vary these parameters to see if they have an impact on the results. The speed of SGHAT allows expedited sensitivity and parametric analyses.
The system output calculation is a DNI-based approximation that assumes clear, sunny skies year-round. It should not be used in place of more rigorous modeling methods.
Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid based on aggregated research data. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.
Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.
Refer to the Help page at **www.forgesolar.com/help/** for assumptions and limitations not listed here.

Default glare analysis parameters and observer eye characteristics (for reference only):

- Analysis time interval: 1 minute
- Ocular transmission coefficient: 0.5
- Pupil diameter: 0.002 meters
- Eye focal length: 0.017 meters
- Sun subtended angle: 9.3 milliradians

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FORGESOLAR GLARE ANALYSIS

Project: **Biglow Canyon Solar**
Site configuration: **North Arrays Analysis 3 - FAA Receptors**

Created 14 Aug, 2024
Updated 14 Aug, 2024
Time-step 1 minute
Timezone offset UTC-8
Minimum sun altitude 0.0 deg
DNI peaks at 1,000.0 W/m^2
Category 100 MW to 1 GW
Site ID 126822.21638

Ocular transmission coefficient 0.5
Pupil diameter 0.002 m
Eye focal length 0.017 m
Sun subtended angle 9.3 mrad
PV analysis methodology V2



Summary of Results No glare predicted

PV Array	Tilt	Orient	Annual Green Glare		Annual Yellow Glare		Energy
	°	°	min	hr	min	hr	kWh
PV array 21	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 22	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 23	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 24	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 25	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 26	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 27	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 28	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 29	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 30	SA tracking	SA tracking	0	0.0	0	0.0	-

Total glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

35S RWY 07	0	0.0	0	0.0
35S RWY 25	0	0.0	0	0.0

Component Data

PV Arrays

Name: PV array 21
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.642846	-120.623403	1553.80	8.00	1561.80
2	45.642835	-120.617915	1522.80	8.00	1530.80
3	45.647327	-120.618296	1483.40	8.00	1491.40
4	45.649663	-120.620935	1525.80	8.00	1533.80
5	45.650831	-120.621681	1496.20	8.00	1504.20
6	45.650772	-120.623482	1484.80	8.00	1492.80

Name: PV array 22
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.654035	-120.619126	1450.00	8.00	1458.00
2	45.652514	-120.613446	1446.70	8.00	1454.70
3	45.646936	-120.613391	1508.10	8.00	1516.10
4	45.646852	-120.614429	1517.10	8.00	1525.10
5	45.649078	-120.614867	1508.90	8.00	1516.90
6	45.649650	-120.615708	1486.80	8.00	1494.80
7	45.651318	-120.617443	1492.00	8.00	1500.00
8	45.652468	-120.619097	1478.00	8.00	1486.00

Name: PV array 23
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.647499	-120.611982	1466.70	8.00	1474.70
2	45.647510	-120.611085	1440.90	8.00	1448.90
3	45.643443	-120.604903	1443.80	8.00	1451.80
4	45.642581	-120.604812	1413.30	8.00	1421.30
5	45.642513	-120.611964	1485.70	8.00	1493.70

Name: PV array 24
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.646733	-120.606734	1357.40	8.00	1365.40
2	45.647767	-120.604788	1343.40	8.00	1351.40
3	45.646820	-120.604268	1365.40	8.00	1373.40
4	45.645600	-120.604306	1398.20	8.00	1406.20
5	45.644768	-120.604728	1443.00	8.00	1451.00
6	45.644699	-120.605433	1453.50	8.00	1461.50
7	45.645842	-120.606734	1381.40	8.00	1389.40

Name: PV array 25
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.655717	-120.612344	1464.40	8.00	1472.40
2	45.656382	-120.611593	1463.80	8.00	1471.80
3	45.656389	-120.605453	1448.20	8.00	1456.20
4	45.655809	-120.602833	1416.80	8.00	1424.80
5	45.654069	-120.602850	1394.40	8.00	1402.40
6	45.653602	-120.605186	1359.50	8.00	1367.50
7	45.653563	-120.606156	1374.10	8.00	1382.10
8	45.652375	-120.607877	1392.40	8.00	1400.40
9	45.651261	-120.609559	1416.60	8.00	1424.60
10	45.650643	-120.610866	1430.20	8.00	1438.20
11	45.650607	-120.611420	1448.50	8.00	1456.50
12	45.651239	-120.612272	1466.20	8.00	1474.20

