CALICO RESOURCES USA CORP.
GRASSY MOUNTAIN MINE PROJECT
MALHEUR COUNTY, OREGON

WILDLIFE MITIGATION PLAN

Original November 2019 (EMS)
Revised December 2021 (EMS & MB&G)
Revised May 2023 (MB&G)
Revised August 2023 (MB&G)

Prepared for:

Calico Resources USA Corp.
665 Anderson Street
Winnemucca, Nevada 89445

Prepared by:

EM Strategies
1650 Meadow Wood Lane
Reno, NV 89502
(775) 826-8822

Mason, Bruce & Girard, Inc.
707 SW Washington, Suite 1300
Portland, OR 97205
503-224-3445
www.masonbruce.com

Table of Contents

1 Introduction 4
1.1 Project Location and Land Status 4
1.2 Baseline Data Collection 5
2 Wildlife Habitat Mitigation Goals and Standards 6
2.1 General Wildlife Habitat 6
2.2 Greater Sage-Grouse Rules and Standards 7
3 Resource Assessment 9
3.1 General Wildlife Habitat Typing and Categorization 9
3.1.1 Results 9
3.1.2 Federally Protected and State Sensitive Species 14
3.1.3 Final General Wildlife Habitat Categories 17
3.2 Mule Deer 18
3.3 Greater Sage-Grouse 18
3.3.1 Oregon Sage-Grouse Mitigation Program and Habitat Quantification Tool 19
4 Analysis of Potential Impacts 20
4.1 Impacts to General Wildlife Habitat 20
4.1.1 Avoidance 20
4.1.2 Minimization 21
4.1.3 Direct Impacts to Habitat 21
4.1.4 Indirect Impacts to Habitat 24
4.2 Impacts to Mule Deer and Mule Deer Habitat 25
4.3 Impacts to Greater Sage-Grouse 26
4.3.1 Avoidance 26
4.3.2 Minimization 27
4.3.3 Impact Duration 27
4.3.4 Direct Impacts 27
4.3.5 Indirect Impacts 27
4.3.6 Habitat Quantification Tool 27
4.3.7 Habitat Quantification Tool Results 28
5 Impact Minimization Measures 29
5.1 General Minimization measures for Wildlife and Habitat 29
5.2 Minimization Measures Specific to Greater Sage-Grouse 32
5.3 Reclamation 33
6 Compensatory Mitigation 34
6.1 Compensatory Mitigation for Greater Sage-Grouse 34
6.2 Compensatory Mitigation for Direct Impacts to Other Wildlife Habitat 34

6.3 Compensatory Mitigation for Indirect Impacts to Mule Deer Winter Range 35
6.4 Summary of Compensatory Mitigation Requirement 35
6.5 Compensatory Mitigation Options 36
6.5.1 Preferred Option: Permittee Implemented Mitigation: Habitat Mitigation Area 36
6.5.2 Option 2: ODFW In-Lieu Fee Program for Greater Sage-Grouse 38
6.5.3 Option 3: Third Party Payment-to-Provide: Wildlife Habitat Management and Greater Sage-Grouse Mitigation Bank 40
6.6 Project-Specific Compensatory Mitigation Scenarios 40
6.6.1 Example 1: Full Mitigation Through Permittee Implemented Mitigation Combined with Third Party Payment-to-Provide 40
6.6.2 Example 2: Full Mitigation through Third Party Payment-to-Provide 41
6.6.3 Example 3: Full Mitigation Through Permittee Implemented Mitigation Combined with ODFW In-Lieu Fee Program 42
7 Monitoring 43
7.1 General Impact Minimization 43
7.2 Additional Wildlife Protection Measures 44
7.3 Reclamation 46
8 Summary 47
9 Amendment 48
10 References 48

List of Tables

Table 1. Biological and Botanical Surveys Performed in the Project Area 5
Table 2. ODFW Mitigation Goals and Implementation Standards by Habitat Category 6
Table 3. Land Cover and Habitat Types within the Permit Area 10
Table 4. Federally Protected and State or BLM Sensitive Species Occurrence and Likely Use of Project Area 15
Table 5. Final Habitat Category Summary 17
Table 6. Ecological State Grade Levels 20
Table 7. Potential Direct Impacts 22
Table 8. Acres of Impact by Habitat Category and Type for the Proposed Project 22
Table 9. Acres of Mule Deer Winter Range by Habitat Type Impacted by Proposed Project 26
Table 10. Habitat Quantification Tool Impact Assessment 28
Table 11. Habitat mitigation Area by Habitat Category and Subtype 35
Table 12. Summary of GRSG Compensatory Mitigation for the Project 36
Table 13. Summary of Other Wildlife Compensatory Mitigation for the Project 36
Table 14. TSF and reclaim pond analytes to be monitored for toxicity to wildlife 44

List of Appendices

Appendix A: Figures
Figure 1: Project Location, Access, and Land Status
Figure 2: Fire History in the Project Area
Figure 3: Field-Verified Land Cover Types in the Project Area
Figure 4: Habitat Categories in the Project Area
Figure 5: Perimeter Fence Area and Proposed Disturbance to Access Road Area
Figure 6: Greater Sage-Grouse Low Density Habitat and Mule Deer Winter Range Habitat
Figure 7: Noise Disturbance
Appendix B: Terrestrial Vegetation Baseline Report
Appendix C: Wildlife Baseline Report
Appendix D: Wetland Delineation Report
Appendix E: Habitat Categorization Methods
Appendix F: Habitat Quantification Tool Outputs
Appendix G: TerraWest Conservation Bank Summary
Appendix H: Prospective HMA Assessments

1 Introduction

Calico Resources USA Corp. (Calico) has prepared this Wildlife Mitigation Plan (WMP) for the Grassy Mountain Mine Project (Project) in compliance with Oregon Administrative Rule (OAR) 635-420-0060 as a part of the consolidated application for a chemical process mine (OAR 632-037-0125 (3)). Calico proposes to construct, operate, reclaim, and close an underground mining and precious metal milling operation. Under OAR 635-420-0060 (2), the Project must meet the standard of "no overall net loss" of fish and wildlife habitat through compliance with OAR 635-415, the Oregon Department of Fish and Wildlife (ODFW) Fish and Wildlife Habitat Mitigation Policy. The purpose of this plan is to describe the impacts of the proposed Project on wildlife habitat and the proposed mitigation for those impacts as required by OAR 635-415-0005 (18) and 635-415-0020 (8).

Although the overall goal for this WMP is to demonstrate how the Project will meet the "no overall net loss" standard, the reader should understand that under OAR 635-415, the Oregon Department of Fish and Wildlife (ODFW) Fish and Wildlife Habitat Mitigation Policy, impacts to some habitat categories require mitigation that meets a higher standard of no net loss of habitat quantity or quality, and a net benefit of habitat quality or quantity, whereas impacts to other habitat categories require no compensatory mitigation. This plan also demonstrates Project compliance with the mitigation hierarchy for greater sage-grouse (*Centrocercus urophasianus*) (GRSG) described in OAR 635-140-0025 and applied in the county land use application process under OAR 660-023-0115 (10)(a)(A-C). Mitigation standards for specific habitat types are further described in Section 2.

This WMP presents the direct and indirect impacts to wildlife habitats, provides an approach for quantifying the impact debits resulting from the Project and the mitigation credits created through the compensatory mitigation projects, and sets forth a schedule for implementing the necessary mitigation projects.

1.1 Project Location and Land Status

The Project is located in Malheur County, Oregon, approximately 22 miles south-southwest of Vale and consists of two areas: the Mine and Process Area and the Access Road Area (Appendix A, Figure 1). Together, the Mine and Process Area and the Access Road Area encompass the Permit Area.

The Mine and Process Area is located on three patented lode mining claims and unpatented lode mining claims that cover an estimated 886 acres. These patented and unpatented lode mining claims are part of a larger land position that includes 455 unpatented lode mining claims and nine mill site claims on lands administered by the Bureau of Land Management (BLM) Vale District Office. All proposed mining would occur on the patented claims, with some mine facilities on unpatented claims. The Mine and Process Area is in all or portions of Sections 5 through 8, T22S, R44E, Willamette Base & Meridian (WB&M).

The Access Road Area is located on public land administered by the BLM, and private land controlled by others. A portion of the Access Road Area is a Malheur County Road named Twin Springs Road. The Access Road Area extends north from the Mine and Process Area to Russell Road, a paved county road. The Access Road Area is in portions of Section 5, T22S, R44E, Sections 3, 10, 11, 14, 15, 21 through 23, 28, 29, and 32, T21S, R44E, Sections 1, 12 through 14, 23, 26, 27, and 34, T20S, R44E, Sections 6 and 7, T20S, R45E, and Sections 22, 23, 26, 35, and 36, T19S, R44E (WB&M). The width of the Access Road Area is 300 feet (150 feet on either side of the access road centerline) to accommodate possible minor

widening or rerouting, and a powerline that will be constructed adjacent to the access road. There are several areas shown that are significantly wider than 300 feet on the Permit Area Map, which are areas where the final alignment has not yet been determined. The final engineering of the road will be consistent throughout, and within the Permit Area. The road corridor will be approximately 40 feet wide, which includes a 20-foot-wide road travel width (ten feet on either side of the road centerline), two-foot-wide shoulders on each side of the road, minimum one-foot-wide ditches on each side of the road, and appropriate cut and fill. The Access Road Area includes an additional buffer on either side of the proposed road width for the collection of environmental baseline data. The Access Road Area totals approximately 876 acres.

1.2 Baseline Data Collection

EM Strategies, Inc. (EMS), Wildlife Resource Consultants LLC (WRC), HDR Engineering (HDR), Northwest Wildlife Consultants (NWC) and Siskiyou BioSurvey LLC (Siskiyou) completed botanical surveys, habitat mapping and categorization, avian use surveys, special status wildlife species surveys, and raptor nest surveys during the period of 2013-2014, 2012-2015, and 2017-2020. A detailed description of biological and botanical surveys performed for the Project in support of information in this WMP, including timing and scope of each survey, is discussed in the Terrestrial Vegetation Baseline Report (Appendix B) and the Wildlife Resources Baseline Report (Appendix C). All biological surveys performed for the Project are summarized in Table 1. Changes to the Project Area boundary required some repetition of surveys, while other surveys were repeated in response to agency comments on Vegetation or Wildlife Baseline Reports or because the passage of time required updated survey data.

Table 1. Biological and Botanical Surveys Performed in the Project Area

Survey Type	Components	Time Period	Performed by:
Botanical	Preliminary Field Study - Transect Inventory, Plant Species Inventory	Summer 2012	HDR
	Daubenmire Vegetation Sampling, Plant Community Description, Plant Species Inventory, Noxious Weed Survey and Special Status Species Survey	Spring 2013	HDR
	Daubenmire Vegetation Sampling, Plant Community Description, Plant Species Inventory, Noxious Weed Survey and Special Status Species Survey	Spring 2015	HDR
	Sagebrush Identification Test	Fall 2018	EMS
	Daubenmire Vegetation Sampling, Plant Community Description, Plant Species Inventory, Noxious Weed Survey and Special Status Species Survey	Summer 2017	EMS
	Plant Community Mapping, Plant Species Inventory, Noxious Weed Survey, and Special Status Species Survey	Summer 2019	Siskiyou
Wildlife	General Wildlife Survey, Avian Plot Surveys, Aerial Raptor Survey, Greater Sage-Grouse Lek Survey (ground), Leporid Survey, and Acoustic Bat Survey	2013 - 2014	NWC
	General Wildlife Survey, Aerial Raptor Survey, Greater Sage-Grouse Lek Survey (aerial), Burrowing Owl Survey, Leporid Survey, and Acoustic Bat Survey	2017 – 2018	WRC
	Aerial Raptor Surveys	2020	WRC

2 Wildlife Habitat Mitigation Goals and Standards

2.1 General Wildlife Habitat

As stated in the introduction, under OAR 635-420-0060 (2), the Project must meet the standard of "no overall net loss" of fish and wildlife habitat through compliance with OAR 635-415, the ODFW Fish and Wildlife Habitat Mitigation Policy. OAR 635-415-0025 defines six habitat categories and establishes mitigation goals and implementation standards for each, which are summarized in Table 2. Mitigation goals for each habitat category range from avoiding impact (Habitat Category 1) to providing reliable in-kind, in-proximity habitat mitigation that achieves no net loss of habitat quantity or quality, and a net benefit of habitat quality or quantity (Category 2), to minimization of direct habitat loss (Category 6). Calico is committed to avoiding impacts to Category 1 habitat, as required by OAR 635-415-0025. For habitat classified as Category 2 through 6, Calico will avoid impacts where possible, and otherwise minimize or mitigate impacts as required by Category level (Table 2) in coordination with ODFW.

Table 2. ODFW Mitigation Goals and Implementation Standards by Habitat Category

Category	Description	Mitigation Goal	Achieved by
1	Irreplaceable, essential habitat for a fish or wildlife species, population, or a unique assemblage of species and is limited on either a physiographic province or site-specific basis, depending on the individual species, population, or unique assemblage.	No loss of either habitat quantity or quality	Avoidance of impacts through alternatives to the proposed development action.
2	Essential habitat for a fish or wildlife species, population, or unique assemblage of species and is limited either on a physiographic province or site-specific basis depending on the individual species, population, or unique assemblage.	No net loss of habitat quantity or quality and to provide a net benefit of habitat quantity or quality	Avoidance of impacts through alternatives to the proposed development action; or mitigation of impacts, if unavoidable, through reliable in-kind, in-proximity habitat mitigation to achieve no net loss of either pre-development habitat quantity or quality. In addition, a net benefit of habitat quantity or quality must be provided.
3	Essential habitat for fish and wildlife, or important habitat for fish and wildlife that is limited either on a physiographic province or site-specific basis, depending on the individual species or population.	No net loss of habitat quantity or quality	Avoidance of impacts through alternatives to the proposed development action; or mitigation of impacts, if unavoidable, through reliable in-kind, in-proximity habitat mitigation to achieve no net loss in either pre-development habitat quantity or quality.
4	Important habitat for fish and wildlife species.	No net loss of habitat quantity or quality	Avoidance of impacts through alternatives to the proposed development action; or mitigation of impacts, if unavoidable, through reliable in-kind or out-of-kind, in-proximity or off-proximity habitat mitigation to achieve no net loss in either pre-development habitat quantity or quality.
5	High potential to become either essential or important habitat.	Net benefit in habitat quantity and quality	Avoidance of impacts through alternatives to the proposed development action; or mitigation of impacts, if unavoidable, through actions that contribute to essential

Category	Description	Mitigation Goal	Achieved by
			or important habitat.
6	Low potential to become essential or important habitat.	Minimize impacts	Actions that minimize direct habitat loss and avoid impacts to offsite habitat.

2.2 Greater Sage-Grouse Rules and Standards

ODFW has designated a portion of the Permit Area as GRSG Low Density habitat (Figure 4 of Appendix C, the Wildlife Baseline Report). Therefore, the Project must also comply with the GRSG-specific goals and standards set forth by ODFW.

The Oregon Land Conservation and Development Department's (DLCD) GRSG rule OAR 660-023-0115 must be applied by a county during the land use application process. OAR 660-023-0115(7) requires the county to determine if the proposed development is a conflicting use, and if so it provides direction on how to apply the mitigation hierarchy for impacts to significant GRSG habitat. OAR 660-023-0115(10)(a) specifically describes the mitigation hierarchy that must be applied to a large-scale development action proposed in a low-density area and serves as the trigger for compensatory mitigation in compliance with OAR 635, division 140. Additionally, the Fish and Wildlife Habitat Mitigation Policy for ODFW (OAR 635-415-0025(7)) states that when impacts to GRSG are anticipated, mitigation shall be addressed as found in OAR 635-140-000 through 635-140-0025. The Oregon Greater Sage-Grouse Conservation Strategy (OAR 635-140-0025(1-3)) provides the following relevant guidance:

> *Policy 1. Mitigation for direct and indirect impacts from development actions will be required where the proposed development action:*
>
> *a. Requires a county land use permit, is a large-scale development as defined in OAR 660-023-0115 (Greater Sage-Grouse), and would impact core or low density habitat…*
>
> *Policy 2. The Department may approve or recommend approval of mitigation for impacts from a large-scale development permitted by a county; or development actions permitted by a state or federal government entity on public land, within sage-grouse habitat only after the following mitigation hierarchy has been addressed by the permitting entity, with the intent of directing the development action away from the most productive habitats and into the least productive areas for sage-grouse (in order of importance: core area, low density, general, and non-habitat)….*
>
> *(b) Avoidance in Low Density Habitat. If the proposed development action can occur in another location that avoids both direct and indirect impacts within low density sage-grouse habitat, then the proposal must not be allowed unless it can satisfy the following criteria:*
>
> *(A) It is not technically or financially feasible to locate the proposed use outside of low density sage-grouse habitat based on accepted engineering practices, regulatory standards, proximity to necessary infrastructure or some combination thereof; or*

(B) The proposed development action is dependent on geographic or other physical feature(s) found in low density habitat areas that are less common at other locations.

(d) Minimization. If after exercising the above avoidance tests, the permitting entity finds the proposed development action cannot be moved to non-habitat or into a habitat category that avoids adverse direct and indirect impacts to a habitat category of greater significance (i.e., core or low density), then the next step applied in the mitigation hierarchy will be minimization of the direct and indirect impacts of the proposed development action. Minimization consists of how to best locate, construct, operate and time (both seasonally and diurnally) the development action so as to avoid or minimize direct and indirect impacts on important sage-grouse habitat and sage-grouse….

(e) Compensatory Mitigation. If avoidance and minimization efforts have been exhausted, compensatory mitigation to address both direct and indirect impacts will be required as part of the permitting process for remaining adverse impacts from the proposed development action to sage-grouse habitat, consistent with the mitigation standard in (3) Policy 3 below.

Policy 3. The standard for compensatory mitigation of direct and indirect habitat impacts in sage-grouse habitat (core low density, and general areas) is to achieve net conservation benefit for sage-grouse by replacing the lost functionality of the impacted habitat to a level capable of supporting greater sage-grouse numbers than that of the habitat which was impacted. Where mitigation actions occur in existing sage-grouse habitat, the increased functionality must be in addition to any existing functionality of the habitat to support sage-grouse. When developing and implementing mitigation measures for impacts to core, low density, and general sage-grouse habitats, the project developers shall:

(a) Work directly with the Department and permitting entity to obtain approval to implement a mitigation plan or measures, at the responsibility of the developer, for mitigating impacts consistent with the standard in OAR 635 140 0025 (3) or, (b) Work with an entity approved by the Department to implement, at the responsibility of the developer, "in-lieu fee" projects consistent with the standard in OAR 635 140 0025 (3).

(c) Any mitigation undertaken pursuant to (a) or (b) above must have in place measures to ensure the results of the mitigation activity will persist (barring unintended natural events such as fire) for the life of the original impact. The Department will engage in mitigation discussions related to development actions in a manner consistent with applicable timelines of permitting entities.

Project compliance with OAR 635-140-0025(3) specifically requires compensatory mitigation for impacts to GRSG habitat to meet a net conservation benefit standard which replaces the "lost functionality of the impacted habitat to a level capable of supporting greater sage-grouse numbers than that of the habitat which was impacted". This is a higher standard than the "no overall net loss" standard stated in OAR 635-420-0060 for wildlife habitat resources, and the Project must meet this higher standard for its impacts to GRSG.