Name: PV array 26
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.650070	-120.607009	1435.00	8.00	1443.00
2	45.650088	-120.605548	1400.90	8.00	1408.90
3	45.651274	-120.605193	1400.10	8.00	1408.10
4	45.652973	-120.605208	1363.20	8.00	1371.20
5	45.652969	-120.606424	1361.80	8.00	1369.80
6	45.651249	-120.607019	1409.50	8.00	1417.50

Name: PV array 27
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.649904	-120.600907	1337.10	8.00	1345.10
2	45.649648	-120.598222	1316.90	8.00	1324.90
3	45.649614	-120.592771	1268.20	8.00	1276.20
4	45.661179	-120.592200	1363.10	8.00	1371.10
5	45.661124	-120.592744	1381.00	8.00	1389.00
6	45.659178	-120.594909	1385.90	8.00	1393.90
7	45.656944	-120.596347	1378.80	8.00	1386.80
8	45.655523	-120.598207	1365.60	8.00	1373.60
9	45.654138	-120.599092	1386.70	8.00	1394.70
10	45.652774	-120.600564	1348.10	8.00	1356.10
11	45.651090	-120.600954	1377.90	8.00	1385.90

Name: PV array 28
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



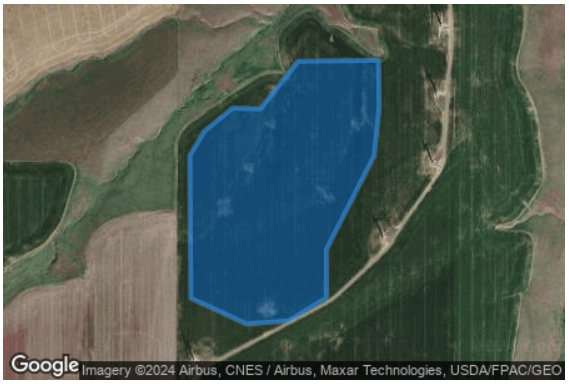
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.653790	-120.592211	1266.90	8.00	1274.90
2	45.652814	-120.591400	1257.40	8.00	1265.40
3	45.652130	-120.586982	1217.10	8.00	1225.10
4	45.656457	-120.582504	1134.80	8.00	1142.80
5	45.663442	-120.582532	1108.40	8.00	1116.40
6	45.663499	-120.591542	1340.30	8.00	1348.30
7	45.661209	-120.592224	1341.40	8.00	1349.40
8	45.653765	-120.592539	1267.90	8.00	1275.90

Name: PV array 29
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.663770	-120.591856	1341.50	8.00	1349.50
2	45.664564	-120.591770	1326.80	8.00	1334.80
3	45.666528	-120.588720	1274.50	8.00	1282.50
4	45.667110	-120.587249	1200.60	8.00	1208.60
5	45.667730	-120.586171	1145.10	8.00	1153.10
6	45.667731	-120.583660	1093.40	8.00	1101.40
7	45.669314	-120.582926	1093.70	8.00	1101.70
8	45.669381	-120.581431	1052.90	8.00	1060.90
9	45.668819	-120.580553	1037.00	8.00	1045.00
10	45.668199	-120.580533	1065.00	8.00	1073.00
11	45.665960	-120.581667	1076.00	8.00	1084.00
12	45.664805	-120.582444	1068.20	8.00	1076.20
13	45.663960	-120.583617	1114.30	8.00	1122.30
14	45.663682	-120.584507	1097.90	8.00	1105.90
15	45.663680	-120.588791	1172.30	8.00	1180.30
16	45.663708	-120.589701	1300.10	8.00	1308.10