3 Resource Assessment

3.1 General Wildlife Habitat Typing and Categorization

To support the impact assessment and determine appropriate avoidance, minimization, and mitigation actions, the habitat categories in the Permit Area were qualitatively categorized based on their importance to fish and wildlife in accordance with OAR 635-415-0020(4)(c). Detailed methodology for habitat categorization is included in Appendix E. Plant communities were field-verified and mapped within the Project Area. Habitat categorization was developed using a combination of the results of the terrestrial vegetation surveys of the Permit Area (Appendix B), wildlife surveys of the Permit Area (Appendix C), wetland delineation report (Appendix D), wildlife habitat mapping (ODFW 2013), input from ODFW biologists, and features of interest or areas with specific characteristics (i.e., rock outcrops, ecotones). The initial baseline habitat category assignments described in Section 3.1.1 were based solely on vegetation community and some wildlife observations made during baseline surveys. Habitat types were mapped according to current vegetation rather than the potential ecological climax for any given location. Field-verified vegetation communities were used as a starting point to categorize habitat in the Project Area, then adjusted based on wildlife observations, unique features on the landscape, and input from ODFW biologists. Vegetation communities described outside the Project Area are based on desktop analysis. The initial habitat category assignments were further refined based on known occurrences of Federally Protected, Oregon State Sensitive, and BLM Sensitive species as well as sensitive area designation (e.g., mule deer winter range). Final habitat category assignments are presented in Section 3.1.3.

3.1.1 Results

Three-tenths of a mile of the northernmost portion of the Permit Area, approximately 12 acres, is irrigated agricultural row crops. The area has been extensively grazed for several years. Conditions on the ground are largely a result of seeding with crested wheatgrass (*Agropyron cristatum*) in rangeland improvement projects and in response to wildfire. Approximately 30 percent of the Project Area has been impacted by wildfire during the period of 1980 to 2018, mostly in the Access Road Area (Appendix A, Figure 2).

Vegetation community types identified within the Permit Area during field surveys in 2019 were classified using the United States National Vegetation Classification (USNVC) Standard (USNVC 2019). The five terrestrial ecological groups and their alliances or associations include:

- CGR019 – Vegetable Crop Cultural Group
- G311 – Intermountain Semi-Desert Grassland Group
    - A1262 – Indian Ricegrass (*Achnatherum hymenoides*) – Bluebunch Wheatgrass (*Pseudoroegneria spicata*) – Sandhill Muhly (*Muhlenbergia pungens*) Grassland Alliance
- G600 – Great Basin-Intermountain Ruderal Dry Shrubland and Grassland Group
    - A4148 – Crested Wheatgrass Western Ruderal Perennial Grassland Alliance
    - CEGL003019 – Cheatgrass (*Bromus tectorum*) Ruderal Grassland Association
    - CEGL005477 – Wyoming Big Sagebrush (*Artemisia tridentata* subsp. *wyomingensis*) / Cheatgrass Ruderal Shrubland Association
- G310 – Intermountain Semi-Desert Steppe and Shrubland Group
    - CEGL005594 – Yellow Rabbitbrush (*Chrysothamnus viscidiflorus*) / Bluebunch Wheatgrass Shrubland Association
- G302 – Intermountain Mesic Tall Sagebrush Steppe and Shrubland Group

- CEGL001009 – Wyoming Big Sagebrush / Bluebunch Wheatgrass Shrubland Association

Additionally, the Permit Area contains several roads that are devoid of vegetation. All vegetation and land cover types are summarized in Table 3 and mapped in Figure 3. These land cover and habitat types are described in this section.

Table 3. Land Cover and Habitat Types within the Permit Area

USNVC[1] Group	USNVC Alliance or Association	Habitat Type Description	Acres in Permit Area
Vegetable Crop Cultural	N/A (Agricultural)	Cultivated fields.	12.0
N/A	Roads	Compacted gravel or dirt roads devoid of vegetation and offering no value to wildlife.	57.9
Intermountain Semi-Desert Steppe and Shrubland Group	Yellow Rabbitbrush/ Bluebunch Wheatgrass Shrubland	Sparse to moderate shrub cover with bluebunch wheatgrass and other native bunchgrasses in the understory.	71.7
Intermountain Semi-Desert Grassland	Indian Ricegrass-Bluebunch-Wheatgrass-Sandhill-Muhly Grassland	Co-dominated by bluebunch wheatgrass and cheatgrass, with native perennial forbs and grasses commonly occurring throughout. Potentially a transitioning state as a result of shrub cover lost due to rangeland wildfires.	118.5
Great Basin-Intermountain Ruderal Dry Shrubland and Grassland	Wyoming Big Sagebrush/ Cheatgrass Ruderal Shrubland	A disturbed native plant community with Wyoming big sagebrush and an understory that is dominated by non-native annuals, including medusahead grass (*Taeniatherum caput-medusae*), tansy mustard (*Descurainia pinnata*), and cheatgrass.	138.4
	Crested Wheatgrass Western Ruderal Perennial Grassland	Non-native vegetation type due to restoration seeding following rangeland fires. Dominated by crested wheatgrass with cheatgrass and Sandberg bluegrass (*Poa secunda*) also occurring. Sparse shrub cover occurs sporadically.	283.4
	Cheatgrass Ruderal Grassland	Highly disturbed, weedy, and dominated by non-native species, namely cheatgrass, and including noxious weeds like Scotch thistle (*Onopordum acanthium*) and rush skeleton weed (*Chondrilla juncea*). Some native grasses and forbs are present.	508.3
Intermountain Mesic Tall Sagebrush	Wyoming Big Sagebrush/ Bluebunch Wheatgrass Shrubland	Dominated by sparse to moderate cover of Wyoming big sagebrush with low to moderate	571.5

USNVC[1] Group	USNVC Alliance or Association	Habitat Type Description	Acres in Permit Area
Steppe and Shrubland		cover of bluebunch wheatgrass. Other native bunchgrass and forb species are present.	
Total Acres			**1,761.7**

[1] USNVC 2019

3.1.1.1 Developed – Road and Agriculture

Approximately 56 acres of the Permit Area are developed in the form of compacted gravel or dirt roads relatively devoid of vegetation and offering little value to most wildlife. Roads are a potential source of the spread of noxious and invasive exotic grasses and weeds. Roads also constitute a potential source of mortality for various wildlife.

Approximately 12 acres of cultivated agricultural fields are present at the north end of the Access Road Area. Agricultural fields vary in composition on an annual basis and are plowed and harvested seasonally. These fields currently have low potential to become productive wildlife habitat, but some portions are within mule deer winter range (ODFW 2013). All developed landcover types in the Project Area are baseline classified as Category 6.

3.1.1.2 Yellow Rabbitbrush/Bluebunch Wheatgrass Shrubland Association

Approximately 71.3 acres of the Permit Area are considered Yellow Rabbitbrush/Bluebunch Wheatgrass Shrubland Association. This habitat is dominated by a sparse to moderate cover of yellow rabbitbrush with bluebunch wheatgrass in the understory. Other native bunch grasses are present, including Sandberg bluegrass (*Poa secunda*), squirreltail (*Elymus elymoides*), needle-and-thread grass (*Hesperostipa comata*), and Indian ricegrass (*Achnatherum hymenoides*). The Double Mountain wildfire in 2005 affected approximately 12 acres of this habitat type.

The suite of animals expected to occur in this general habitat type and region include western burrowing owl (*Athene cunicularia hypugaea*), prairie falcon (*Falco mexicanus*), GRSG, black-throated sparrow (*Amphispiza bilineata*), Bell's sparrow (*Artemisiospiza belli*), ferruginous hawk (*Buteo regalis*), gopher snake (*Pituophis catenifer*), pocket gopher (*Thomomys* sp.), and horned lizard (*Phrynosoma* sp.) (Wildlife Action Plan Team [WAPT] 2013; Kittel et al. 2014). Golden eagles (*Aquila chrysaetos*) and other raptors would also be expected to forage in this habitat type. There were no wildlife observations recorded in the Yellow Rabbitbrush/Bluebunch Wheatgrass Shrubland Association. This habitat type is somewhat degraded and is not unique in terms of wildlife resources and is baseline classified as Category 4.

3.1.1.3 Indian Ricegrass-Bluebunch Wheatgrass-Sandhill Muhly Grassland Alliance

This vegetation community type occurs throughout the Permit Area, covering a total of 118.5 acres. Bluebunch wheatgrass and cheatgrass (*Bromus tectorum*) co-dominate, with native perennial forbs and other grass species commonly occurring. There are areas within this alliance where disturbance has increased the number of non-native forbs, and where cheatgrass and medusahead grass (*Taeniatherum caput-medusae*) co-dominate with bluebunch wheatgrass. The 2005 Double Mountain wildfire which

burned approximately 27 acres of this vegetation community may have reduced the amount of shrub cover.

The state of Oregon has determined strategy species based on the following definition: "[Species]…having small or declining populations, [that] are at-risk, and/or are of management concern" (ODFW 2016). Strategy species associated with grasslands in Oregon include the burrowing owl, GRSG, common nighthawk (*Chordeiles minor*), grasshopper sparrow (*Ammodramus savannarum*), long-billed curlew (*Numenius americanus*), western bluebird (*Sialia mexicana*), western meadowlark (*Sturnella neglecta*), and ferruginous hawk (ODFW 2016). Other species that may be found in grassland habitats include prairie falcon, western rattlesnake (*Crotalus oreganus*), gopher snake, ground squirrel and horned lizard (WAPT 2013; Jones and Schulz 2015). Golden eagles and other raptors would also be expected to forage in this habitat type. No wildlife observations in this habitat type were recorded. This habitat type has been periodically disturbed and degraded and is not essential in terms of resources for wildlife, so it has been classified as baseline Category 4.

3.1.1.4 Wyoming Big Sagebrush/Cheatgrass Ruderal Shrubland Association

This association covers 138.4 acres in the Project Area and is a disturbed native plant community type. The understory and openings within this association are dominated by a moderate to heavy cover of cheatgrass and other non-native annuals. There are also scattered to extensive areas of medusahead grass. Approximately 3.5 acres of this habitat type were burned in the 2005 Double Mountain wildfire in an area adjacent to the Access Road.

Strategy species that are associated with sagebrush habitats in eastern Oregon include GRSG, ferruginous hawk, loggerhead shrike (*Lanius ludovicianus*), sagebrush sparrow (*Artemisiospiza nevadensis*), Brewer's sparrow (*Spizella breweri*), northern sagebrush lizard (*Sceloporus graciosus graciosus*) and pygmy rabbit (*Brachylagus idahoensis*) (ODFW 2016). This ruderal sagebrush shrubland also offers habitat to a suite of species similar to that described in Section 3.1.1.2. The only wildlife observation recorded in this habitat type was the nest of a bushy-tailed woodrat (*Neotoma cinerea*). Due to the degraded and disturbed nature of this habitat compared to adjacent, native-dominated sagebrush habitat, this association has been classified as baseline Category 4.

3.1.1.5 Crested Wheatgrass Western Ruderal Perennial Grassland Alliance

This alliance covers 283.4 acres within the Project Area, with the majority occurring along the Access Road Area. Crested wheatgrass (*Agropyron cristatum*) is the dominant vegetation, likely resulting from restoration seeding after rangeland fires. Also common throughout is cheatgrass and Sandberg bluegrass*,* which together comprise a large percentage of total cover. Native grasses and forbs occur sparsely and include squirreltail*,* Indian ricegrass (*Achnatherum hymenoides*)*,* and bluebunch wheatgrass *(Pseudoroegneria spicata*)*.* There are scattered Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) and yellow rabbitbrush (*Chrysothamnus viscidiflorus*) within this alliance. The Crested Wheatgrass Western Ruderal Perennial Grassland Alliance in the Project Area appears to be heavily impacted by grazing and wildfires.

The general suite of animals that could potentially be found in this habitat type and region include GRSG, western burrowing owl, western rattlesnake, loggerhead shrike, horned lizard, gopher snake, vesper sparrow (*Pooecetes gramineus*), and sagebrush lizard (Jones and Schulz 2015). Golden eagles and other raptors would also be expected to forage in this habitat type. Wildlife observations near this

alliance included a long-billed curlew that was flying over the road. One bat detector location was within this habitat type, immediately adjacent to the Access Road Area, which recorded calls from California myotis (*Myotis californicus*), western small-footed myotis (*Myotis ciliolabrum*), and silver-haired bat (*Lasionycteris noctivagans*). This bat detector was located near a small seep, which is likely what attracted the bats to the area. Due to the degraded and disturbed nature of this grassland habitat type, it is unlikely that bats are foraging in the areas away from the seep. This degraded, disturbed habitat type is not essential to wildlife, but it is possible that it could become such in the future; therefore, this habitat type is baseline classified as Category 5.

3.1.1.6 Cheatgrass Ruderal Grassland Association

This habitat type covers 508.3 acres in the Permit Area and occurs in areas that are heavily grazed. It is dominated by exotic annuals, particularly cheatgrass and medusahead. Native bunchgrasses are absent or, where present, a minor component. Noxious weeds are present in this association, including Scotch thistle (*Onopardum acanthium*) and rush skeleton weed (*Chondrilla juncea*). This habitat type in general is very degraded and has been repeatedly disturbed by grazing and wildfires (approximately 113 acres in 1996 in the Cow Hollow fire, and 90 acres in 2005 in the Double Mountain fire), most notably where it occurs in the Access Road Area.

The general suite of animals that could potentially be found in this habitat type and region are similar to those listed in Section 3.1.1.5. No wildlife observations were noted for this habitat where it occurs along the Access Road Area, but several observations were recorded in the Mine and Process Area. These observations include northern harrier (*Circus hudsonius*), black-tailed jackrabbit (*Lepus californicus*), mountain cottontail (*Sylvilagus nuttallii*), numerous lizards, yellow-bellied racer (*Coluber constrictor*), and Great Basin rattlesnake (*Crotalus oreganus oreganus*). In addition, a number of birds were recorded in avian survey plots located in this association, including common raven (*Corvus corax*), various sparrows, chukar (*Alectoris chukar*), western king-bird (*Tyrannus verticalis*), loggerhead shrike, horned lark, barn swallow (*Hirundo rustica*), mountain bluebird, sage thrasher, western meadowlark, and Brewer's blackbird (*Euphagus cyanocephalus*). A golden eagle was seen in this habitat near the interface with the Wyoming Big Sagebrush/Bluebunch Wheatgrass Shrubland Alliance.

Despite the presence of invasive grasses and history of disturbance, this association appears to be important to wildlife in the Mine and Process Area, most likely because of the heterogenous landscape which includes several vegetation community types (i.e., sagebrush and grasslands with more native species) in relatively close proximity. This portion of the habitat with higher wildlife functionality is classified as Category 4. Where it occurs adjacent to the Access Road, this habitat is classified as baseline Category 5.

3.1.1.7 Wyoming Big Sagebrush / Bluebunch Wheatgrass Shrubland Alliance

This alliance occurs throughout the Permit Area, covering 571.5 acres. This native vegetation alliance is dominated by a sparse to moderate cover of Wyoming big sagebrush, and a low to moderate cover of bluebunch wheatgrass. This plant community may include other native bunch grass and forb species, including Sandberg bluegrass, squirreltail, Indian ricegrass, and needle-and-thread grass. Within this alliance are scattered areas of Basin big sagebrush (*Artemisia tridentata* subsp. *tridentata*) with a high native forb cover. Approximately 28 acres in this habitat type were burned in the 2005 Double Mountain wildfire, limited to the Access Road Area.

Strategy species that are associated with sagebrush habitats in eastern Oregon include GRSG, ferruginous hawk, loggerhead shrike, sagebrush sparrow, Brewer's sparrow, northern sagebrush lizard and pygmy rabbit. Several other bird and mammal species are associated with sagebrush-steppe environments, including western meadowlark, horned lark, mourning dove (*Zenaida macroura*), brewer's blackbird, several sparrows including black-throated sparrow, pocket gophers, white-tailed jackrabbit (*Lepus townsendii*), mule deer (*Odocoileus hemionus*), badger (*Taxidea taxus*), pocket mouse (*Chaetodipus* sp.), and coyote (*Canus latrans*) (Johnson and O'Neil 2001; Crawford et al. 2016). The side-blotched lizard (*Uta stansburiana*), horned lizard, striped whipsnake (*Masticophis taeniatus*) and gopher snake are also likely to utilize this habitat type (Johnson and O'Neil 2001; Crawford et al. 2016). Golden eagles and other raptors would also be expected to forage in this habitat type.

General wildlife observations within this alliance included western fence lizard (*Sceloporus occidentalis*), sagebrush lizard (*Sceloporus graciosus*), Great Basin rattlesnake, mountain cottontail, Merriam's ground squirrel (*Urocitellus canus*), Belding's ground squirrel (*U. beldingi*), and bobcat (*Lynx rufus*). Birds reported from small and large plot survey points located in this alliance include horned lark, rock wren (*Salpinctes obsoletus*), canyon wren (*Catherpes mexicanus*), lark sparrow, black-throated sparrow, sagebrush sparrow, western meadowlark, California quail (*Callipepla californica*), common raven, mountain bluebird, sage thrasher, and Brewer's sparrow. Bat detectors located within this habitat type detected calls from western small-footed myotis, long-eared myotis (*Myotis evotis*), Yuma myotis (*Myotis yumanensis*), silver-haired bat, canyon bat (*Parastrellus hesperus*), big brown bat (*Eptesicus fuscus*), and pallid bat (*Antrozous pallidus*). This habitat is likely utilized for foraging and day roosting by bats. No hibernacula or group roosting sites are known or expected to occur due to a lack of suitable features (i.e., shafts, adits, caves). This is a relatively less disturbed and degraded habitat type compared to surrounding shrubland communities and appears to be important foraging habitat for species not seen in other habitat types; therefore, it is classified as baseline Category 3.

3.1.2 Federally Protected and State Sensitive Species

In further accordance with OAR 635-415-0020(c), Federally protected, Oregon State Sensitive and BLM Sensitive Species that have potential to occur in the Project Area were evaluated. Table 4 summarizes the species with either documented occurrence or potential to occur, relevant wildlife survey observations, and how species might utilize the habitat in the Project Area whether or not they were documented. The vegetation community descriptions in Section 3.1.1 include these species, where relevant. This list is compiled using the following sources:

- United States Fish and Wildlife Service Information for Planning and Consultation system;
- The Oregon Biodiversity Information Center (ORBIC);
- ODFW Threatened, Endangered, and Candidate Species list (Revised February 2021);
- State of Oregon deer and elk winter range maps (ODFW 2013);
- The Oregon Conservation Strategy (updated 2016); and
- The Oregon/Washington BLM Special Status Species List (Updated February 2019)

Table 4. Federally Protected and State or BLM Sensitive Species Occurrence and Likely Use of Project Area

Common Name	Scientific Name	Habitat and Status	Occurrence	Likely Use
Golden eagle	*Aquila chrysaetos*	BGEPA[1]. Nests in rugged crags, canyons, cliffs, and mountains. Forages in areas near nest sites.	Confirmed: Seen near the Project Area during wildlife surveys. ORBIC records also indicated presence of this species. Two nesting territories were designated as occupied within two miles of the Project Area.	Foraging in grassland and shrubland habitats. Nesting habitat is not present within the Project Area (i.e., rocky cliffs).
Ferruginous hawk	*Buteo regalis*	State and BLM Sensitive. Prefers open grasslands and shrub-steppe communities but will use a variety of open country and forest edge habitats (GBBO 2010).	Confirmed: Seen near the Project Area during wildlife surveys. Five occupied nests recorded within two miles of the Project Area.	Foraging in open grasslands and shrub-steppe communities throughout the Project Area. Breeding in areas adjacent to the Project Area, which generally lacks features associated with nest sites (i.e., cottonwood trees near streams, junipers).
Swainson's hawk	*Buteo swainsoni*	State Sensitive. Open shrublands near large riparian trees or juniper-sagebrush communities; usually near riparian areas (GBBO 2010).	Unconfirmed: Recorded in Malheur County but not from the vicinity of the Project. Not seen during raptor surveys in 2017, 2018, or 2020.	There does not appear to be habitat for this species in the Project Area or immediate vicinity (i.e., riparian areas with junipers).
Western burrowing owl	*Athene cunicularia hypogaea*	State and BLM Sensitive. Short vegetation, open grasslands like prairies, plains, and savannahs; occasionally in sagebrush communities (GBBO 2010).	Confirmed: Recorded in the immediate vicinity of the Project Area during focused surveys. Historic records exist for Malheur County. ORBIC records place them in the immediate vicinity.	Foraging and breeding in open grassland areas and sparse shrubland communities in the Project Area.
White-tailed jack rabbit	*Lepus townsendii*	State and BLM Sensitive. Open grasslands, plains, and cultivated areas; less common in sagebrush flats (Reid 2006). Needs a mixture of shrubs, forbs, and grasses for wintering.	Unconfirmed: Not recorded in the Project Area during focused surveys. No museum database records of this species from Malheur County. Geographic range thought to extend throughout Malheur County (Brown and Smith 2019).	Does not appear to be present in the Project Area, but suitable habitat exists in intact sagebrush communities in the Project Area.
Pygmy rabbit	*Brachylagus idahoensis*	State and BLM Sensitive. Deep, friable, loamy soils in broad valley floors,	Unconfirmed: Not recorded in the Project Area during focused	There does not appear to be suitable sagebrush habitat (i.e., lacking

Common Name	Scientific Name	Habitat and Status	Occurrence	Likely Use
		drainage bottoms, alluvial fans in big sagebrush; especially where uneven, tall, and dense(Ulmschneider 2008).	surveys. Museum database records exist for Malheur County.	canopy cover and density/height characteristics) for this species in the Project Area. Potentially suitable habitat may exist outside the Project Area.
Townsend's big-eared bat	*Corynorhinus townsendii*	State and BLM Sensitive. Caves and mine tunnels; commonly in mesic habitats like deciduous forests but can occupy a range of habitats (Bradley et al. 2006).	Unconfirmed: Not recorded during bat acoustic surveys. No museum database records of this species from Malheur County.	There does not appear to be suitable maternity or hibernation roosting habitat and few trees are present that could serve as night roosts. Foraging habitat exists near springs/seeps/ wetlands.
Spotted bat	*Euderma maculatum*	State and BLM Sensitive. Roosts in cliff cracks and crevices; found in a variety of habitats from pinon-juniper to open pastures (Bradley et al. 2006).	Confirmed: Recorded during acoustic surveys in October 2013. No museum database records of this species from Malheur County.	No mines or caves in proximity to the Project Area, likely foraging at springs or seeps during migration.
Fringed myotis	*Myotis thysanodes*	State and BLM Sensitive. Roosts in a variety of protected sites (i.e., caves, tree hollows, buildings). Found in desert, grassland, and woodland habitats (Bradley et al. 2006).	Unconfirmed: Not recorded during bat acoustic surveys. No museum database records of this species from Malheur County.	Appropriate roosting habitat is limited (trees) or absent (caves, buildings). Grasslands in the Project Area offer potential foraging habitat.
Grasshopper sparrow	*Ammodramus savannarum*	State and BLM Sensitive. Moderately open, unfragmented grasslands with patches of bare ground, sometimes with a light cover of shrubs.	Unconfirmed: Not recorded during wildlife surveys. No museum database records of this species in the Project vicinity.	Foraging, breeding in contiguous grasslands or open shrublands.
Northern sagebrush lizard	*Sceloporus graciosus graciosus*	State Sensitive. Big sagebrush and antelope bitterbrush with small perches such as rocks or logs and burrows of other animals.	Likely confirmed: Several sagebrush lizards were recorded during wildlife surveys. Differentiation based on scale count was not conducted, but likely is the northern subspecies.	Foraging and breeding in sagebrush communities.
Western toad	*Anaxyrus boreas*	State Sensitive. Lakes, rivers, streams, and wetlands for breeding; otherwise, will utilize various habitats from grassland to forest.	Unconfirmed: Not recorded during wildlife surveys. Records exist for the vicinity of the Project Area.	Limited breeding habitat (surface waters). Foraging habitat is present in the vicinity of mesic habitats like wetlands or springs.
Loggerhead shrike	*Lanius ludovicianus*	State Sensitive. Open areas with short vegetation and	Confirmed: Recorded during avian plot surveys.	Breeding and foraging habitat in the form of sagebrush shrub and

Common Name	Scientific Name	Habitat and Status	Occurrence	Likely Use
		perches for hunting, like shrubs and fenceposts.		grassland communities is dispersed throughout the Project Area.
California myotis	*Myotis californicus*	State Sensitive. Various habitats, from deserts to forests. Generally, forages around trees and open water and roosts in cliffs, caves, structures, and tree crevices.	Confirmed: Recorded during bat acoustic surveys.	Roosting habitat is limited (trees, rock crevices) or absent (caves). Foraging habitat exists throughout the Project Area, probably focused near mesic areas.
Silver-haired bat	*Lasionycteris noctivagans*	State Sensitive. Generally found in forested areas. Forages over ponds and streams and day roosts under loose bark.	Confirmed: Recorded during bat acoustic surveys	Not likely to utilize habitat within the Project Area other than as a stopping point during migration.

[1]BGEPA - Bald and Golden Eagle Protection Act of 1940, as amended; GBBO – Great Basin Bird Observatory

3.1.3 Final General Wildlife Habitat Categories

Methods for the Geographic Information Systems (GIS) analysis that created final habitat categories are included in Appendix E. The final habitat categories are summarized in Table 5 and shown in Figure 4. Most of the vegetation community baseline categories were altered during the GIS analysis, usually in a piece-meal fashion according to how input layers overlapped with each other.

Table 5. Final Habitat Category Summary

Category	Acres in Project Area	Description
2	174.2	Habitat in this category is either mule deer winter range as mapped by ODFW (2013) or any type of wetland with a vegetative response (i.e., spring, seep, intermittent drainage). These two input layers override all other layers except where they overlap with existing roads.
3	892.3	The determining factor for inclusion in this category is that habitat must be essential and limited. Areas within the Project Area that are a heterogenous mix of vegetation communities, with numerous ecotone “edges”, were manually carved out and assigned to this category due to the importance of edge habitats and the generally higher species richness compared to homogenous habitats. The baseline category of some vegetation communities was upgraded to this category in response to comments from ODFW, including the crested wheatgrass communities occurring along the access road. Nearly all of the vegetation communities have some portions classified as Category 3, based on various inputs. Ephemeral drainages in the Project Area were considered a Category 3 modifier layer.
4	461.5	This category is made up of baseline category 4 vegetation communities that were not overlapping with any input layer that justified elevating the category. See Section 3.1.1 for detailed habitat descriptions and justification for baseline classification.
5	174.6	This category comprises vegetation communities that were baseline categorized as 5 that did not overlap with any input layer that would justify elevating the category, as well as the modified canal that runs along the northern end of the

Category	Acres in Project Area	Description
		Access Road Area. The modified canal was assigned to this category at the direction of ODFW. See Section 3.1.1 for detailed habitat descriptions and justification for baseline classification. Portions of agricultural areas in the Project Area are also included, where they did not overlap with either mule deer winter range as mapped by ODFW (2013) or with any wetland (i.e., spring, seep, intermittent/ephemeral drainage).
6	60.0	Road surfaces are included in this category type.

3.2 Mule Deer

A section of the Access Road Area is designated as Winter Range for mule deer (ODFW 2013). There is evidence that mule deer avoid areas proximal to roads (Rost and Bailey 1979). Mule deer avoid primary roads more than secondary or tertiary roads and are more likely to avoid roads that are in open habitats as opposed to areas with vegetative or topographic cover (Wisdom et al. 2004). Studies have shown that distance to an open road is an important factor in determining habitat use by mule deer, with likelihood of utilization increasing as distance increases (Coe et al. 2018). Mule deer utilizing this area may be impacted by increased road traffic and preferentially avoid habitat near the road, with effects most pronounced close to the road but with decreasing effects potentially extending up to two kilometers away (Northrup et al. 2015; Coe et al. 2018). Avoidance of roads by mule deer and other ungulates has been linked to human activity (i.e., traffic) on the road and not the road itself (Sawyer et al. 2006; Gilbert et al. 2017). Noise produced by traffic may be a key driver of mule deer avoidance and Kleist et al. (2021) observed a stronger behavioral avoidance of noisy road environments by mule deer. There is no ODFW-developed methodology available for estimating Indirect impacts to the designated mule deer winter range habitat. Calico quantified these effects for the proposed Project by calculating the acreage of biological mule deer winter range located within a 100-foot-wide (30.5-meter-wide) buffer of the Access Road.

3.3 Greater Sage-Grouse

ODFW identified a portion of the Permit Area as GRSG Low Density habitat. GRSG surveys were conducted in 2013, 2014, 2017, 2018 and 2020. Results of all surveys prior to 2020 are detailed in the Wildlife Baseline Report (Appendix C), along with figures that depict survey coverage. Brood-rearing surveys were performed by NWC in June and July of 2014, and by EMS in June and July of 2017. Winter-use surveys by NWC took place in December of 2013 and January of 2014 and by EMS in January and February of 2018. Lek surveys were conducted in April of 2014 by NWC, and in April of 2017 by EMS. No GRSG sign was seen during any survey, but sagebrush and grassland habitats in proximity to leks are assumed to be occupied.

Due to the GRSG Low Density habitat designation, this report provides a description of the GRSG habitat characteristics that is separate from that presented for general wildlife habitat. As described in Section 2.2, the DLCD rules (OAR 660-023-0115) indicate that certain types of large-scale development projects, such as the Grassy Mountain Mine, must comply with avoidance, minimization, and compensatory mitigation requirements for impacts to GRSG habitat. Furthermore, OAR 635-140 describes ODFW's GRSG Conservation Strategy for Oregon. Specifically, OAR 635-140-0025 describes ODFW's process for implementing the GRSG mitigation hierarchy.

The impact assessment presented in Section 4.3 of this report follows the process described in OAR 635-140-0000, specifically the mitigation hierarchy (OAR 635-140-0025). The impact assessment and associated quantification of compensatory mitigation relied on the Oregon Sage-Grouse Habitat Quantification Tool (HQT) which provided the science-based method for quantifying habitat function, assessing the impacts of the proposed development on greater sage-grouse, and identifying the appropriate compensatory mitigation. The impact assessment was guided by the Sage-Grouse Mitigation Program Manual (State of Oregon 2019c) and the HQT was applied following the methodology presented in the HQT User Guide (State of Oregon 2019a) with reference to the HQT Scientific Rationale (State of Oregon 2019b).

3.3.1 Oregon Sage-Grouse Mitigation Program and Habitat Quantification Tool

The HQT was developed to provide a rigorous, consistent, and scientifically based method for assessing the impacts of a proposed project on GRSG habitat function. It provides the analytical backbone of Oregon's Sage-Grouse Mitigation Program and it is used to assess the likely outcome of both development and habitat restoration projects. At an individual project scale, the HQT is used to determine the change in GRSG habitat function from the pre-project ecological state to the post-project state. The difference represents the impact of the development on habitat quality and function and can in turn be used to determine the appropriate amount and type of compensatory mitigation needed to offset the impacts of the proposed Project on GRSG and its habitat, as required by OAR 635-140-0025(3).

Application of the HQT involves the following steps:

1. Determination of the HQT Project analysis area
   For a proposed mine the HQT Project analysis area (PAA) includes the Project footprint wherein direct impacts are calculated, plus a 5-km buffer to capture the area of anticipated indirect impacts.
2. Desktop review of the Project analysis area
   The ODFW Program Administrator uses aerial imagery and other GIS data layers to identify map units, existing development footprints, and potential areas of non-habitat. This review informs the field habitat assessment.
3. Field habitat assessment
   Field biologists apply ocular assessment methods and trend indicators to determine the current (pre-project) ecological states of the map units within the PAA.
4. Spatial analysis
   ODFW uses the data from the field assessment to update spatial data layers created in the HQT GIS Toolkit and run the HQT spatial analysis.
5. Credit/debit calculation
   ODFW calculates the expected number of debits associated with the development Project by entering the results of the field habitat assessment and spatial analysis into the HQT Calculator workbook (Version 2.2)

This section describes the process of applying the HQT and reports the results of the pre-Project field assessment of habitat function: the ecological states. The impact assessment which consisted of the spatial analysis and credit/debit calculation steps for the Project on GRSG and its habitat continued to follow the HQT and is presented separately in Section 4.3.

3.3.1.1 HQT Project Analysis Area and Desktop Review

For the Grassy Mountain Mine, the Permit Area served as the Project footprint, and the area of indirect impacts was represented by a 5 km buffer from the Permit Area (Appendix A, Figure 6). The PAA only included portions of the Permit Area and indirect impacts buffer that intersected with GRSG habitat. In this case, the Low Density habitat is located in the southern portion of the Permit Area and the adjacent buffer. These two areas comprise the HQT PAA. The ODFW Program Administrator completed the desktop review to determine the preliminary map units for the field habitat assessment.

3.3.1.2 HQT Field Habitat Assessment

Field surveys for the HQT analysis were completed in September of 2020 by a crew composed of biologists and botanists from EMS and ODFW. Based on the surveys of the HQT PAA, habitat was given an ecological state grade that described ecosystem function and its potential to provide GRSG habitat. A designation of "non-habitat" indicated that suitable habitat for GRSG was not present. This included the surface area of roads, and the footprint of transmission lines already present in the PAA. Table 6 summarizes the possible grades, as described in the *Oregon Sage-Grouse Habitat Quantification Tool Scientific Rationale* (State of Oregon 2019b), and the proportions of each within the PAA. Transitional scores indicated that habitat was near a threshold, for example either increasing in sagebrush cover or decreasing in sagebrush cover.

Table 6. Ecological State Grade Levels

Grade	Ecosystem Function	Potential Habitat Value	Threat Level	Acres in Analysis Area	Percent of Analysis Area
A	High	High	Limited	2,313.0	16.4
B	High	Moderate	Limited	2,174.6	15.4
C	Impaired	Fair	Moderate	3,113.2	22.0
D/E	Compromised	Limited	Significant	2,242.7	17.2
Transitional	Varies	Near threshold	Significant or manifesting	4,029.1	28.6
Non-habitat	-	-	-	56.7	<1
Total	-	-	-	14,111.3	100.0

4 Analysis of Potential Impacts

4.1 Impacts to General Wildlife Habitat

ODFW's Habitat Mitigation Policy sets forth a mitigation goal for each habitat category as summarized in Table 2 (OAR 635-415-0025(1-6)). This section summarizes the habitat category-specific measures that will avoid, minimize, or mitigate impacts as recommended or required by ODFW.

4.1.1 Avoidance

There is no Category 1 habitat present in the Project Area. Category 2 through Category 6 habitat types do not require avoidance of impacts, but avoidance is recommended and should be considered. Impacts should be minimized where possible, and unavoidable impacts to these categories may be excused by showing that the impacts will be mitigated (OAR 635-415-0025(2-6)(b)(B)).

The following adjustments to the Project layout have been made to avoid impacts to general wildlife habitat:

- Wetlands—Major components and related facilities have been specifically aligned to avoid (Category 2) wetlands to the extent possible.
- Roads—During construction and operation, vehicles and construction equipment will use existing roads to the maximum extent possible. When road construction is unavoidable, the minimum width for safe travel will be used.

Calico is proposing multiple measures to be implemented during construction and operation of the Project that will avoid and minimize impacts to wildlife habitats (Section 5.1).

4.1.2 Minimization

Voluntary minimization to reduce potential impacts will occur in Habitat Categories 2 through 5 where feasible. The minimization measures proposed by Calico are detailed in Section 5.1. For Habitat Category 6, ODFW's Habitat Mitigation Policy requires that impacts be minimized. There is no requirement for mitigation for Habitat Category 6 (OAR 635-415-0025(6)(b)). Implementation of the Noxious Weed Plan and Reclamation and Closure Plan (Section 4 of the Consolidated Permit Application [CPA]) will minimize impacts to Habitat Category 6 consistent with ODFW's Habitat Mitigation Policy, and no compensatory mitigation is required or proposed.

4.1.3 Direct Impacts to Habitat

Direct impacts are defined as the impacts that will have an adverse effect upon species habitat or individuals, and that will occur at the same time and place, or in proximity thereof. Habitat types within the Project Area were identified consistent with ODFW's Habitat Mitigation Policy (Table 2). The direct impacts due to Project activities for each habitat category type were then determined by calculating the acres of each habitat type within the construction and operation footprints. The analysis of direct impacts to habitat types is described below, and the resulting impact acres are set forth in Table 8.

Direct impacts to wildlife habitat have been estimated using the proposed disturbance footprint presented in the Plan of Operations (Section 3 of the CPA). Any changes to the proposed disturbance as presented in the Plan will be approved by appropriate agencies prior to implementation. Direct impacts resulting from proposed Project activities are summarized in Table 7.

The Mine and Process Area includes an area of open space that will not be developed. A fence constructed to meet the specifications outlined in the Wildlife Protection Plan will enclose an area of approximately 739 acres (Figure 5). The area within this fence will effectively be lost to most wildlife species for the duration of mining operations and although much of it will retain its vegetation and not be converted to mine facilities the impacts to it are considered to be direct for the purposes of this mitigation plan. The remainder of the Mine and Process Area located outside of the perimeter fence will remain as open space and will not experience direct habitat loss.

Wildlife can be directly affected by roads and minerals exploration through habitat loss and vehicle collisions. The Access Road Area encompasses an existing road that is currently lightly utilized. Increased road traffic poses a mortality risk to mule deer and other wildlife species in the form of vehicle collisions; however, the design speed of the upgraded road will remain relatively low at 35 miles per hour. Habitat loss for the Access Road Area portion of the Project Area will be restricted to minor road

improvements and construction associated with a power line that will be installed on the west side of the road. Direct impacts from the road upgrades were assessed by assuming the road surface would be widened from approximately 20-feet-wide to 40-feet-wide along the access route. Direct impact calculations for the new powerline assumed poles would be placed approximately every 300 feet and would require approximately 36 square feet of disturbance per pole.

Table 7. Potential Direct Impacts

Disturbance Type	Impact Timing	Mitigation Measures
Habitat loss	Initial construction	Concurrent reclamation
	Throughout mine operation	Reclamation Plan; in-kind or in-lieu offset mitigation
Road mortality	Throughout mine operations	Traffic control measures (i.e., carpooling, speed limits); environmental training
Increased human presence	Throughout mine operations	Traffic control measures; environmental training

To quantify impacts to wildlife habitat, the estimated acreage of Project-related disturbance is based on a conservative assumption that all areas enclosed within the perimeter fence on the Permit Area will be permanently and directly impacted. Direct impacts also include proposed areas of new ground disturbances made along the access route. The impacted area is shown in Figure 5 and acres are tabulated in Table 8. The actual acreages of disturbance will be lower than those estimated under this assumption. The final design layout of the Project will be provided to ODFW, along with the associated actual impact acreages prior to the beginning of construction; however, impact mitigation requirements presented in this plan have been calculated based on the acreages quantified while applying the conservative assumption.