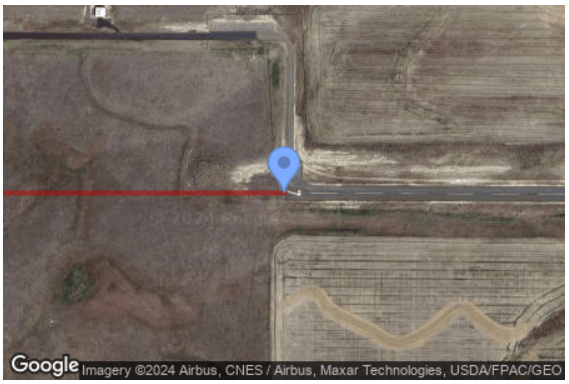
Name: PV array 30
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 5.0°
Ground Coverage Ratio: 0.3
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	45.667149	-120.589944	1268.70	8.00	1276.70
2	45.667766	-120.591865	1281.20	8.00	1289.20
3	45.671183	-120.591899	1105.70	8.00	1113.70
4	45.671759	-120.591404	1078.40	8.00	1086.40
5	45.672318	-120.590421	1045.40	8.00	1053.40
6	45.672295	-120.589473	1039.80	8.00	1047.80
7	45.673437	-120.588178	1018.60	8.00	1026.60
8	45.673462	-120.585414	1059.60	8.00	1067.60
9	45.672314	-120.585392	1087.60	8.00	1095.60
10	45.671169	-120.585566	1094.60	8.00	1102.60
11	45.668932	-120.587208	1130.00	8.00	1138.00
12	45.667778	-120.587198	1180.30	8.00	1188.30
13	45.667225	-120.588498	1230.80	8.00	1238.80

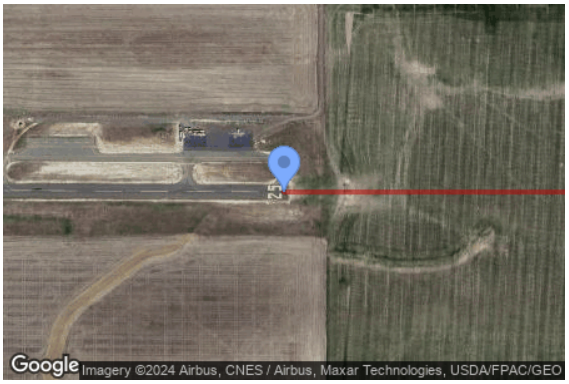
Flight Path Receptors

Name: 35S RWY 07
Description:
Threshold height: 50 ft
Direction: 90.0°
Glide slope: 3.0°
Pilot view restricted? Yes
Vertical view: 30.0°
Azimuthal view: 50.0°



Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	45.589252	-120.680664	1450.12	50.00	1500.12
Two-mile	45.589252	-120.722028	1349.68	703.86	2053.54

Name: 35S RWY 25
Description:
Threshold height: 50 ft
Direction: 270.0°
Glide slope: 3.0°
Pilot view restricted? Yes
Vertical view: 30.0°
Azimuthal view: 50.0°



Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	45.589212	-120.667270	1501.38	50.00	1551.38
Two-mile	45.589212	-120.625906	1591.74	513.07	2104.81

Glare Analysis Results

Summary of Results No glare predicted

PV Array	Tilt	Orient	Annual Green Glare		Annual Yellow Glare		Energy
	°	°	min	hr	min	hr	kWh
PV array 21	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 22	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 23	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 24	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 25	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 26	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 27	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 28	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 29	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 30	SA tracking	SA tracking	0	0.0	0	0.0	-

Total glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
35S RWY 07	0	0.0	0	0.0
35S RWY 25	0	0.0	0	0.0

PV: PV array 21 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
35S RWY 07	0	0.0	0	0.0
35S RWY 25	0	0.0	0	0.0

PV array 21 and FP: 35S RWY 07

No glare found

PV array 21 and FP: 35S RWY 25

No glare found

PV: PV array 22 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
35S RWY 07	0	0.0	0	0.0
35S RWY 25	0	0.0	0	0.0

PV array 22 and FP: 35S RWY 07

No glare found

PV array 22 and FP: 35S RWY 25

No glare found

PV: PV array 23 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
35S RWY 07	0	0.0	0	0.0
35S RWY 25	0	0.0	0	0.0

PV array 23 and FP: 35S RWY 07

No glare found

PV array 23 and FP: 35S RWY 25

No glare found

PV: PV array 24 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
35S RWY 07	0	0.0	0	0.0
35S RWY 25	0	0.0	0	0.0