Table 8. Acres of Impact by Habitat Category and Type for the Proposed Project

ODFW Habitat Category	Habitat Type (USNVC Alliance or Association)	Directly Impacted (Acres)[1]
2	Vegetable Crop Cultural	0.69
6		0.08
6	Roads	47.76
2	Wyoming Big Sagebrush/Cheatgrass Ruderal Shrubland	0.00
3		12.21
4		17.79
2	Crested Wheatgrass Western Ruderal Perennial Grassland	1.43

ODFW Habitat Category	Habitat Type (USNVC Alliance or Association)	Directly Impacted (Acres)[1]
3		40.96
4		0.00
5		0.00
2	Wyoming Big Sagebrush/Bluebunch Wheatgrass Shrubland Alliance	1.54
3		261.89
2	Cheatgrass Ruderal Grassland Association	9.21
3		0.04
4		9.51
5		10.40
3	Indian Ricegrass- Bluebunch- Wheatgrass- Sandhill-Muhly Grassland Association	15.41
4		32.95
3	Yellow Rabbitbrush/Bluebunch Wheatgrass Shrubland Association	0.13
4		22.92
TOTALS		**485.18**
GRAND TOTAL		**838.83**

[1] Includes acres of directly impacted wildlife habitat other than GRSG Low Density Habitat

The mine facility footprint (area covered by long-term facility components), other areas included within the perimeter fence, and upgrades to the access route will directly impact approximately 839 acres of habitat for the life of the Project. Of this total approximately 485 acres comprise wildlife habitat ranging in quality from Category 2 through 6. The remaining habitat is designated as significant for GRSG and it is addressed separately in this plan. Impacts to GRSG are further discussed in Section 4.3.

After final closure of this Project, the mine facility footprint will be restored and recovered. Removal of the perimeter fence will allow wildlife to regain access to the recovering disturbed areas as well as patches of habitat that were inaccessible to most wildlife for the life of the Project, but otherwise unaffected. See the Reclamation and Closure Plan for additional details on site restoration. For the purposes of this mitigation plan, all directly impacted acres are considered to be permanently affected by the Project.

4.1.4 Indirect Impacts to Habitat

Indirect impacts are defined as the impacts that will have an adverse effect upon wildlife habitat or individuals, and that will occur in a different place than the Project activities. For this project indirect impacts may occur in the form of habitat fragmentation due to road construction. Indirect impacts associated with Project activities also include noise, traffic, dust, and other nuisances resulting from construction activities and use of access roads as well as the increased potential for noxious, invasive, and non-native weed introduction. New infrastructure and human activity can also provide perching or nesting locations as well as food subsidies for avian predators such as common ravens (*Corvus corax*). Following direction from ODFW, assessment of indirect impacts is limited to greater sage-grouse (GRSG) (*Centrocercus urophasianus*) (per OAR 635-140-0025), mule deer winter range habitat (see Section 4.2), and nearby springs. ODFW also requested an analysis of the indirect effects of Project-related noise on the surrounding wildlife habitat.

4.1.4.1 Indirect Impacts to Springs

The groundwater baseline study described the proximal groundwater resource and several nearby surface springs and seeps (SPF 2021). The mining operations could affect groundwater resources and impact surface flow rates at nearby springs. Potential impacts were modeled by Lorax Environmental (2022). Based on a drawdown impact threshold of greater than 0.2 feet, modeling indicated drawdown effects could impact 9 springs up to 2 miles from the production wells. Over the 10-year course of operations, drawdown at the closest spring, Lowe Spring, which is within 1 mile of the nearest proposed pumping well, could approach 12 feet. Poison Spring, approximately 1.75 miles from a proposed production well, could experience a maximum drawdown of less than 0.5 feet. Additional detail on the modeling results is available in the Numerical Hydrogeologic Assessment (Lorax Environmental 2022).

4.1.4.2 Indirect Impacts from Noise

Project related activities are expected to generate noise throughout the life of the Project. Calico coordinated with ODFW to determine relevant noise levels to use as thresholds when assessing the potential impact of the Project-related noise on wildlife. NDOW (2018), recommended by ODFW, described typical noise thresholds appropriate for determining acoustic impacts to Greater sage-grouse and indicated these thresholds are defensible for assessing impacts to other wildlife species. Wildlife sensitivity thresholds can be approximated by the site-specific background noise level plus 10 dBA. Following NDOW (2018) the Calico team used baseline noise data collected to inform the Baseline Noise Report (Creative Acoustics Northwest 2019) to determine the lowest, and therefore most conservative, measured background noise level (18 dBA) and from that determined the wildlife sensitivity threshold to be 28 dBA for the Project site and surrounding habitat.

BKL (2023) modeled Project-related noise levels associated with the construction and operations phases of the Project. Predicted noise levels are depicted in Figure 7 for typical equipment and activities expected to be used during the loudest scenarios modeled for construction and operations phases of the Project. The figure shows noise created by the Project during both construction and operations, excepting blasting, is expected to attenuate to a level below 30 dBA and close to or below 25 dBA within 5 kilometers (3.1 miles) from the Project's perimeter fence. This means the Project-related noise generated during the construction and operations phases will attenuate below the 28 dBA wildlife sensitivity threshold within approximately 5 kilometers (3.1 miles) from the mining facilities.

BKL also modeled the predicted noise environment associated with access road use. During the construction phase, widening and improvement of the existing access route will involve the use of heavy

equipment including scrapers, dozers, graders, dump trucks, and other similar machinery. During operations noise emitters along the access road will primarily include light vehicles such as passenger vehicles and the employee shuttles. As modeled, some of the heavy equipment used during construction would be expected to produce the loudest noise disturbance along the access route. During both construction and operations, depending on topography and type of equipment in use, noise would be expected to attenuate to approximately 35 to 45 dBA within 1 kilometer (0.62 miles). Noise levels are predicted to attenuate to below 28 dBA at a distance of approximately 4 kilometers (2.5 miles) from the road during the worst case construction scenario.

Project-related blasting will take place in the borrow pit located within the eastern portion of the area within the perimeter fence. Calico will use blasting over a 29-day period during construction followed by approximately two blast events per week during operations. Noise produced by blasting is instantaneous and episodic and not comparable via the noise disturbance threshold used for noise produced by equipment operating over longer periods of time.

4.2 Impacts to Mule Deer and Mule Deer Habitat

The proposed Project activities will indirectly impact mule deer winter range. Traffic on the existing access route is expected to increase from approximately 2.7 Average Daily Traffic (ADT) to 42.6 ADT based on a traffic study conducted in the fall of 2014 and spring of 2015, and traffic estimates for the Project. Indirect impacts resulting from proposed operations will be largely mitigated through traffic control measures that Calico has agreed to implement. These measures include a requirement that regularly commuting employees use shuttles and an employee education plan that instructs employees to practice vigilance during periods of heightened wildlife activity.

Road improvements may also lead to increased access by humans which may increase hunting and poaching pressure on local mule deer herds (Cole et al. 1997). Roads and trails can facilitate deer harvest success. Since deer-hunting is controlled through hunting zone quotas and tag limits established by ODFW, an increase in hunting opportunity or hunter success is unlikely to impact deer populations. Hunting limits also include estimates of the amount of illegal hunting and roadkill occurring.

An additional indirect effect associated with the proposed Project stems from the spread of noxious weeds due to increased traffic. Eleven species of noxious weeds were recorded during botanical surveys of the Project Area. Information on locations of noxious weeds is detailed in the Noxious Weed Monitoring and Control Plan (Appendix D17 of the CPA). Calico has agreed to require use of a shuttle by regularly commuting employees to limit increased traffic, which will reduce potential introduction and spread of noxious and invasive weeds. The Noxious Weed Monitoring and Control Plan details the proposed approach to monitoring and controlling noxious weeds as well as practices that will be implemented to reduce the potential spread of noxious weeds.

Fire can change vegetation communities and increase the chance of noxious or invasive weed establishment, which in turn may reduce habitat quality. Effects of fire can be mitigated through fire management and prevention programs as well as post-fire reclamation efforts. Fire safety measures are discussed in Section 3.5.4 of the CPA.

After applying the 100-foot-wide (30.5-meter-wide) buffer to the Access Road where it intersects with biological mule deer winter range, the Project team calculated approximately 113 acres of mule deer winter range habitat will be indirectly affected by the Project (Table 9).

Table 9. Acres of Mule deer Winter Range by Habitat Type Impacted by the Proposed Project

Habitat Type (USNVC Alliance or Association)	Indirect Impact to Mule Deer Winter Range (Acres)[1]
Vegetable Crop Cultural	7.11
Roads	0.93
Wyoming Big Sagebrush/Cheatgrass Ruderal Shrubland	0.25
Crested Wheatgrass Western Ruderal Perennial Grassland	9.83
Cheatgrass Ruderal Grassland Association	95.05
TOTAL	**113.16**

[1] Indirect Impacts in this table only include mule deer winter range

4.3 Impacts to Greater Sage-Grouse

4.3.1 Avoidance

OAR 635-140-0025(2)(b) and OAR 660-023-0115(10)(A) require a project proponent to demonstrate that the proposed project cannot avoid impacting significant GRSG habitat, in this case Low Density habitat. The location of a mine is determined by the location of the targeted resource, and Grassy Mountain Mine is proposed based on the existence of the gold and silver mineral resources underlying the proposed Project Area. Calico owns and controls the mining claims and leases that comprise the proposed Grassy Mountain Mine. The Project complies with OAR 635-140-0025(2)(b)(A) because it is not technically or financially feasible to locate the proposed mine outside of low-density sage grouse habitat due to accepted engineering practices and regulatory standards that allow for the mine to keep its surface impacts confined within the Project Area. Additionally, in compliance with OAR 635-140-0025(2)(b)(B) the proposed mine and associated infrastructure are singularly dependent on both the mineral resource's location and it's economical value.

Beyond selecting the location based on the presence of the underlying resource, during the siting process, Calico considered several alternatives for type of mine (i.e., open leach, underground) and placement of structures. Restrictions ranged from location of the underground resource, topography, geology, human and environmental safety considerations, surface water management, and economic feasibility. Alternatives analyses are presented in Section 5 and Appendix J of the CPA. The Project as proposed offers the least disturbance acres within Low Density GRSG habitat while safely and economically accessing the underground resource.

4.3.2 Minimization

OAR 635-140-0025(2)(d) provides that the project developer will minimize unavoidable impacts by taking measures to locate, construct, operate, and time the development action to minimize impacts to GRSG and their habitat. In addition, OAR 660-023-0115(10)(B) states that a proposed project "shall be located to minimize the amount of GRSG habitat directly or indirectly disturbed, and to minimize fragmentation of the low density area in question by locating the development adjacent to existing development and at the edge of the low density area when possible. Uses should minimize impacts through micro-siting, limitations on the timing of construction or use, or both, and methods of construction". The minimization measures proposed by Calico are detailed in Section 5.2.

4.3.3 Impact Duration

Impacts may be long-term or short-term. The duration of short-term impacts to habitat will vary by vegetation type; for example, the recovery period for grasslands is generally three to seven years, while shrublands may require at least 30 years to recover. Vegetatively sparse sites that tend towards aridity, as well as sites with specific soil types (i.e., saline, alkaline, shallow) may be difficult to restore at the end of the Project. Calico recognizes that some sites may require special techniques or repeated revegetation efforts to restore successfully. Short-term impact areas will be restored according to the Reclamation and Closure Plan (Section 4 of the CPA). Compensatory mitigation for impacts is addressed in Section 6.

4.3.4 Direct Impacts

For GRSG, direct impacts from proposed Project activities are defined as impacts that have "an adverse effect. . . upon sage-grouse habitat which is proximal to the physical footprint of the development action in time and place" (OAR 635-140-0002(4)). Direct impacts can be long-term or short-term.

4.3.5 Indirect Impacts

Indirect impacts on GRSG are defined as ". . . adverse effects to sage-grouse and their habitat that are caused by or will ultimately result from implementation of a development action, with such effects usually occurring later in time or more removed in distance as compared to direct effects." (OAR 635-140-0002(6)). Indirect impacts can be long-term or short-term.

The two main indirect impacts on GRSG as a result of proposed Project activities include increased corvid predation on GRSG nests and noise effects, both of which are long-term effects. Corvid nest predation has been shown to be a main cause of GRSG nest failure, and corvids often use anthropogenic structures to nest (Harju et al. 2018). Therefore, the addition of potential nesting habitat for corvids could lead to increased predation pressure on GRSG. Anthropogenic noise can have various detrimental effects on GRSG, including decreased reproductive rates, increased predation rates, and increased stress levels, which can feed back into reproductive ability and predation vulnerability (Blickley et al. 2012).

4.3.6 Habitat Quantification Tool

Following application of the avoidance and minimization steps of the GRSG mitigation hierarchy, the Project's potential long-term and short-term direct and indirect impacts on GRSG were quantified using the HQT. As described in Section 3.3.1, the ODFW Greater Sage Grouse Mitigation Coordinator used the field verified ecological state grade levels (Table 6) to update spatial data layers and complete the spatial analysis step of the HQT. The ODFW GRSG Program Manager next calculated the expected number of

debits associated with the proposed Project by entering the results of the field habitat assessment and spatial analysis into the HQT Calculator workbook (Version 2.2).

The HQT calculated functional acres removed as a result of proposed Project activities. More specifically, it calculated the change in functional acres between the pre-project and post-project conditions for each of the spatial map units that were assessed in the field. The functional acre is a common currency that is a 1:1 ratio with mitigation debits (i.e., one functional acre equals one mitigation debit). Functional acres are calculated using the number of acres in the analysis area, developmental impacts, current sage-grouse occupancy, and habitat quality determined through field surveys (State of Oregon 2019a). Generally, one functional acre will always be represented by multiple real-world acres on the landscape.

4.3.7 Habitat Quantification Tool Results

The PAA for GRSG HQT analysis includes 14,048.2 acres of upland habitat and 48.2 acres of mesic habitat, based on proposed disturbance ("Disturbed Area" as defined in OAR 632-037-0010[10]) and proximity of the Project to Low Density habitat (Figure 1) (Analysis Area). The disturbed area includes the area within the permit boundary where surface or subsurface resources will be impacted by the mining activities or the processing or mine facilities. For this Project, the disturbed area includes the area enclosed by the perimeter fence and the area along the access road. Please refer to Section 1.1 for a description of the Project.

The main threat identified in the Analysis Area during HQT surveys was invasion by annual grasses, including medusahead and cheatgrass. The HQT final output provided by ODFW (N. Seidel, pers. comm) is summarized in Table 10. The Excel worksheets are included in Appendix F.

Table 10. Habitat Quantification Tool Impact Assessment

Assessment Type	Assessment Acres	Direct Impact Acres	Indirect Impact Acres	Functional Acres Lost	Mitigation Acres[1]
Upland - Actual	14048.2	360.3	13,687.9	668.8	769.1
Upland – Functional	-	81.3	587.5		
Mesic – Actual	48.2	0	48.2	0.7	0.8
Mesic – Functional	-	0	0.7		
Total				**669.5**	**769.9**

[1]Functional acres multiplied by 1.15 to achieve the net benefit requirement.

The HQT indicated the proposed Project would result in a loss of 669.5 functional acres. Compensatory mitigation for GRSG must lead to a net benefit for the species. To achieve a net benefit the HQT applied a 15% multiplier resulting in a mitigation requirement of 769.9 functional acres. As stated earlier in Section 4.3.6, the actual acreage of mitigation habitat needed to meet this functional acreage debit will depend on the specific habitat quality and characteristics of the proposed mitigation location. The proposed compensatory mitigation for Grassy Mountain Mine is detailed in the compensatory mitigation section (Section 6).

5 Impact Minimization Measures

These measures are designed to reduce adverse impacts of the proposed Project on general and special status wildlife and habitat. The minimization measures listed in this section may be modified in coordination with ODFW.

5.1 General Minimization measures for Wildlife and Habitat

Calico will work to minimize the impact of construction on the environment by employing the following methods to ensure compliance with federal, state, and local regulations and industry best practices:

- Seasonal Avoidance— The Project is expected to operate year-round and sound and visual disturbances will occur year-round associated with operations. In general, the Project will complete episodic Project related disturbances including vegetation clearing, road improvements, facility construction and other noise and visual disturbance producing activities outside of timing restrictions listed below. If an episodic activity needs to occur within one of the restrictive buffers during one of the timing restrictions described below, the Project's Environmental and Safety Superintendent (ESS) will coordinate with ODFW (or USFWS in the case of golden eagles) prior to completing the activity to determine the appropriate course of action (e.g. pre-activity nesting surveys to determine current occupancy prior to completing the activity, activity timing adjustments, a need for additional mitigation, etc.).
    - Raptors:
        - Ferruginous hawk: Within 0.5 mile of occupied nest (between March 5–June 15)
        - Swainson's hawk: Within 0.25 mile of occupied nest (between April 1–August 15)
        - Golden eagle: Within 1.0 mile of the closest nest location within an active territory if the nest is within line-of-site of the activity, or 0.5 mile if topography blocks view of nest (between January 15 -July 15)
        - Western burrowing owl: Within 0.25 mile of occupied nest (between April 1–August 15). If vegetation clearing must occur during the burrowing owl nesting period, a nesting clearance survey of the area to be cleared will be performed no more than 14 days prior to disturbance.
        - If Calico identifies a need to create a noise or visual disturbance during one of the above timing restrictions, Calico will coordinate with ODFW (and USFWS if golden eagles are involved) prior to completing the action to discuss avoidance or minimization options.
    - If vegetation clearing must occur during the migratory bird nesting period (April 15 to July 31), a nesting clearance survey of the area to be cleared will be performed no more than 14 days prior to disturbance. If an active nest is found, a 100-foot (30.5-meter) no-disturbance buffer will be applied until the nest has fledged or failed.
    - In mule deer winter range habitat, ground-disturbing activities (*i.e.*, road construction or widening) will be avoided from December 1 to March 31.
    - For GRSG habitat, ground-disturbing activities (*i.e.*, construction) within Low Density habitat will be avoided from March 1 to June 30. If an episodic activity needs to occur within the seasonal restriction, the Project's Environmental and Safety Superintendent

(ESS) will coordinate with ODFW prior to completing the activity to determine the appropriate course of action.

- Environmental Training—A qualified biologist will develop an environmental training course for site workers, which will require reporting any injured or dead wildlife on the site, adherence to site speed limits, trash control, and other subjects. The Project's ESS will be responsible for administering the environmental training course.
- Best management practices (BMPs)—The Applicant will develop an erosion and sediment control plan in accordance with the Project's 1200-Z Mining Operation Stormwater National Pollutant Discharge Elimination System (NPDES) Permit. The Applicant and its construction contractors will use best management practices to reduce potential impacts on areas immediately surrounding the construction site. Straw wattles, silt fence, rock check dams, or ditching will be installed to control erosion and avoid contamination of discharged stormwater. Water will be sprayed in high-traffic areas to prevent fugitive dust from blowing offsite. The Project Field Contact Representative and biological monitor will conduct periodic inspections of BMPs to ensure all measures are maintained and in compliance with the NPDES permit. Dust control measures will be deployed throughout the Project where construction is active.
- Hazardous material containment—Any hazardous materials generated by construction will be collected and disposed of properly. Concrete trucks will be required to wash out in designated plastic lined collection pits to prevent alkaline runoff. Equipment maintenance and fueling will be performed over drip pans and equipment is inspected for leaks regularly. Waste oil and contaminated earth from minor spills or drips will be collected for disposal. Spills will be reported in accordance with the NPDES permit requirements.
- Fire Safety—Vegetation management will be undertaken to prevent wildfire as a result of anthropomorphic disturbance. This includes but is not limited to selective site sterilization (i.e., vegetation-free spaces around fire hazard areas).
- Restoration—Any disturbed ground will be prepared and sown with an appropriate native seed mix in accordance with the Reclamation and Closure Plan and the Noxious Weed Control Plan to ensure successful growth and erosion prevention. Per OAR 635-420-0060 (5), regular monitoring of restored areas will include quantitative measures used to evaluate habitat and wildlife species diversity by recording data on the plant community composition and structure, and evidence of utilization by wildlife.
- Noxious weeds – Weeds will be monitored and controlled using both mechanical and chemical methods in all surface-disturbed areas in accordance with the Reclamation and Closure Plan and the Noxious Weed Control Plan. All mixing and application of herbicide and pesticide will be conducted in accordance with federal, state, and local laws and regulations and the specific product's label.
    - A wash station will be used to remove weed seeds from the commuter shuttle. New equipment will also be inspected and cleaned upon arrival at the Project site
- Lighting during Operation and Construction— Mining operations will occur below-ground or within enclosed buildings during most of the time, reducing the impacts of night-time lighting. To further minimize impacts:
    - The Project will follow Best Management Practices (BMPs) developed by the BLM for lighting at night as detailed in Sullivan *et al.* (2023). Example BMPs include:

        - Skyward lighting will be avoided except in cases where it is needed to maintain safe conditions (*e.g.* signal lights or lights on moving equipment).
        - Stationary external lights will be shielded and use motion detectors, timers, or dimmers where appropriate.
        - Lighting will also be directed only onto the work area and away from adjacent areas not in use, with safety and proper lighting of the active work areas being the primary goal.

- Traffic—All personnel will be required to adhere to a reduced speed limit of 25 mph while driving in the Project Area inside the perimeter fence, and posted speed limits on public roads. If there are no posted speed limits, the contractor will operate vehicles in a manner consistent with typical public traffic on public roads. Speed limits will be posted throughout the Project construction area. Access will be limited by gates or fences where possible. All daily commuting will follow the Access Road route. Mitchell Butte Road will not be used by employees as a regular commuting route. A daily bus or van shuttle service will be provided to transport workers from Vale, Oregon to the Project Area. Employees will be required to use this service when regularly commuting to the Project Area.
- Off-Road Travel—No off-road travel will be allowed except in cases of emergency or for approved safety and maintenance activities (*e.g.* fence maintenance or noxious weed control).
- Noise—Noise minimization measures include the following restrictions unless Calico coordinates with ODFW to grant an exception:
    - In mule deer winter range habitat, noise-producing ground-disturbing activities (*i.e.*, road construction or widening) will be avoided from December 1 to March 31.
    - From March 1 to June 30, if ongoing noise monitoring (see Noise Monitoring Plan (Calico, 2023d)) indicates construction-related noise exceeds the expected levels disclosed in Section 4.1.4, Calico will halt activities and coordinate with ODFW to determine an adaptive management approach.
    - If ongoing noise monitoring (see Noise Monitoring Plan (Calico, 2023d)) indicates operational noise exceeds the expected levels disclosed in Section 4.1.4, Calico will coordinate with ODFW to propose and incorporate reduction components or measurements for machinery.
    - Blasting will adhere to seasonal and daily timing restrictions:
        - If possible, blasting for construction will be avoided from March 1 through June 30. If Calico determines blasting must occur during this period, Calico will coordinate with ODFW in advance to determine appropriate measures to reduce or avoid impacts.
        - During operations, blasting will occur only during daylight hours and avoid the periods from sunrise to 2 hours after sunrise and 2 hours before sunset.
- Power Lines – The power transmission line will be designed to adhere to the Avian Power Line Interaction Committee (APLIC) suggested practices for avian protection. Perching and nesting deterrence structures will be installed on power line structures located within 10 kilometers (6.2 miles) of GRSG habitat.
    - The Project-specific HQT analysis presented in Section 4.3.7 included this minimization measure as an assumption.

- Housekeeping—Trenches will not be left open overnight but will be filled or covered in a way that prevents animals from entering. If trenches cannot be fully covered, a wildlife escape ramp, such as a 2-by-4, will be installed to ensure no wildlife are trapped in the excavation. No burning or burying of waste materials will occur at the Project site. The contractor will be responsible for the removal of all waste materials from the construction area. All contaminated soil and construction debris will be disposed of in approved landfills in accordance with appropriate environmental regulations. Garbage will be disposed of in appropriate covered waste bins to prevent access by corvids and other wildlife. Contractor and Calico personnel will use good housekeeping practices to remove any waste.
- Springs— The Spring and Seep Monitoring and Mitigation Plan (SLR 2023a) details the spring and seep monitoring plan which involves regular monitoring of surface area, water quality and quantity (flow), other abiotic conditions, and associated vegetation community and sign of wildlife use. If monitoring detects a change from baseline conditions to an extent that triggers mitigation,

  a detailed site-specific plan will be developed and submitted to ODFW, ODEQ, DOGAMI, and BLM within thirty days of the quarterly monitoring report. From SLR 2023a, an example of a mitigation trigger is a reduction by half of the seasonal baseline flow for four consecutive monitoring events (a period of 1 year). Conceptual mitigation measures include:

  - Installation of a groundwater well and pump at the affected spring or seep to restore and maintain surface flows at baseline levels.
  - Installation of a stormwater capture and retention system
  - Installation of a capture apron and guzzler
  - Addition of an alternative water supply

  Additional details on the monitoring plan and conceptual mitigation measures are provided in the Spring and Seep Monitoring and Mitigation Plan (SLR 2023a).

5.2 Minimization Measures Specific to Greater Sage-Grouse

The Project will comply with OAR 660-023-0115(10)(B) by minimizing its impacts to Low Density habitat primarily through its design features which include an underground mine rather than an open pit (see Alternatives Assessment Report in Appendix J to the CPA), and its location at the eastern edge of the Low Density habitat. The Project will also comply with OAR 635-140-0025(2)(d) which requires the Project developer to minimize unavoidable impacts by taking measures to locate, construct, operate, and time the development action to minimize impacts to GRSG and their habitat. Minimization measures that are expected to be of most importance to GRSG, and that demonstrate Project compliance with OAR 635-140-0025(2)(d) include:

- Seasonal Avoidance— Within the Low Density GRSG habitat, ground-disturbing activities (i.e., construction, vegetation clearing) will be avoided from March 1 to June 30 unless ODFW grants an exception. If an episodic activity needs to occur within the seasonal restriction, the Project's Environmental and Safety Superintendent (ESS) will coordinate with ODFW prior to completing the activity to determine the appropriate course of action.
- Noise Reduction— Noise minimization measures applicable to GRSG include the following restrictions unless ODFW grants a specific exception:

- From March 1 to June 30 if ongoing noise monitoring (see Noise Monitoring Plan (Calico, 2023d)) indicates construction-related noise exceeds the expected levels disclosed in Section 4.1.4, Calico will halt activities and coordinate with ODFW to determine an adaptive management approach.
- If ongoing noise monitoring (see Noise Monitoring Plan (Calico 2023d)) indicates operational noise exceeds the expected levels disclosed in Section 4.1.4, Calico will coordinate with ODFW to propose and incorporate noise reduction components for machinery.
- Blasting will adhere to seasonal and daily timing restrictions:
  - If possible, blasting for construction will be avoided from March 1 through June 30. If Calico determines blasting must occur during this period, Calico will coordinate with ODFW in advance to determine appropriate measures to reduce or avoid impacts.
  - During operations, blasting will occur only during daylight hours and avoid the periods from sunrise to 2 hours after sunrise and 2 hours before sunset to sunset.

- Power Lines –To deter use by GRSG predators, perching and nesting deterrence structures will be installed on power line structures located within 10 kilometers (6.2 miles) of GRSG Low Density habitat. In addition, power poles will be monitored by qualified personnel annually during the appropriate nesting season for evidence of any nesting by potential avian predators including raptors, corvids, and eagles. If a nest is detected, the qualified monitor will notify the ESS who will coordinate with ODFW within one business day to determine an appropriate response.

5.3 Reclamation

Following OAR 635-420-0060 (5) Calico must ensure that reclamation efforts will result in a "self-sustaining ecosystem comparable to undamaged ecosystems in the study area upon completion of reclamation". To meet this requirement, Calico prepared a Reclamation Plan (Calico 2023b) that describes measures proposed to restore the ecosystem to pre-Project conditions. In summary, these include measures proposed to remove and restore disturbed areas associated with:

- The underground mine
- Tailings storage facility
- Temporary waste rock storage facility
- Process plant
- Infrastructure and ancillary facilities
- Internal access roads
- Yards, laydown areas, stockpiles
- Power transmission system
- Stormwater management facilities
- Quarry
- Borrow areas

From a wildlife habitat perspective, key relevant objectives of the Reclamation Plan include:

- Provide a stable post-closure landscape that supports defined land uses of livestock grazing or range land, wildlife habitat, and recreational land, with opportunities to consider mineral exploration and development when feasible;

- Coordinate with agencies to implement and monitor the reclamation using quantitative measures for evaluating habitat diversity, wildlife species diversity, and plant community composition, structure and utilization by wildlife;
- Minimize erosion damage and protect water resources through control of water runoff and stabilization of components;
- Establish post-closure surface soil conditions conducive to the regeneration of a stable plant community;
- Revegetate disturbed areas with appropriate plant species in order to self-sufficient, stable plant communities compatible with existing land uses; and

See the Reclamation Plan (Calico 2023b) for a detailed description of the reclamation measures and expected timing.

6 Compensatory Mitigation

Calico followed ODFW's Fish and Wildlife Habitat Mitigation Policy (OAR 635-415-0000 through OAR 635-415-0025) to determine the appropriate compensatory mitigation for impacts to wildlife habitats that are expected to remain following implementation of the avoidance and minimization measures. Appropriate compensatory mitigation for impacts to GRSG were separately determined by following the Oregon Greater Sage-Grouse Conservation Strategy as described in OAR 635-140-0000 through 635-140-0025.

6.1 Compensatory Mitigation for Greater Sage-Grouse

Calico will comply with the compensatory mitigation standard for direct and indirect impacts to GRSG Low Density habitat stated in OAR 635-140-0025(3). The standard requires the proposed mitigation to achieve a net conservation benefit for GRSG "by replacing the lost functionality of the impacted habitat to a level capable of supporting greater sage-grouse numbers than that of the habitat which was impacted. Where mitigation actions occur in existing sage-grouse habitat, the increased functionality must be in addition to any existing functionality of the habitat to support sage-grouse". To meet this standard, Calico worked directly with ODFW to identify the compensatory mitigation needed to offset the Project's impacts to GRSG Low Density habitat, and to refine the compensatory mitigation options described in Section 6.5.

Compensatory mitigation for Project-related direct and indirect impacts to GRSG was determined by ODFW through application of the HQT, as described in Section 4.3.7. The HQT final output is summarized in Table 10, and it indicates a compensatory mitigation requirement for GRSG of **769.9 functional acres**. This value represents the change in functional acres between the pre-Project and post-Project conditions summed across all map units included in the PAA. It represents the debit acres accounting for lost GRSG habitat function expected to occur once the Project has been developed. This is also the amount of compensatory mitigation Calico will need to provide for GRSG and its habitat. The actual acreage of mitigation habitat needed to meet this functional acreage debit will depend on the specific habitat quality and characteristics of the proposed mitigation options that comprise the mitigation plan.

6.2 Compensatory Mitigation for Direct Impacts to Other Wildlife Habitat

Calico will use in-kind or out-of-kind habitat compensatory mitigation in-proximity or off-proximity to the Project to effectively offset impacts in consultation with ODFW and consistent with ODFW Habitat Mitigation Policy (OAR 635-415-0025). The Project will directly impact habitats meeting ODFW Categories 2 through 6. As described in Table 2, mitigation for impacts to Category 2 habitat must meet

the no net loss and net benefit goal. Mitigation for impacts to Categories 3 and 4 must demonstrate no net loss of habitat quantity or quality. Mitigation for impacts to Category 5 habitats must result in a net benefit in habitat quantity or quality which can be achieved through actions that improve remaining habitat or through compensatory mitigation. Impacts to Category 6 habitat do not require compensatory mitigation. Impacts to this category will be minimized but not mitigated. Consistent with the ODFW Habitat Mitigation Policy (OAR 635-415-0025), mitigation to offset impacts to Category 2-4 habitats will be implemented and completed either prior to or concurrent with the Project.

For this Project, the direct impacts are assumed to occur for the life of the Project, and therefore are assumed to be permanent for the purposes of mitigation. Calico proposes to offset these impacts using one or a combination of tools that will provide an immediate mitigation benefit (e.g., Third Party Payment to Provide or In Lieu Fee) or by implementing a long-term habitat improvement program on a stand-alone Habitat Mitigation Area (see Section 6.5 below for details). The habitat mitigation ratios for each Category of direct impact are presented in Table 11.

Table 11. Habitat Mitigation Area by Habitat Category and Subtype

Habitat Category	Mitigation Ratio	Acres Impacted	Mitigation Acres
2	2:1	12.93	25.85
3	1:1	330.74	330.74
4	1:1	83.21	83.21
5	1:1	10.46	10.46
6	None	47.84	0.00
Total		**485.18**	**450.27**

To avoid double-counting acres when determining the compensatory mitigation requirement, the directly impacted acres of GRSG Low Density habitat are not included in the “Acres Impacted” totals reported in Table 11. Compensatory mitigation for the directly impacted GRSG habitat is expected to benefit the entire suite of species using GRSG habitat and is reflected in the separate 769.9 functional acre mitigation requirement specific to GRSG reported in Section 6.1.

6.3 Compensatory Mitigation for Indirect Impacts to Mule Deer Winter Range

Indirect impacts to mule deer winter range were assessed using the methods described in Section 3.2. Mule deer are expected to respond to increased traffic by less frequently utilizing the forage species and cover habitats located within 100 feet of the access route where it passes through biological winter range for the species. Mule deer are expected to respond to the increased road traffic by reducing their use of the area by 50 percent which represents an indirect effect to the winter range habitat quality for this species. Approximately 113 acres of mule deer winter range will be impacted. Calico will provide compensatory mitigation for this impact with 1.5 acres of compensatory mitigation for each acre of degraded winter range; a 1.5-to-1.0 ratio.

6.4 Summary of Compensatory Mitigation Requirement

Table 12 presents a summary of the compensatory mitigation needed to offset the remaining impacts of the proposed Project on GRSG and Table 13 presents a similar summary of the compensatory mitigation needed to offset the remaining impacts of the Proposed Project on other wildlife species and their

habitat once avoidance and minimization measures of the proposed Project have been implemented. Although Tables 12 and 13 present mitigation acreages, or in the case of GRSG functional acres, by impact category, the on-the-ground mitigation acreage will likely vary from these acreage amounts based on the functional value of mitigation habitat compared to that impacted by the proposed Project and based on the types of functions provided by mitigation acres. In some cases, mitigation acres can be overlapped, if appropriate. For example, habitat that supports greater sage-grouse may also function as mule deer winter range.

Options for providing compensatory mitigation are described in the following sections. Consistent with OAR 635-420-0060 (2), the overarching goal of the compensatory mitigation proposed in this plan is to meet the standard of "no overall net loss" of fish and wildlife habitat. Additionally, for some habitat types which require compensatory mitigation to provide a net conservation benefit (*e.g.* Category 2, or GRSG Low Density Habitat) the compensatory mitigation plan will meet the habitat Category or GRSG-specific requirements described in OARs 635-415-0025 and 635-140-0025(3).

Table 12. Summary of GRSG Compensatory Mitigation for the Project

Type of Impact	Functional Acres
Direct and Indirect Impacts to GRSG Upland Habitat	769.1
Direct and Indirect Impacts to GRSG Mesic Habitat	0.8
Total Direct and Indirect Impacts to GRSG Habitats	769.9

Table 13. Summary of Other Wildlife Compensatory Mitigation for the Project

Type of Impact	Mitigation Acres
Direct Impacts to Other Wildlife Habitat	450.3
Indirect Impacts to Mule Deer Winter Range	169.5

6.5 Compensatory Mitigation Options

Calico proposes to utilize one or a combination of the following options to provide compensatory mitigation for impacts to wildlife and wildlife habitat that are otherwise not addressed by the minimization and avoidance measures presented above. Calico's preferred option is to complete compensatory mitigation by obtaining and managing one or more off-site Habitat Mitigation Areas (HMAs) for the life of the Project or the duration of the Project's impacts (per OAR 635-415-0020(g)) (see Section 6.5.1, below). Secondary to the HMA approach for providing compensatory mitigation, any mitigation not satisfied by the HMAs will preferentially be offset by purchasing credits from a mitigation bank (see Option 3, Section 6.5.3, below).

6.5.1 Preferred Option: Permittee Implemented Mitigation: Habitat Mitigation Area

Under the preferred option, Calico would obtain and manage one or more off-site Habitat Mitigation Areas (HMAs) for the life of the Project or the duration of the Project's impacts (per OAR 635-415-0020(g)). To investigate the feasibility of this option, the Project team performed a high-level assessment of two example HMA properties available for purchase at the time of this report preparation. Appendix H presents the results of the assessment for these properties. The general vegetation community assessment relied on the latest version of the United States National Vegetation Classification (USNVC 2021) and the GAP/LANDFIRE National Terrestrial Ecosystems dataset (Homer et

al. 2015) to compare the characteristics of the vegetation communities mapped on the prospective HMA to those within the Project Area, specifically the comparison relied on the group level (Level 6 of 8 total) within the natural vegetation hierarchy. This level classifies vegetation communities by regional species and growth forms and is appropriate for capturing regional differences in mesoclimate, geology, substrate, hydrology, and disturbance regimes. The Project team also assessed the presence of biological mule deer winter range, mapped greater sage-grouse habitats, mapped wetlands or stream resources, and adjacent land ownership or use patterns that could affect the larger landscape-scale value and functionality of the habitat for connectivity and long-term management. Developed features on the property were also considered such as presence of residences and other buildings, and roads. Each assessment provides a preliminary summary and conclusion for the site.

Calico worked with ODFW to obtain preliminary HQT outputs for two properties, the Hank Bishop Property and the Dry Creek Ranch. The HQT outputs provide an initial approximation of functional acres available as mitigation credits for offsetting the Project's impacts to greater sage-grouse habitat.

Calico is working to identify an additional example property that could be used to specifically offset the Project's impacts to mule deer winter range which is also ODFW Habitat Category 2. To meet the no net loss and net benefit mitigation goal for this category of habitat, per OAR 635-415-0025, ODFW communicated to Calico (T. Segal, pers. comm.) that HMA properties for mule deer winter range would preferably be located within the Beulah, Owyhee, or Malheur River Wildlife Management Units (WMUs) to meet the in-proximity component of the mitigation goal.

Prospective HMA sites included in Appendix H would each be capable of addressing at least a portion of the compensatory mitigation needs of the Project; however, they are only presented as examples to demonstrate the feasibility of an HMA approach for the Project. This approach is Calico's preferred alternative for providing compensatory mitigation and Calico will work closely with ODFW to select the HMA sites from this group of initially assessed properties or to consider other properties that would also fulfill the mitigation need. See Sections 6.6.1 and 6.6.3 below for example mitigation scenarios involving HMAs.

6.5.1.1 Implementation and Monitoring of HMAs

Calico intends to fulfill its mitigation requirement in full with the establishment of HMAs, but if it is unable to obtain sufficient HMAs to complete mitigation, it will complete mitigation using HMAs in combination with one or more of the other options.

Calico will acquire the selected property for the HMA through outright purchase, a conservation easement, or other legal device and provide documentation of the legal arrangement to ODFW prior to initiating construction of the Project. Once a property is selected and legally obtained, Calico would work with ODFW to develop an HMA-specific mitigation plan that would describe the site-specific habitat management and restoration objectives for the HMA. Calico would initially collect baseline field data on habitat types and conditions observed on the selected site and these data would inform the development of the HMA management plan. The HMA mitigation plan would provide mitigation performance measures (per OAR 635-415-0020 (8)(h)(A-D)) including success criteria, a timeline for formally determining that mitigation goals and standards have been met, provisions for the long-term protection and management of the HMA, and a reporting schedule to ensure the HMA can be successfully managed to fulfill the compensatory mitigation goals for the Project.