PV array 24 and FP: 35S RWY 07

No glare found

PV array 24 and FP: 35S RWY 25

No glare found

PV: PV array 25 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
35S RWY 07	0	0.0	0	0.0
35S RWY 25	0	0.0	0	0.0

PV array 25 and FP: 35S RWY 07

No glare found

PV array 25 and FP: 35S RWY 25

No glare found

PV: PV array 26 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
35S RWY 07	0	0.0	0	0.0
35S RWY 25	0	0.0	0	0.0

PV array 26 and FP: 35S RWY 07

No glare found

PV array 26 and FP: 35S RWY 25

No glare found

PV: PV array 27 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
35S RWY 07	0	0.0	0	0.0
35S RWY 25	0	0.0	0	0.0

PV array 27 and FP: 35S RWY 07

No glare found

PV array 27 and FP: 35S RWY 25

No glare found

PV: PV array 28 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
35S RWY 07	0	0.0	0	0.0
35S RWY 25	0	0.0	0	0.0

PV array 28 and FP: 35S RWY 07

No glare found

PV array 28 and FP: 35S RWY 25

No glare found

PV: PV array 29 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
35S RWY 07	0	0.0	0	0.0
35S RWY 25	0	0.0	0	0.0

PV array 29 and FP: 35S RWY 07

No glare found

PV array 29 and FP: 35S RWY 25

No glare found

PV: PV array 30 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
35S RWY 07	0	0.0	0	0.0
35S RWY 25	0	0.0	0	0.0

PV array 30 and FP: 35S RWY 07

No glare found

PV array 30 and FP: 35S RWY 25

No glare found

Assumptions

"Green" glare is glare with low potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.
"Yellow" glare is glare with potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.
Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.
The algorithm does not rigorously represent the detailed geometry of a system; detailed features such as gaps between modules, variable height of the PV array, and support structures may impact actual glare results. However, we have validated our models against several systems, including a PV array causing glare to the air-traffic control tower at Manchester-Boston Regional Airport and several sites in Albuquerque, and the tool accurately predicted the occurrence and intensity of glare at different times and days of the year.
Several V1 calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for large PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare. This primarily affects V1 analyses of path receptors.
Random number computations are utilized by various steps of the annual hazard analysis algorithm. Predicted minutes of glare can vary between runs as a result. This limitation primarily affects analyses of Observation Point receptors, including ATCTs. Note that the SGHAT/ ForgeSolar methodology has always relied on an analytical, qualitative approach to accurately determine the overall hazard (i.e. green vs. yellow) of expected glare on an annual basis.
The analysis does not automatically consider obstacles (either man-made or natural) between the observation points and the prescribed solar installation that may obstruct observed glare, such as trees, hills, buildings, etc.
The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)
The variable direct normal irradiance (DNI) feature (if selected) scales the user-prescribed peak DNI using a typical clear-day irradiance profile. This profile has a lower DNI in the mornings and evenings and a maximum at solar noon. The scaling uses a clear-day irradiance profile based on a normalized time relative to sunrise, solar noon, and sunset, which are prescribed by a sun-position algorithm and the latitude and longitude obtained from Google maps. The actual DNI on any given day can be affected by cloud cover, atmospheric attenuation, and other environmental factors.
The ocular hazard predicted by the tool depends on a number of environmental, optical, and human factors, which can be uncertain. We provide input fields and typical ranges of values for these factors so that the user can vary these parameters to see if they have an impact on the results. The speed of SGHAT allows expedited sensitivity and parametric analyses.
The system output calculation is a DNI-based approximation that assumes clear, sunny skies year-round. It should not be used in place of more rigorous modeling methods.
Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid based on aggregated research data. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.
Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.
Refer to the Help page at **www.forgesolar.com/help/** for assumptions and limitations not listed here.

Default glare analysis parameters and observer eye characteristics (for reference only):

- Analysis time interval: 1 minute
- Ocular transmission coefficient: 0.5
- Pupil diameter: 0.002 meters
- Eye focal length: 0.017 meters
- Sun subtended angle: 9.3 milliradians

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Federal Aviation Administration

The FAA is currently experiencing delays in processing off-airport aeronautical studies. These delays are currently resulting in an approximate 15 additional days in processing time. The FAA will continue to work aeronautical studies on a first come, first served basis. Please take this possible delay into consideration when determining when to submit your case. If your submitted aeronautical study requires priority and 60 days has elapsed since submission, please contact the OEG Specialist for your state with the rationale for your request and it will be reviewed for escalation. The issue causing these delays is actively being mitigated and is expected to be resolved around August.