As part of the HMA mitigation plan performance measures, a specific suite of habitat enhancement actions would be tailored to the HMA once it is selected and assessed. Habitat enhancement actions that are typical for HMAs involving shrub steppe and native grassland vegetation communities often include:

- *Seasonal restrictions* designed to reduce disturbance or disruption of targeted species. For example, the HMA plan may limit activities allowed within mule deer winter range during the winter.
- *Juniper control:* Removal of juniper is commonly applied to restore habitat quality of shrub-steppe vegetation communities.
- *Weed control:* Noxious and invasive plant species reduce habitat forage quality for many species and can change the fire regime.
- *Seeding and shrub planting:* Targeted restoration can be achieved by replanting key forage and cover species for mule deer, GRSG, and other native wildlife species.
- *Protection and targeted restoration* of spatially limited, high value habitats such as riparian buffers along streams.

The example HMA summaries provided in Appendix H also include descriptions of site-specific habitat restoration or conservation measures that could be used to generate uplift for the specific HMA. These were tentatively identified based on the limited amount of information used to perform the desktop analysis, but they provide an initial assessment of appropriate measures that would be vetted if Calico pursues an HMA on one or more of these properties.

Effectiveness of the HMA-specific habitat enhancement measures would be assessed using quantifiable and repeatable success criteria such as percent cover thresholds for targeted native vegetation communities, or spatially defined reductions in noxious weed area coverage.

Additional components of the HMA mitigation plan include:

- Provisions for long-term management would be ensured by the financial tools used by Calico to secure and provide ongoing stewardship of the HMA property.
- The reporting schedule would be made in coordination with ODFW.

The HMA mitigation plan would also allow for future modifications if needed to meet the compensatory mitigation needs of the Project, per OAR 635-415-0020 (f).

6.5.2 Option 2: ODFW In-Lieu Fee Program for Greater Sage-Grouse

This option is currently limited to mitigating the Project impacts to greater sage-grouse. As described in Section 6.1, Calico worked with ODFW to determine the compensatory mitigation requirement for offsetting impacts of the proposed Project on greater sage-grouse. In May 2021, Oregon created a funding structure for the ODFW Sage-Grouse Mitigation Program (Mitigation Program) In-Lieu Fee (ILF) option for mitigation. Through the ILF, Calico can pay a project-specific calculated fee to the Mitigation Program. Once paid, Calico's mitigation responsibility for offsetting impacts to greater sage-grouse and any liability therein will be assumed by the State and the mitigation will be managed by the Mitigation Program.

6.5.2.1 Project-specific GRSG Mitigation Scenario: Advance payment to ILF (assuming credits are unavailable at the time of purchase)

The Mitigation Program Operations and Administration Manual (State of Oregon 2019c) describes the steps for fulfilling a Project's compensatory mitigation needs using the ILF option. Calico worked with the ODFW Greater Sage-Grouse Mitigation Program Manager to complete a preliminary review of the Project-specific steps that would be taken to fulfill the Grassy Mountain Mine greater sage-grouse compensatory mitigation needs using the ILF. In general, compensatory mitigation completed by purchasing credits through the ILF fund requires obtaining an amount sufficient to meet the Mitigation Program's statutory requirement to provide a net benefit for greater sage-grouse habitat while considering the uncertainties associated with crediting project outcomes and potential temporal loss of habitat due to the timing of development relative to mitigation. This means a project proponent must offset the functional acres lost due to the project (the base debit amount) by 1) purchasing the amount of functional acre credits needed to offset the base debit amount, 2) purchasing an additional 15% of the base debit amount in credits to meet the net benefit requirement, 3) making a contribution equivalent to a percentage of the base debit amount (currently 25%) to a reserve pool set aside by ODFW to account for the risks associated with mitigation projects and potentially devastating events such as large-scale fires. If on-the-ground credits are not immediately available for purchase, the project proponent would also pay a 10% surcharge, the temporal loss multiplier, which enables the ILF fund to account for the gap between project development and implementation of the credits on the ground.

As presented in Section 4.3.7 and summarized in Table 10, the HQT indicated the Project would result in a loss of 669.5 functional acres including 668.8 upland functional acres and 0.7 mesic functional acres. To provide compensatory mitigation for these losses through the ILF option Calico would need to make an advance payment to the ILF including the temporal loss multiplier because credits are not currently available at the time of this report. Following the debit adjustment methodology described in the Mitigation Program Operations and Administration Manual (State of Oregon 2019c), revised with additional and more recent guidance provided by ODFW during our Project-specific coordination the Project-specific ILF compensatory mitigation scenario would apply the following formula:

Base debit amount (669.5 functional acres) + 15% net benefit (100.4 functional acres) + 10% temporal loss contribution (76.9 functional acres) = Adjusted Debit Amount (846.9 functional acres)

Adjusted Debit amount (846.9 functional acres) + 25% reserve account contribution (211.7 functional acres) = **Total Credit Amount of 1,058.6 Functional Acres**

To fulfill the entire greater sage-grouse compensatory mitigation requirement for the Project using the ILF, Calico would need to purchase 1,058.6 Functional Acre Credits by making a payment to the ILF fund equivalent to approximately $27.9 million U.S. dollars. The Functional Acre credits would be implemented on approximately 7,100 physical acres at a cost of approximately $3,900 per physical acre. The functional acre credit costs would cover the entire compensatory mitigation requirement for Project-related impacts to greater sage-grouse and would account for the costs of implementing mitigation actions, planning and monitoring mitigation acres, long term stewardship, the land value, and the ODFW ILF Program Administrative Fee.

6.5.3 Option 3: Third Party Payment-to-Provide: Wildlife Habitat Management and Greater Sage-Grouse Mitigation Bank

Under this option, Calico would purchase mitigation credits from a Conservation Bank owned and operated by TerraWest Conservancy (TerraWest), a habitat conservation and management company based out of Jackson, Wyoming. TerraWest currently has an approximately 32,000-acre upland habitat Conservation Bank under development in Malheur County, Oregon. The new Conservation Bank will be located in the same GRSG Service Area as the Project and will provide greater sage-grouse habitat credits. The same property could also be used by TerraWest to provide appropriate mitigation acres for offsetting other impacts (e.g., direct and indirect impacts to mule deer winter range, and direct impacts to other in-kind habitat types similar to those that will be impacted by the Project).

In early 2023, Calico provided TerraWest with an accounting of the expected Project impacts on wildlife habitat organized by ODFW habitat category, habitat type (e.g. vegetation community) and status as mule deer winter range or greater sage-grouse habitat; a summary of the impacts presented in this report. TerraWest subsequently confirmed they have the habitats available on the bank property to generate the credits needed to fully satisfy the compensatory mitigation needs of the Project for greater sage-grouse, mule deer winter range, and other wildlife habitats. TerraWest provided Calico with an initial cost estimate for the compensatory mitigation package for the Project. Mitigation acres generating the needed credits would be located on two properties that comprise the Northern Great Basin Conservation Bank (NGBCB). NGBCB 3 Creek would be used to satisfy the greater sage-grouse functional acres and a portion of the acreage needed to offset impacts to other wildlife habitat, and NGBCB Bridgeport would be used to satisfy the remaining other wildlife habitat mitigation needs including mule deer winter range. Credits purchased by Calico as mitigation for this Project would be retired and maintained in perpetuity. A description of the TerraWest conservation bank is included as Appendix F.

6.6 Project-Specific Compensatory Mitigation Scenarios

This section describes example scenarios that would fulfill all three of the Project's wildlife-related compensatory mitigation needs including greater sage-grouse, other wildlife habitat, and the mule deer winter range. Based on the example HMAs assessed during preparation of this report, Example 1 most closely adheres to Calico's preferred method of providing compensatory mitigation, with the majority of mitigation provided by HMAs while the remaining shortfall is fulfilled by purchasing credits from the NGBCB.

6.6.1 Example 1: Full Mitigation Through Permittee Implemented Mitigation Combined with Third Party Payment-to-Provide

Under this scenario, Calico would fulfill the compensatory mitigation needs of the Project by establishing two HMAs, one on the Hank Bishop property and one on the Dry Creek Ranch. The balance of mitigation credits needed for greater sage-grouse and mule deer winter range would be purchased through the NGBCB. Desktop assessments of the Hank Bishop property and Dry Creek Ranch are provided in Appendix H. Key components of this approach include:

- The 1,232-acre Hank Bishop property would fulfill the compensatory mitigation needs for other wildlife habitat (450 mitigation acres) and provide approximately 201.4 upland functional acre credits for greater sage-grouse.

- The 1,451-acre Dry Creek Ranch would provide an additional 361.9 upland functional acre credits and 75.2 mesic functional acre credits for greater sage-grouse. This property would fully satisfy the mesic functional acre credits needed for greater sage-grouse. It could also be used to fulfill any remaining compensatory mitigation needs for other wildlife habitat if more detailed surveys of the Hank Bishop property indicate a deficiency for fulfilling the specific ODFW habitat category and vegetation community types.
- Mule deer compensatory mitigation would be fulfilled by purchasing approximately 170 credits from the NGBCB.
- The balance of 205.8 upland functional acre credits needed for greater sage-grouse mitigation would be purchased from the NGBCB.

In summary, the Hank Bishop Property and Dry Creek Ranch would provide mitigation uplift opportunities on approximately 2,683 acres of wildlife habitat to be managed as compensatory mitigation, and the NGBCB would provide 170 mule deer winter range credits and the balance of 205.8 functional acre credits for greater sage-grouse. Based on the estimated direct impacts of the Project to approximately 839 acres of wildlife habitat the HMA component of this example represents an average mitigation ratio for direct impacts of 3.2:1.

Schedule of Implementation

If this scenario is selected, Calico will acquire the HMA properties through fee title acquisition, a conservation easement, or other legal device and provide documentation of the legal arrangement to ODFW prior to initiating construction of the Project. Calico will also work with ODFW to develop an HMA-specific mitigation plan that will describe the site-specific habitat management and restoration objectives for the HMA as detailed in Section 6.5.3.1. The HMA-specific plan will be drafted and approved by ODFW before initiating construction of the Project. The NGBCB is expected to receive preliminary approval during early summer 2023 and final approval by the fourth quarter of 2023, at which time credits will be released for purchase. Calico will purchase the remaining greater sage-grouse functional acre credits and the mule deer winter range credits needed to fulfill the compensatory mitigation for those resources prior to the initiation of Project construction.

This scenario is preliminary and based on desktop assessments completed by Calico for example HMA properties that were available at the time of report preparation. If Calico selects an option similar to this example, HMA properties would undergo a more thorough vetting, including field reconnaissance and further refinement of the HQT crediting process.

6.6.2 Example 2: Full Mitigation through Third Party Payment-to-Provide

Under this scenario, Calico would purchase credits from the Northern Great Basin Conservation Bank (NGBCB) to fulfill all wildlife habitat compensatory mitigation needs for the Project. The specific credits purchased by Calico would include approximately 770 functional acre credits for greater sage-grouse to offset the impacts summarized in Table 10, 455 ODFW Habitat Mitigation Policy Category 2-6 credits to offset the impacts to Other Wildlife Habitat as summarized in Table 11, and 170 mule deer winter range credits to offset the indirect impacts summarized in Table 9. The credit purchase is estimated to total approximately 1,395 credits.

Schedule of Implementation

NGBCB is expected to receive preliminary approval during early summer 2023 and final approval by the fourth quarter of 2023, at which time credits will be released for purchase.

6.6.3 Example 3: Full Mitigation Through Permittee Implemented Mitigation Combined with ODFW In-Lieu Fee Program

Under this scenario, Calico would fulfill the compensatory mitigation needs of the Project by establishing three HMAs, one on the Hank Bishop property, one on the Dry Creek Ranch, and a third property obtained within mule deer winter range. After accounting for the greater sage-grouse upland and mesic functional acres provided by the HMA properties, the remaining compensatory mitigation deficit of greater sage-grouse functional acres would be fulfilled by purchasing credits through the ODFW In-Lieu Fee Program. Preliminary desktop assessments of the Hank Bishop property and Dry Creek Ranch are provided in Appendix H. Key components of this approach include:

- The 1,232-acre Hank Bishop property would fulfill the compensatory mitigation needs for other wildlife habitat (450 mitigation acres) and provide approximately 201.4 upland functional acre credits for greater sage-grouse.
- The 1,451-acre Dry Creek Ranch would provide an additional 361.9 upland functional acre credits and 75.2 mesic functional acre credits for greater sage-grouse. This property would fully satisfy the mesic functional acre credits needed for greater sage-grouse. It could also be used to fulfill any remaining compensatory mitigation needs for other wildlife habitat if more detailed surveys of the Hank Bishop property indicate a deficiency for fulfilling the specific ODFW habitat category and vegetation community types.
- A third property, yet to be identified, would provide approximately 170 acres of mule deer winter range to fulfill the compensatory mitigation needs for this resource.
- The balance of 205.8 upland functional acre credits needed for greater sage-grouse mitigation would be purchased from the ODFW In-Lieu Fee Program.

Site-specific mitigation actions identified for the Hank Bishop and Dry Creek HMAs include:

- Weed treatments
- Native shrubland or grassland restoration
- Preserve and maintain intact native shrubland with good sagebrush cover
- Wildfire planning
- Livestock grazing management
- Infrastructure removal
- Seep/Spring restoration and management

Additional detail on site-specific mitigation options is available in Appendix H.

In summary, the Hank Bishop property, Dry Creek Ranch, and the mule deer winter range HMA would provide mitigation uplift opportunities on approximately 2,853 acres of wildlife habitat to be managed as compensatory mitigation. The ILF Program would provide the balance of 205.8 upland functional acre credits for greater sage-grouse. Based on the estimated direct impacts of the Project to approximately 839 acres of wildlife habitat the HMA component of this example represents an average mitigation ratio for direct impacts of 3.4:1.

Schedule of Implementation

If this less preferred scenario was selected, Calico would acquire the HMA properties through fee title acquisition, a conservation easement, or other legal device and provide documentation of the legal arrangement to ODFW prior to initiating construction of the Project. Calico would also work with ODFW to develop an HMA-specific mitigation plan that will describe the site-specific habitat management and restoration objectives for the HMA as detailed in Section 6.5.1.1. The HMA-specific plan will be drafted and approved by ODFW before initiating construction of the Project. The ILF Program is currently available and Calico will purchase the remaining greater sage-grouse functional acre credits needed to fulfill the compensatory mitigation for that resource prior to the initiation of Project construction.

It is important to note this scenario is preliminary and based on desktop assessments completed by Calico for example HMA properties that were available at the time of report preparation. If Calico selects an option similar to this example, HMA properties would undergo a more thorough vetting, including field reconnaissance, further refinement of the HQT crediting process, and additional vetting of HMA-generated credit availability and timeline to achieve mitigation uplift.

7 Monitoring

In addition to compensatory mitigation monitoring, impact minimization and wildlife protection measures will be monitored as described below. As required by OAR 635-420-0020 (4)(e), wildlife protection measures are also detailed in the Wildlife Protection Plan, but they are repeated here.

7.1 General Impact Minimization

- Visual and Noise Disturbance – Because known golden eagle territories are in the vicinity of the Project Calico proposes to complete surveys during spring of the Project construction year, prior to initiation of construction activities.
    - One territory survey would be conducted prior to April 15th to detect any active territories within the Permit Area and 2-mile buffer
    - Nesting surveys would be completed at any active territories detected during the territory inventory
        - Nesting surveys would be completed within the nesting season (April 15th – June 15th) and consist of at least two surveys separated by at least 30 days.
- Noise — Following the Noise Monitoring Plan (Calico 2023d) measurements will be collected annually during the period of March 1 through June 30 at established locations.
    - Monitoring should occur during all hours of operational activities.
    - Results of annual noise monitoring will be included in the fourth quarter monitoring report, as described in the Wildlife Protection Plan.
    - Where noise reduction components have been installed on machinery, monitoring and maintenance will be incorporated into normal operation practices.
- Power Lines – Perching and nesting deterrence structures installed on power poles will be inspected at least once every 3 years to identify needed repairs. In addition, power poles will be monitored by qualified personnel annually during the appropriate nesting season for evidence of any nesting by potential avian predators including raptors, corvids, and eagles. If a nest is

detected, the qualified monitor will notify the ESS who will coordinate with ODFW within one business day to determine an appropriate response.

- Noxious Weeds – The Noxious Weed Monitoring and Control Plan (Calico 2023) describes monitoring procedures for noxious weeds. Among other weed control and prevention measures, the plan describes a requirement to decontaminate all vehicles that could transport weed seed to or from the Project location. A wash station will be used to remove weed seeds from vehicles on site. New equipment will also be inspected and cleaned upon arrival at the Project site.
- Traffic – The Project will maintain a daily gate log which will record each vehicle that enters the Project site. The gate log will be used to track daily traffic volumes associated with the Project and data will be reported in the quarterly monitoring report.

7.2 Additional Wildlife Protection Measures

The Project's Environmental and Safety Superintendent (ESS) will be responsible for monitoring and maintaining the wildlife protection measures described in this report. The ESS will be tasked with applying for and maintaining a current Wildlife Scientific Taking Permit (STP) from ODFW and will follow all monitoring and reporting requirements of the permit which typically includes preparation and submittal of monitoring reports to ODFW. The ESS will also work with ODFW to resolve issues or failures of protection measures observed during the operation and closure phases of the mine. Per OAR 635-420-0070, the ESS will be responsible for preparing the monitoring report on a quarterly basis that will follow the requirements specified in OAR 635-420-0070 (1) through (3).

The quarterly monitoring report will include:

- Results of regular sampling and testing of the contact waters stored in the TSF and reclaim pond to demonstrate they consistently remain non-toxic to wildlife species that might come into contact with them. Monitoring will include at least quarterly repetition of the ecological risk assessment (SLR 2023) for likely wildlife receptors (see Tailings Chemical Monitoring Plan (Calico 2023b)).
    - As detailed in the Tailings Chemical Monitoring Plan (Calico 2023b) and the ecological risk assessment (SLR 2023) several analytes will be monitored within the TSF and reclaim pond. Screening levels of concern for each analyte are presented in Table 14.

Table 14. TSF and reclaim pond analytes to be monitored for toxicity to wildlife.

Analyte[1]	**Wildlife-specific Ecological Screening Level[2]**	
	Birds (mg/L)	Mammals (mg/L)
Cyanide	1.6	3,000
Aluminum (Al)	4,500	86
Arsenic (As)	52	5.6
Copper (Cu)	130	33
Chromium (Cr)	71	630
Molybdenum (Mo)	NE	NE
Vanadium (V)	45	18
Antimony (Sb)	NE	2.3
Lead (Pb)	640	16
Nickel (Ni)	160	3
Iron (Fe)	NE	NE

Manganese (Mn)	24,000	700
Mercury (Hg)	0.78	63
Alkalinity	NE	NE
pH	NE	NE

[1] List of monitored analytes from Tailings Chemical Monitoring Plan (Calico 2023b)
[2] Drinking water conservative exposure point concentration screening levels as cited in Table 1 of Ecological Risk Assessment (SLR 2023)

  - Additional water quality characteristics including temperature, dissolved oxygen (DO), salinity/ electrical conductivity will also be monitored and reported quarterly.
  - If the tailings chemical monitoring system indicates any thresholds for wildlife toxicity have been exceeded in the TSF and reclaim pond the Project operators would implement remediation actions including:
    - Cyanide will be monitored continuously (Calico 2023b). In the event of a cyanide exceedance: Project operators would complete a common batch cyanide treatment process through the addition of hydrogen peroxide to the affected water body.
      - The ESS would deploy temporary wildlife deterrence measures such as air cannons, or mylar streamers to deter birds or bats from accessing the TSF.
      - Deterrence measures would remain active until the cyanide concentrations dropped back below the monitoring threshold.
    - Acid Base Accounting (ABA) described in the Tailings Chemical Monitoring Plan will be completed weekly (Calico 2023b). The amount of lime added will be adjusted based on the ABA test results to maintain the targeted baseline geochemical properties of the Project tailings.
  - Notify ODFW's representative on the Project Coordinating Committee and the Technical Review Team by the beginning of the next business day of any event where TSF or reclaim pond waters exceed wildlife toxicity thresholds.
- Results of monthly inspection of the perimeter fence to detect and repair any damage to the fence or evidence of under-burrowing by larger species (*e.g.* badger).
- Results of quarterly inspections of stormwater drainage facilities for evidence of wildlife use (*e.g.* tracks, scat), or any incidental observations of wildlife using these structures.
- Results of daily, during project initiation, and later on, weekly observational monitoring completed by qualified personnel of the TSF and reclaim pond for presence of fish, aquatic invertebrates, algae, or aquatic vegetation.
  - Coordinate with ODFW's representative on the Project Coordinating Committee and the Technical Review Team and USFWS if observations are made of fish, invertebrates, algae, or aquatic vegetation in the same location over more than three quarters. After agency coordination, ESS shall implement control measures such as:
    - Aquatic vegetation removal and control
    - Installation of additional deterrent measures
- Results of annual noise monitoring (fourth quarter report only).
- Power Lines – Perching and nesting deterrence structures installed on power poles will be inspected at least once every 3 years to identify needed repairs. Results of inspection will be included in the following quarterly report. In addition, power poles will be monitored by qualified

personnel annually during the appropriate nesting season for evidence of any nesting by potential avian predators including raptors, corvids, and eagles. If a nest is detected, the qualified monitor will notify the ESS who will coordinate with ODFW within one business day to determine an appropriate response. Results of nest monitoring will be included in the following quarterly monitoring report.

- Results of annual monitoring of nest exclusion devices on structures associated with the facility. Monitoring will be completed by qualified personnel during the nesting season of targeted species (e.g. corvids and bats). If a nest is detected, the qualified monitor will notify the ESS who will coordinate with ODFW within one business day to determine an appropriate response. Results of nest monitoring will be included in the following quarterly monitoring report.
- Record of any wildlife mortality events.
    - Employees will be required to report any wildlife fatalities to the ESS.
    - The TSF and reclaim pond as well as enclosed contact water tanks will be monitored daily by trained individuals on a routine schedule to determine the condition of any wildlife exclusion tools and to detect any wildlife mortalities.
- Record of any exceedance of toxicity threshold in the TSF or reclaim pond, and description of immediate response such as the addition of hydrogen peroxide to the affected water body.
    - Record of any temporary wildlife deterrence measures temporarily deployed after the incident.
- Record of any discussions with ODFW and any adaptive measures implemented during the year to address wildlife protection issues.

In addition to the quarterly frequency of the monitoring report, per OAR 635-420-0070 (4) the ESS will be responsible for more frequent reporting to ODFW's representative on the Project Coordinating Committee and the Technical Review Team for specific types of incidents including:

- Beginning of next business day notification of the designated ODFW representative by telephone of any wildlife injuries or mortalities involving:
    - Injuries or mortalities which may be associated with exposure to chemical processing solutions or associated wastewater
    - Injuries or mortalities which may be associated with wildlife protective measures
    - Injuries or mortalities of state or federally listed threatened or endangered species or state sensitive species
    - Event where TSF or reclaim pond exceeds wildlife toxicity thresholds

Finally, per OAR 635-420-0080(3) Calico shall notify ODFW at least 30 days prior to completion of construction of the Grassy Mountain Mine to allow inspection by ODFW which will happen within 10 days of mine completion. Calico will not commence the use of chemical processing solutions until after notification by ODFW that the inspection has been completed. Throughout the life of the permit, ODFW will complete inspections on at least a semi-annual basis.

7.3 Reclamation

The Reclamation Plan (Calico 2023b) describes post-closure monitoring including several efforts that will assist the re-establishment of a self-sustaining ecosystem comparable to undamaged ecosystems in the study area, per OAR 635-420-0060 (5). From the Reclamation Plan, specific monitoring will include:

- The fence surrounding the E-Cell will be inspected routinely during the post-closure monitoring period. Maintenance may consist of repairs to the fence and fence posts. This activity will be conducted until closure has been approved and the bond released.
- Vegetation monitoring of the reclaimed facilities will be conducted at the various mining facilities at the Project 5 years after revegetation activities have been completed. The monitoring will involve photo-documentation and be conducted during the "peak green" spring season. This program will be coordinated with the BLM and DOGAMI to facilitate coordination between the agencies. Reclaimed areas not meeting regulatory standards would be evaluated and corrective actions implemented. These measures could include, if necessary, additional soil amendments, reseeding, and installation of erosion control measures, followed by monitoring consistent with what was conducted previously. This obligation will cease when the reclamation goals and requirements have been achieved and upon release of all related reclamation bonds.
- The flow rate of the tailings underflow from the TSF to the Reclaim Pond/E-Cell will be routinely monitored.
- Groundwater quality will be routinely collected, tested, and reported to respective regulatory agencies to demonstrate reclamation compliance in the 15 monitoring wells according to the requirements established by the ODEQ upon approval of the Chemical Mining Permit. This activity will be conducted until closure has been approved and the bond released, estimated to be a period of 30 years. Groundwater monitoring will be conducted in three phases:
  - Phase 1 includes quarterly monitoring for a period of 5 years.
  - Phase 2 includes semi-annual monitoring for a period of 10 years.
  - Phase 3 includes annual monitoring for a period of 15 years.
- Noxious weed monitoring and control will be implemented during operations and for a minimum period of 5 years following the cessation of operation
- Stormwater diversion channels will be inspected during the reclamation monitoring period to ensure that sediment has not accumulated and that the lining in the channels (riprap, concrete, etc.) has not been compromised, thereby reducing the design capacity of the structure.
- Stormwater samples from the permitted outfalls will be collected, tested, and reported to respective regulatory agencies to demonstrate reclamation compliance where necessary.

The Reclamation Plan also indicated Calico will coordinate with agencies to implement and monitor the reclamation using quantitative measures for evaluating habitat diversity, wildlife species diversity, and plant community composition, structure and utilization by wildlife. This can be integrated with the vegetation monitoring described above, but the actual protocol will be developed by Calico based on the best available science at the time and approved by ODFW prior to implementation.

8 Summary

The proposed Project will result in both direct and indirect impacts to wildlife habitat including shrub-steppe vegetation communities and specifically some areas identified as greater sage-grouse low density habitat, and mule deer biological winter range. The compensatory mitigation options presented in section 6 will provide ample resources to offset the impacts disclosed in this report and to satisfy the "no overall net loss of habitat value" standard listed in OAR 635-420-0060 (2) as a requirement of the consolidated application, and further described in OAR 635-415. Calico will continue to work with ODFW

and other regulatory agencies as appropriate to select the specific mix of compensatory mitigation options for the proposed Project.

9 Amendment

This WMP may be amended periodically by agreement of Calico and the ODFW.

10 References

Blickley, J.L., D. Blackwood, and G.L. Patricelli. 2012. Experimental Evidence for the Effects of Chronic Anthropogenic Noise on Abundance of Greater Sage-Grouse at Leks. Conservation Biology 26(3): 461-471.

BKL. 2023. Grassy Mountain Mine, Oregon, Noise Model Summary. Dated April 5, 2023.

Bradley, P. V., M. J. O'Farrell, J. A. Williams, and J. E. Newmark. Editors. 2006. The Revised Nevada Bat Conservation Plan. Nevada Bat Working Group. Reno, Nevada. 216 pp.

Brown, D.E. and A.T. Smith. 2019. *Lepus townsendii*. The IUCN Red List of Threatened Species. Available online at: https://www.iucnredlist.org/species/41288/45189364.

Calico Resources USA Corp. 2023. Grassy Mountain Mine Project Noxious Weed Monitoring and Control Plan. Revised April 2023.

Calico Resources USA Corp. 2023b. Grassy Mountain Mine Project Reclamation Plan. Revised August 2023.

Calico Resources USA Corp. 2023c. Tailings Chemical Monitoring Plan. Prepared for the Grassy Mountain Mine Project. Revised August 2023.

Calico Resources USA Corp. 2023d. Grassy Mountain Mine Project, Malheur County, Oregon, Noise Monitoring Plan. May 2023.

Coe, P.K., D.A. Clark, R.M. Nielson, S.C. Gregory, J.B. Cupples, M.J. Hedrick, B.K. Johnson and D.H. Jackson. 2018. Multiscale Models of Habitat Use by Mule Deer in Winter. Journal of Wildlife Management 82(6): 1285-1299.

Cole, E.K., M.D. Pope and R.G. Anthony. 1997. Effects of road management on movement and survival of Roosevelt elk. Journal of Wildlife Management 61: 1115-1126.

Crawford, R., M.S. Reid and K.A. Schulz. 2016. NatureServe Explorer Terrestrial Ecological System: Columbia Plateau Steppe and Grassland. Available online at https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.740175/Columbia_Plateau_Steppe_and_Grassland. Accessed August 2, 2021.

Creative Acoustics Northwest, Inc. 2019. Calico Resources USA Corp. Grassy Mountain Mine Project, Malheur County, Oregon, Noise Baseline Report. Revised February 2019.

Gilbert, S.L., K.J. Hundertmark, D.K. Person, M.S. Lindberg, and M.S. Boyce. 2017. Behavioral plasticity in a variable environment: snow depth and habitat interactions drive deer movement in winter. Journal of Mammalogy 98: 246-259.

Harju, S.M., C.V. Olson, J.E. Hess and B. Bedrosian. 2018. Common raven movement and space use: influence of anthropogenic subsidies within greater sage-grouse nesting habitat. Ecosphere 9(7).

Homer, C.G., J.A. Dewitz, L. Yang, S. Jin, P. Danielson, G. Xian, J. Coulston, N.D. Herold, J.D. Wickham, and K. Megown. 2015. Completion of the 2011 National Land cover Database for the conterminous United States-Representing a decade of land cover change information. Photogrammetric Engineering and Remote Sensing, v. 81, no. 5, p. 345-354.

Johnson, D.H. and T.A. O'Neil. 2001. Wildlife-Habitat Relationships in Oregon and Washington. Washington Department of Fish and Wildlife and Northwest Habitat Institute. Oregon State University Press. Corvallis, Oregon.

Jones, G.P. and K.A. Schulz. 2015. NatureServe Explorer Terrestrial Ecological System: Inter-Mountain Basins Semi-Desert Grassland. Available online at https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.722885/Inter-Mountain_Basins_Semi-Desert_Grassland. Accessed August 2, 2021.

Kittel, G., M.S. Reid and K.A. Schulz. 2014. NatureServe Explorer Terrestrial Ecological System: Inter-Mountain Basins Semi-Desert Shrub-Steppe. Available online at https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.722884/Inter-Mountain_Basins_Semi-Desert_Shrub-Steppe. Accessed August 2, 2021.

Kleist, N.J., R.T. Buxton, P.E. Lendrum, C. Linares, K.R. Crooks, and G. Wittemyer. 2021. Noise and landscape features influence habitat use of mammalian herbivores in a natural gas field. Journal of Animal Ecology 90:875-885.

Lorax Environmental. 2022. Grassy Mountain Gold and Silver Project, Numerical Hydrogeologic Assessment. Prepared for SLR International Corporation on behalf of Paramount Gold Nevada Corp. October 21, 2022.

Northrup, J.M., C.R. Anderson, Jr. and G. Wittemyer. 2015. Quantifying spatial habitat loss from hydrocarbon development through assessing habitat selection patterns of mule deer. Global Change Biology 21: 3961-3970.

Oregon Administrative Rule (OAR) 632-037-0125. Chapter 632, Department of Geology and Mineral Industries, Division 037, Consolidated Permitting of Mining Operations, Rule 0125 Fish and Wildlife Standards. Accessed at: Oregon Secretary of State Administrative Rules

Oregon Administrative Rules (OAR) 635-140-0000 through 635-140-0025. Chapter 635, Department of Fish and Wildlife, Division 140, Greater Sage-Grouse Conservation Strategy for Oregon. Accessed at: Oregon Secretary of State Administrative Rules

Oregon Administrative Rules (OAR) 635-415-0000 through 635-415-0025. Chapter 635, Department of Fish and Wildlife, Division 415, Fish and Wildlife Habitat Mitigation Policy. Accessed at: Oregon Secretary of State Administrative Rules

Oregon Administrative Rules (OAR) 635-420-0060. Chapter 635, Department of Fish and Wildlife, Division 420, Chemical Process Mining Consolidated Application and Permit Review Standards, Rule 0060 Wildlife Mitigation Plan. Accessed at: Oregon Secretary of State Administrative Rules

Oregon Administrative Rules (OAR) 660-023-0115. Chapter 660, Land Conservation and Development Department, Division 023, Procedures and Requirements for Complying with Goal 5, Rule 0115 Greater Sage-Grouse. Accessed at: Oregon Secretary of State Administrative Rules

Oregon Department of Fish and Wildlife (ODFW). 2013. ODFW Deer and Elk Winter Range for Eastern Oregon (2012). Publish date January 9, 2013. Available online at: https://nrimp.dfw.state.or.us/DataClearinghouse/default.aspx?p=202&XMLname=885.xml.

_____. 2016. Oregon Conservation Strategy. Strategy Habitats. Available online at https://www.oregonconservationstrategy.org/strategy-habitats/.

Reid, F. 2006. Peterson Field Guide to Mammals of North America, Fourth Edition. Houghton Mifflin Company.

Rost, G.R. and J.A. Bailey. 1979. Distribution of Mule Deer and Elk in Relation to Roads. Journal of Wildlife Management, 43(3): 634-641.

Sawyer, H., R.M. Nielson, F. Lindzey and L.L. McDonald. 2006. Winter habitat selection of mule deer before and during development of a natural gas field. Journal of Wildlife Management 70: 396-403.

Segal, T., ODFW Wildlife Habitat Biologist, Personal Communication with W. Wente, MB&G Ecologist, April 26, 2023.

Seidel, N., ODFW Sage-Grouse Mitigation Coordinator, Personal Communication with W. Wente, MB&G Ecologist, December 8, 2021.

SLR. 2023a. Grassy Mountain Mine Seep and Spring Monitoring and Mitigation Plan. Prepared for Calico Resources USA Corp. May 2023.

SLR. 2023b. Grassy Mountain Mine Project Ecological Risk Assessment for Proposed Tailings Storage Facility. August 2023.

SPF Water Engineering, LLC. 2021. Grassy Mountain Mine Project Groundwater. Groundwater Baseline Data Report. Prepared for Calico Resources USA Corp. Dated December 8, 2021.

State of Oregon. 2019a. Oregon Sage-Grouse Habitat Quantification Tool User Guide Document. Version 2.2. Portland, Oregon.

State of Oregon. 2019b. Oregon Sage-Grouse Habitat Quantification Tool Scientific Rationale Document. Version 2.2. Portland, Oregon. Available online at https://www.dfw.state.or.us/wildlife/sagegrouse/mitigation.asp.

State of Oregon. 2019c. Greater Sage-Grouse Habitat Mitigation Program Operations and Administration Manual. October 2019.

Sullivan, R., N. Glines-Bovio, K.N. Rogers, J.H. McCarty, D. Korzilius, and H. Hartmann. 2023. Night Sky and Dark Environments: Best Management Practices for Artificial Light at Night on BLM-Managed Lands. Tech Note 457. U.S. Department of the Interior, Bureau of Land Management, National Operations Center, Denver, CO.

Ulmschneider, H. 2008. Surveying for Pygmy Rabbits (*Brachylagus idahoensis*), Fourth Draft. June 3, 2004. Boise District, Idaho, Bureau of Land Management, Department of the Interior.

United States National Vegetation Classification (USNVC). 2019. United States National Vegetation Classification Database, V2.03. Federal Geographic Data Committee, Vegetation Subcommittee, Washington DC. [usnvc.org] Accessed September 14, 2020.

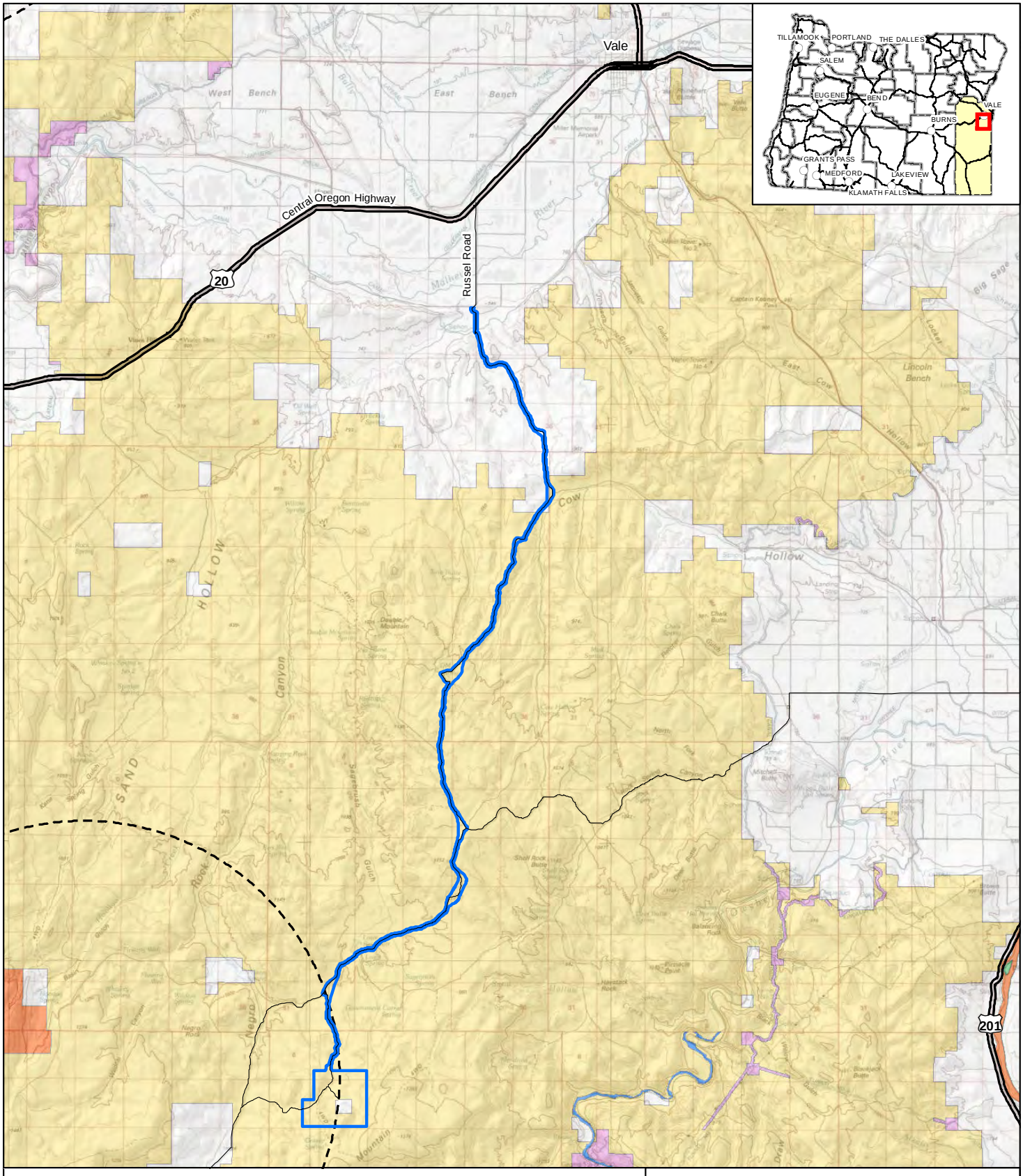
United States National Vegetation Classification (USNVC). 2021. United States National Vegetation Classification Database, V2.031. Federal Geographic Data Committee, Vegetation Subcommittee, Washington DC. [usnvc.org] Accessed December 1, 2021.