« OE/AAA

Notice Criteria Tool

Notice Criteria Tool - Desk Reference Guide V_2018.2.0

The requirements for filing with the Federal Aviation Administration for proposed structures vary based on a number of factors: height, proximity to an airport, location, and frequencies emitted from the structure, etc. For more details, please reference CFR Title 14 Part 77.9.

You must file with the FAA at least 45 days prior to construction if:

- your structure will exceed 200ft above ground level
- your structure will be in proximity to an airport and will exceed the slope ratio
- your structure involves construction of a traverseway (i.e. highway, railroad, waterway etc...) and once adjusted upward with the appropriate vertical distance would exceed a standard of 77.9(a) or (b)
- your structure will emit frequencies, and does not meet the conditions of the FAA Co-location Policy
- your structure will be in an instrument approach area and might exceed part 77 Subpart C
- your proposed structure will be in proximity to a navigation facility and may impact the assurance of navigation signal reception
- your structure will be on an airport or heliport
- filing has been requested by the FAA

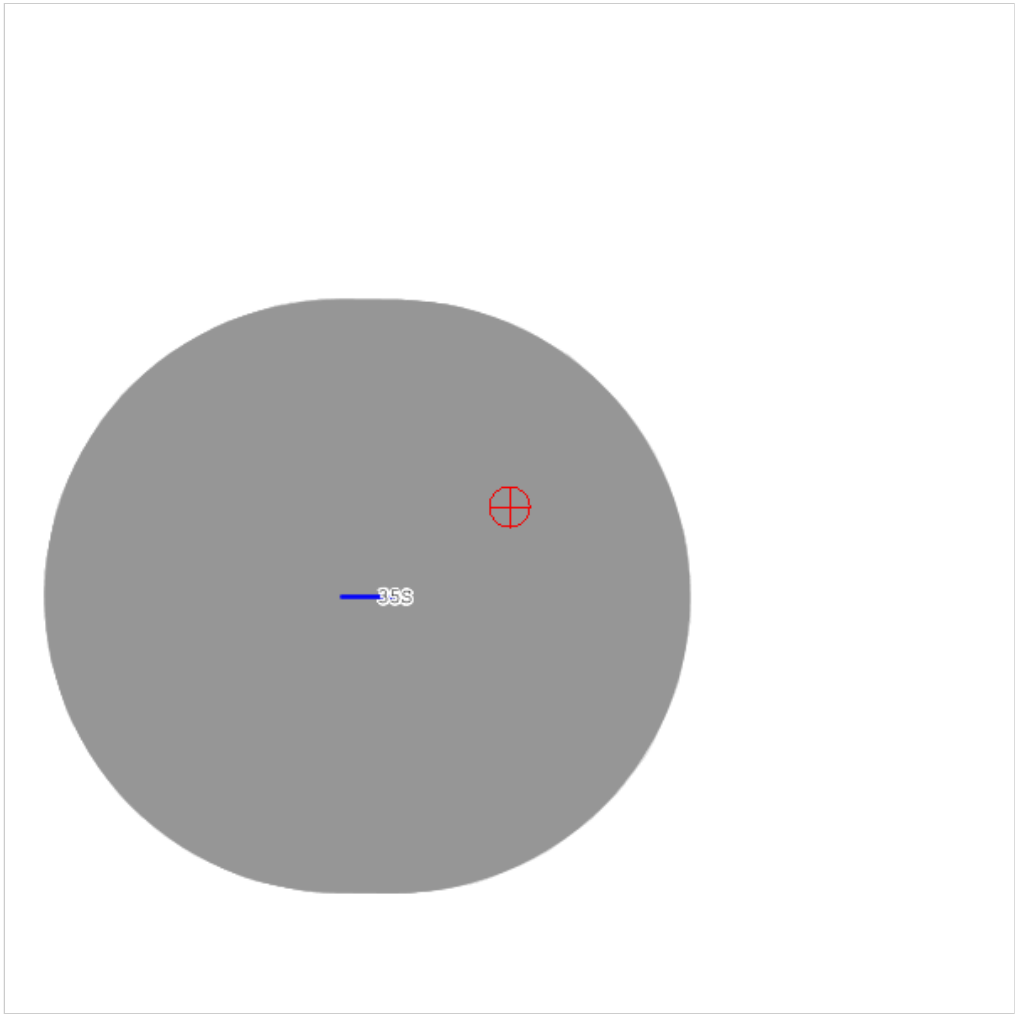
If you require additional information regarding the filing requirements for your structure, please identify and contact the appropriate FAA representative using the Air Traffic Areas of Responsibility map for Off Airport construction, or contact the FAA Airports Region / District Office for On Airport construction.

The tool below will assist in applying Part 77 Notice Criteria.

* **Structure Type:**	SOLAR | Solar Panel Please select structure type and complete location point information.
Latitude:	45 Deg 36 M 19.99 S N
Longitude:	120 Deg 38 M 10.45 S W
Horizontal Datum:	NAD83
Site Elevation (SE):	1536 (nearest foot)
Structure Height :	15 (nearest foot)
Is structure on airport:	(•) No ( ) Yes

Results

You do not exceed Notice Criteria.


35S

Federal Aviation Administration

The FAA is currently experiencing delays in processing off-airport aeronautical studies. These delays are currently resulting in an approximate 15 additional days in processing time. The FAA will continue to work aeronautical studies on a first come, first served basis. Please take this possible delay into consideration when determining when to submit your case. If your submitted aeronautical study requires priority and 60 days has elapsed since submission, please contact the OEG Specialist for your state with the rationale for your request and it will be reviewed for escalation. The issue causing these delays is actively being mitigated and is expected to be resolved around August.

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- your proposed structure will be in proximity to a navigation facility and may impact the assurance of navigation signal reception
- your structure will be on an airport or heliport
- filing has been requested by the FAA

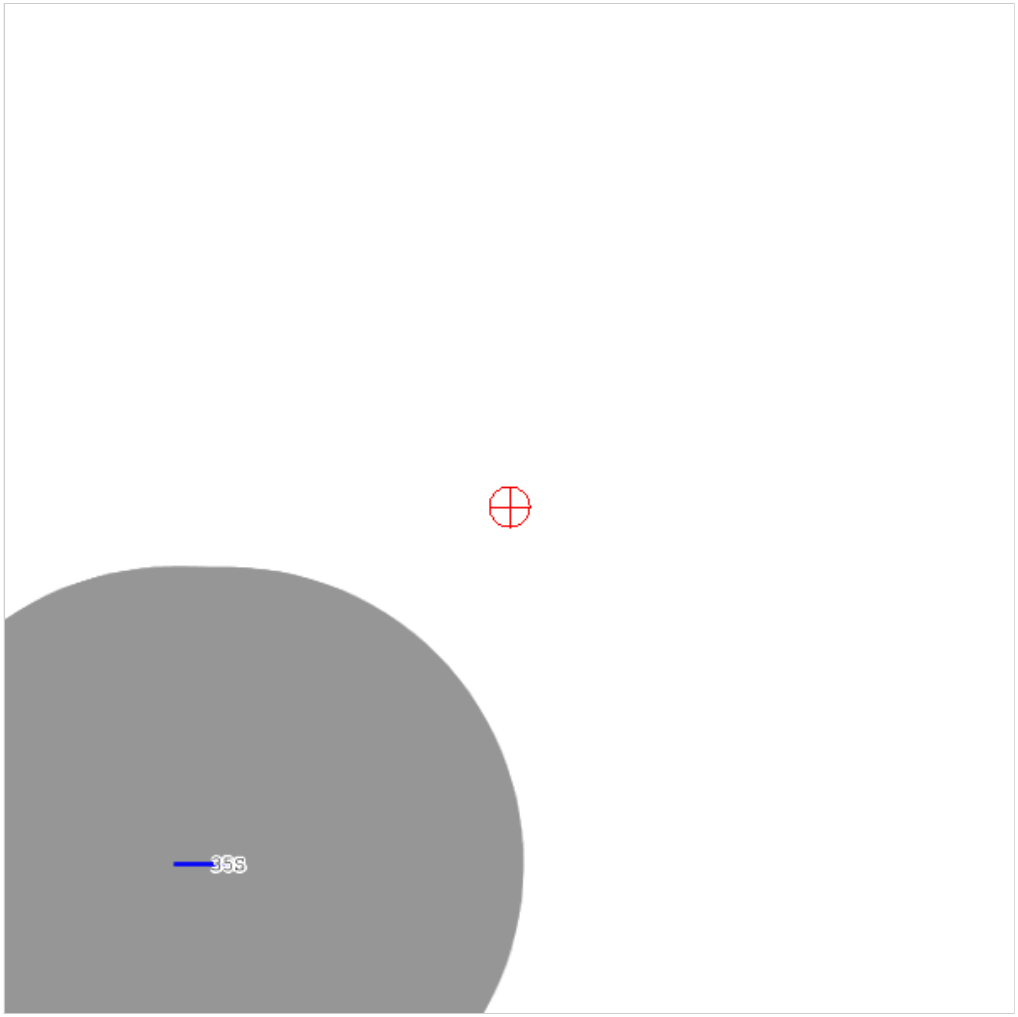
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The tool below will assist in applying Part 77 Notice Criteria.

* **Structure Type:**	SOLAR | Solar Panel Please select structure type and complete location point information.
Latitude:	45 Deg 39 M 18.23 S N
Longitude:	120 Deg 35 M 31.95 S W
Horizontal Datum:	NAD83
Site Elevation (SE):	1281 (nearest foot)
Structure Height :	15 (nearest foot)
Is structure on airport:	(●) No ( ) Yes

Results

You do not exceed Notice Criteria.


35S

Attachment R-3. Photolog

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Photo 1. KOP 1, Klondike Road.View north from Klondike Road, approximately 0.5 mile west of Egypt Road.



Photo 2. Old Wasco Heppner Highway. View east from Old Wasco Heppner Highway, adjacent to Wasco State Airport.



Photo 3. KOP 3, Medler Lane. View east from Medler Lane, approximately 0.19 mile west of Scott Canyon Road.



Photo 4. KOP 4, Oeham Road. View north from Oeham Road, approximately 0.15 mile north of McNab Lane.



Photo 5. KOP 5, Helms Creek Lane. View north from Helms Creek Lane, approximately 0.85 mile north of McNab Lane.



Photo 6. KOP 6, Helms Lane. View southeast from Helms Lane, approximately 0.5 mile east of Helms Creek Lane.



Photo 7. KOP 7, Herin Lane. View west from Herin Lane, approximately 1mile north of Beacon Road.



Photo 8. KOP 8, Biglow Canyon Road. View west from Biglow Canyon Road at intersection with Beacon Road.



Photo 9. KOP 9, N. Klondike Road. View southwest from N. Klondike Road approximately 0.5 mile north of Webfoot Road.



Photo 10. KOP 10, N. Klondike Road. View west from N. Klondike Road approximately 0.2 mile north of Old Wasco Heppner Highway.



Photo 11. KOP 11, Klondike Road. View northwest from Klondike Road, approximately 0.8 mile east of Egypt Road .



Photo 12. KOP 12, Emigrant Springs Lane. View northwest from Emigrant Springs Lane ant the intersection with Weir Lane.



Photo 13. KOP 13, Emigrant Springs Cemetery. View southwest from Emigrant Springs Cemetery.



Photo 14. KOP 14, SR 206 . View north from SR 206 at intersection with Egypt Road.



Photo 15. KOP 15, US 97. View northeast from US 97 approximately 0.5 mile south of Egypt Road.



Photo 16. KOP 16, Old Wasco Heppner Highway. View east from Old Wasco Heppner Highway, near intersection with US 97.



Photo 17. KOP 17, Wasco School Events Center. View east from Wasco School Events Center.



Photo 18. KOP 18, Sunrise Cemetery . View east from Sunrise Cemetery.



Photo 19. KOP 19, Goldendale Scenic Overlook. View southeast from Goldendale Scenic Overlook.



Photo 20. KOP 20, SR 14. View southeast from SR 14, near intersection with US 97.



Photo 21. KOP 21, Towal Road. View south from SR 14, near intersection with Towal Road.