Wildlife Action Plan Team (WAPT). 2013. Nevada Wildlife Action Plan. Nevada Department of Wildlife, Reno.

Wisdom, M.J., N.J. Cimon, B.K. Johnson, E.O. Garton and J.W. Thomas. 2004. Spatial Partitioning by Mule Deer and Elk in Relation to Traffic. Session Six, Transactions of the 69th North American Wildlife and Natural Resources Conference, pp. 509-530.

APPENDIX A

Figures



Explanation

- Project Area (1,761.7 acres)
- Greater Sage-Grouse Low Density Area
- Existing Road
- Existing Highway

Land Status

- Bureau of Land Management
- State Agency
- Bureau of Reclamation
- Private
- U.S. Fish and Wildlife Service
- Water

0 1 2 Miles

N

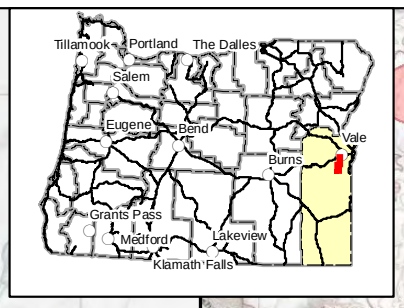
CALICO RESOURCES USA CORP.

GRASSY MOUNTAIN MINE PROJECT

Project Location, Access, and Land Status

Label: Figure 1	Drawn By: TLF
Date: 10/27/2021	Project No.: 3678
Base Map: USGS 100K quad: Vale, OR	
File Name: 3678T_GrassyMtn_Fig1_Loc.mxd	

EM STRATEGIES



Match Line

T20S R44E

T19S R44E

T20S R44E

T20S R45E

T21S R44E

T22S R44E

Match Line

Explanation

Project Area (1,761.7 acres)

Fire History

0 1 2 Miles

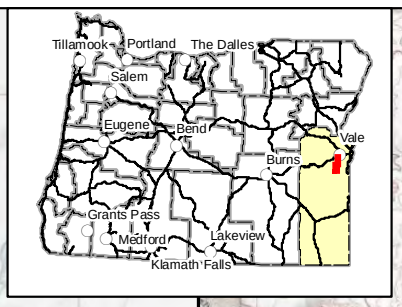
N

CALICO RESOURCES USA CORP.

GRASSY MOUNTAIN MINE PROJECT

Fire History in the Project Area

Label:	Figure 2	Drawn By:	TLF
Date:	10/27/2021	Project No.:	3678
Base Map:	USGS 7.5' quads: Grassy Mountain, Sourdough Spring		
File Name:	3678T_GrassyMtn_Fig2_Fires.mxd		



T20S R44E

T19S R44E

T20S R45E

T21S R44E

T22S R44E

Match Line

Match Line

Explanation

- Project Area (1761.7 acres)
- Vegetable Crop Cultural Group (12.0 acres)
- Yellow Rabbitbrush/Bluebunch Wheatgrass Shrubland Association (71.7 acres)
- Indian Ricegrass-Bluebunch Wheatgrass-Sandhill Muhly Grassland Alliance (118.5 acres)
- Wyoming Big Sagebrush/Cheatgrass Ruderal Shrubland Association (138.4 acres)
- Crested Wheatgrass Western Ruderal Perennial Grassland Alliance (283.4 acres)
- Cheatgrass Ruderal Grassland Association (508.3 acres)
- Wyoming Big Sagebrush/Bluebunch Wheatgrass Shrubland Alliance (571.5 acres)

0 1 2 Miles N

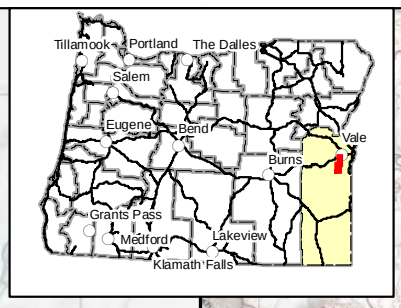
CALICO RESOURCES USA CORP.

GRASSY MOUNTAIN MINE PROJECT

Field-Verified Land Cover Types in the Project Area

Label: Figure 3	Drawn By: TLF
Date: 10/27/2021	Project No.: 3678
Base Map: USGS 7.5' quads: Grassy Mountain, Sourdough Spring	
File Name: 3678T_GrassyMtn_Fig3_FV_Veg.mxd	

EM STRATEGIES



T19S R44E

T20S R44E

T20S R45E

T21S R44E

T22S R44E

Match Line

Match Line

Explanation

- Project Area (1761.7 acres)
- Category 2 (174.2 acres)
- Category 3 (892.3 acres)
- Category 4 (461.5 acres)
- Category 5 (174.6 acres)
- Category 6 (60.0 acres)

0 1 2 Miles

N

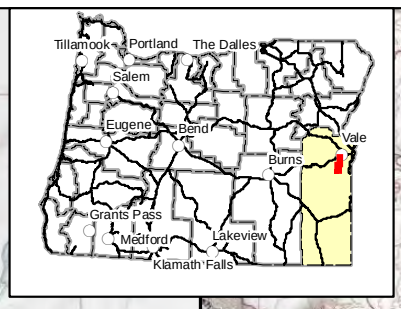
CALICO RESOURCES USA CORP.

GRASSY MOUNTAIN MINE PROJECT

Habitat Categories in the Project Area

Label: Figure 4	Drawn By: TLF
Date: 10/27/2021	Project No.: 3678
Base Map: USGS 7.5' quads: Grassy Mountain, Sourdough Spring	
File Name: 3678T_GrassyMtn_Fig4_HabCats.mxd	

EM STRATEGIES



T20S R44E

T21S R44E

T22S R44E

Match Line

Match Line

Explanation

- Fenceline Perimeter (740 acres)
- Project Area (1,761.7 acres)
- Proposed Road Disturbance (96.0 acres)

0 1 2 Miles

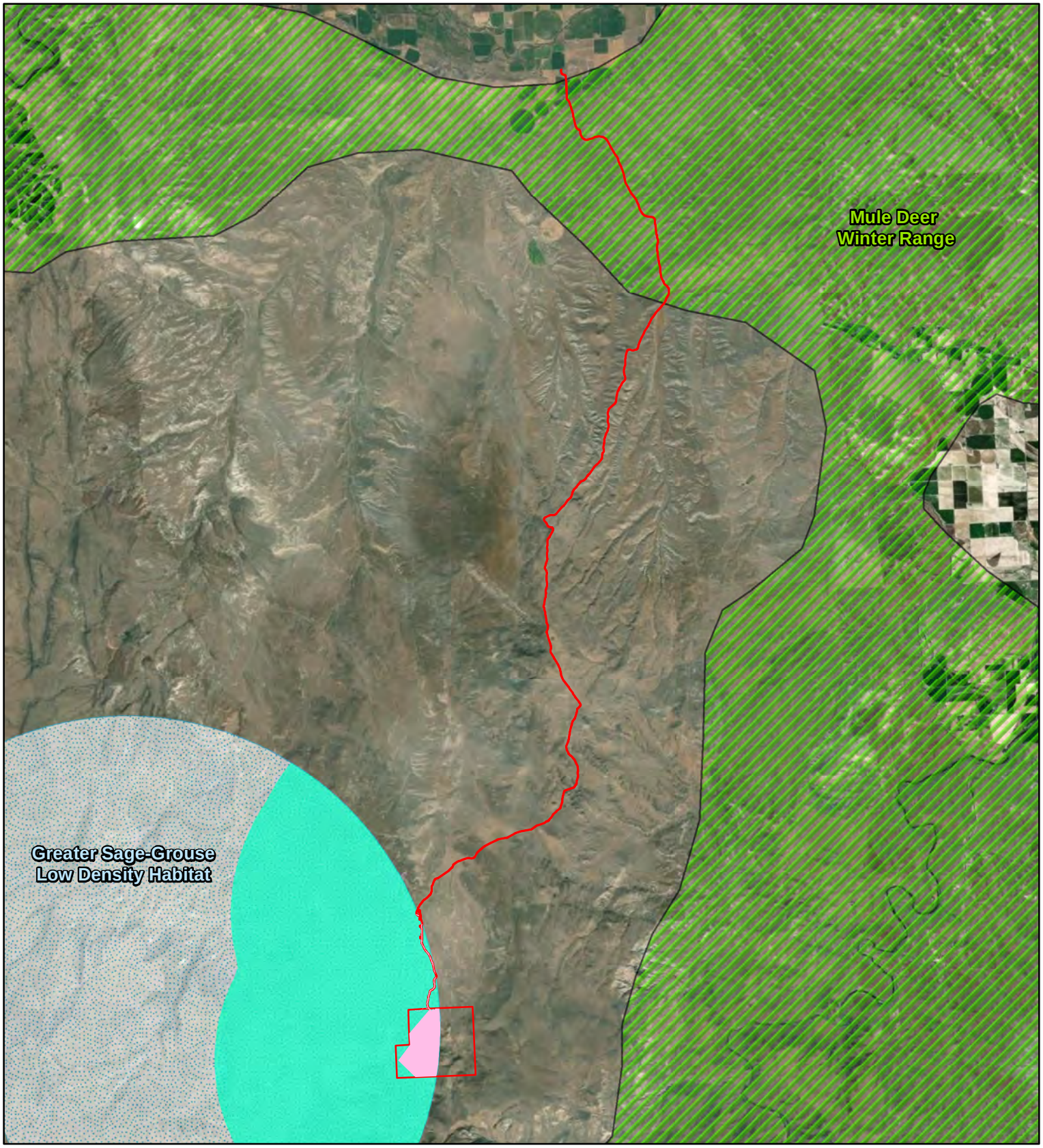
N

CALICO RESOURCES USA CORP.

GRASSY MOUNTAIN MINE PROJECT

Perimeter Fence Area and Proposed Disturbance to Access Road Area

Label:	Figure 5	Drawn By:	TLF
Date:	12/10/2021	Project No.:	3678
Base Map:	USGS 7.5' quads: Grassy Mountain, Sourdough Spring		
File Name:	3678T_GrassyMtn_Fig5_RoadDist.mxd		



Greater Sage-Grouse Low Density Habitat
and Mule Deer Winter Range Habitat

Project Study Area
Grassy Mountain Mine Footprint
HQT Project Analysis Area
Greater Sage-Grouse Low Density Habitat
Mule Deer Winter Range

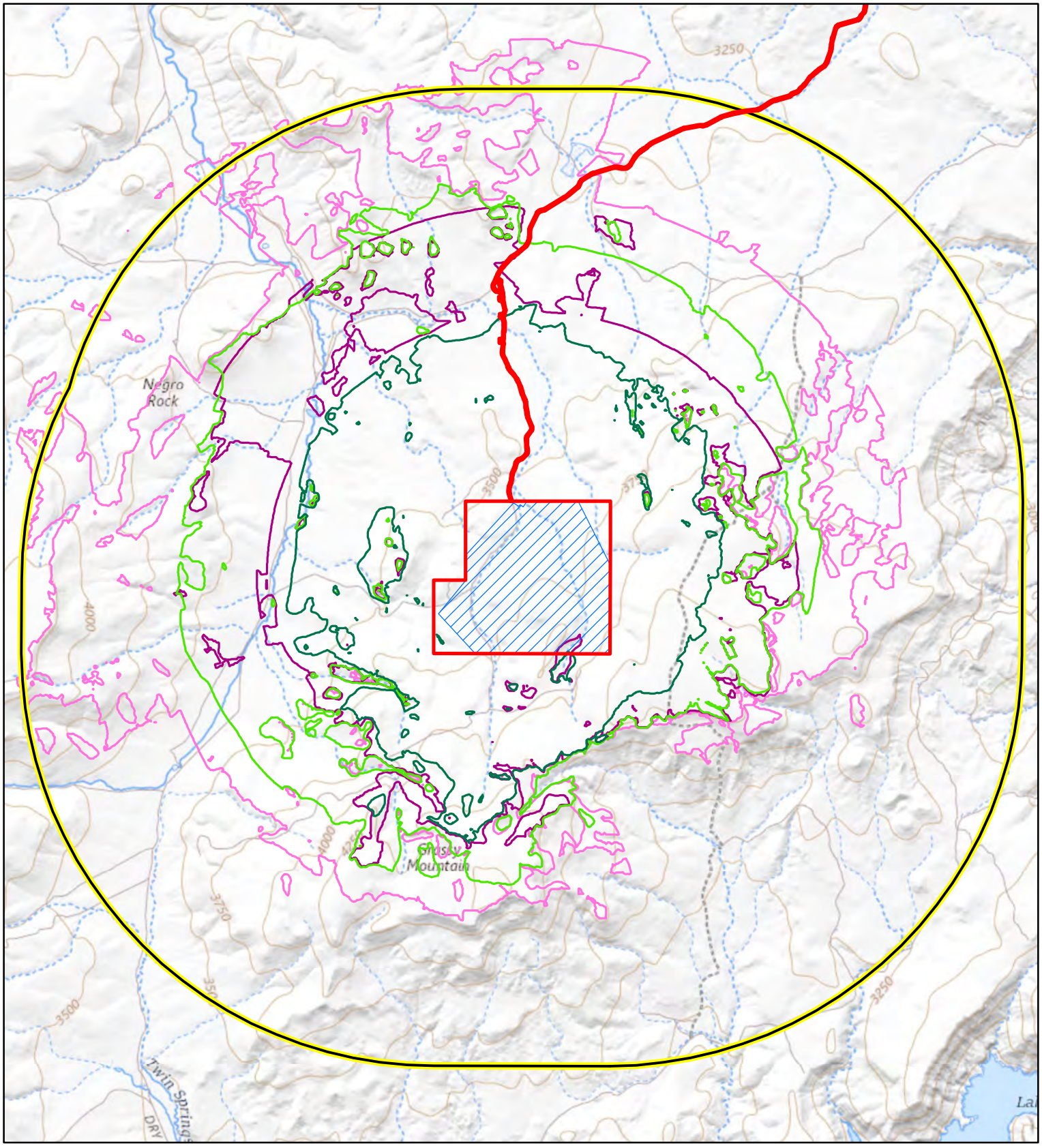
MASON, BRUCE & GIRARD

Source: Basemap from ESRI; PSA from SLR; Habitat data from ODFW. Reproduced for informational purposes and may not be suitable for legal, engineering, or surveying purposes. Conclusions drawn from such information are the responsibility of the user.

N

0 0.5 1 2 Miles

Calico Grassy Mountain Mine
Malheur County, Oregon



Noise Disturbance Figure

Project Study Area
Fence Perimeter
Fence Perimeter 5 km Buffer
Construction 25 dBA
Construction 30 dBA
Operations 25 dBA
Operations 30 dBA

MB&G

Source: Basemap from USGS; noise data from BKL; project area and fence perimeter from SLR. Reproduced for informational purposes and may not be suitable for legal, engineering, or surveying purposes. Conclusions drawn from such information are the responsibility of the user.

N

0 0.25 0.5 1 Miles

Grassy Mountain Mine Project
Malheur County, Oregon

APPENDIX B

Terrestrial Vegetation Report

CALICO RESOURCES USA CORP.
GRASSY MOUNTAIN MINE PROJECT
MALHEUR COUNTY, OREGON

TERRESTRIAL VEGETATION BASELINE REPORT

JANUARY 2018
REVISED OCTOBER 2018
REVISED OCTOBER 2020

Prepared for:

Calico Resources USA Corp.
665 Anderson Street
Winnemucca, Nevada 89445

Prepared by:

Reno:
1650 Meadow Wood Lane
Reno, Nevada 89502
Phone: (775) 826-8822 | Fax: (775) 826-8857

Elko:
835 Railroad Street
Elko, Nevada 89801
Phone: (775) 753-9496 | Fax: (775) 826-8857

CALICO RESOURCES USA CORP.
GRASSY MOUNTAIN MINE PROJECT
TERRESTRIAL VEGETATION BASELINE REPORT

TABLE OF CONTENTS

1 INTRODUCTION 1
2 RESOURCE STUDY AREA 1
3 REGULATORY FRAMEWORK 4
3.1 Federal 4
3.1.1 Noxious Weeds 4
3.1.2 United States Fish and Wildlife Service 6
3.1.3 Bureau of Land Management 6
3.2 State 7
3.2.1 Oregon Administrative Rules 7
3.2.2 Oregon Endangered Species Act 7
4 STUDY METHODOLOGY 8
4.1 Literature Review 8
4.2 Field Studies 8
4.2.1 Vegetation Attributes 8
5 BASELINE CHARACTERIZATION 10
5.1 Plant Community Description 10
5.1.1 CEGL001009 Wyoming Big Sagebrush/Bluebunch Wheatgrass Shrubland Alliance 11
5.1.2 CEGL003019 Cheatgrass Ruderal Grassland Association 12
5.1.3 A4148 Crested Wheatgrass Western Ruderal Perennial Grassland Alliance. 12
5.1.4 CEGL005477 Wyoming Big Sagebrush/Cheatgrass Ruderal Shrubland Association 12
5.1.5 A1262 Indian Ricegrass-Bluebunch Wheatgrass-Sandhill Muhly Grassland Alliance 12
5.1.6 CEGL005594 Yellow Rabbitbrush/Bluebunch Wheatgrass Shrubland Association 13
5.1.7 CGR019 Vegetable Crop Cultural Group 13
5.2 Vegetation Transects 13
5.2.1 Transect 1 13
5.2.2 Transect 2 14
5.2.3 Transect 3 14
5.3 Daubenmire Sampling Results 15
5.3.1 Daubenmire 1 – Cheatgrass Ruderal Grassland Association 15
5.3.2 Daubenmire 2 – Cheatgrass Ruderal Grassland Association 15
5.3.3 Daubenmire 3 – Yellow Rabbitbrush/Bluebunch Wheatgrass Shrubland Association 16
5.3.4 Daubenmire 4 – Wyoming Big Sagebrush/Bluebunch Wheatgrass Shrubland Alliance 16
5.3.5 Daubenmire 5 – Wyoming Big Sagebrush/Bluebunch Wheatgrass Shrubland Alliance 17
5.3.6 Daubenmire 6 – Crested Wheatgrass Western Ruderal Perennial Grassland Alliance 18

5.3.7 Daubenmire 7 – Cheatgrass Ruderal Grassland Association 18
5.4 Special Status Plant Species 19
5.4.1 Threatened and Endangered Species 19
5.4.2 BLM Sensitive Species 19
5.5 Noxious Weed Species 21
5.6 Description of Competing Land Uses 21
5.7 Revegetation and Reclamation Considerations and Opportunities 21
6 BIBLIOGRAPHY 22
7 CONTACTS 23
8 LIST OF PREPARERS 23

LIST OF TABLES

Table 1: National Vegetation Classification of Plant Communities in the Permit Area ... 11
Table 2: Transect 1 - Wyoming Big Sagebrush/Bluebunch Wheatgrass Shrubland Alliance 14
Table 3: Transect 2 - Crested Wheatgrass Western Ruderal Perennial Grassland Alliance 14
Table 4: Transect 3 – Cheatgrass Ruderal Grassland Association 14
Table 5: Daubenmire 1 - Cheatgrass Ruderal Grassland Association 15
Table 6: Daubenmire 2 – Cheatgrass Ruderal Grassland Association 16
Table 7: Daubenmire 3 – Yellow Rabbitbrush/Bluebunch Wheatgrass Shrubland Association 16
Table 8: Daubenmire 4 – Wyoming Big Sagebrush/Bluebunch Wheatgrass Shrubland Alliance 17
Table 9: Daubenmire 5 – Wyoming Big Sagebrush/Bluebunch Wheatgrass Shrubland Alliance 17
Table 10: Daubenmire 6 – Crested Wheatgrass Western Ruderal Perennial Grassland Alliance 18
Table 11: Daubenmire 7 – Cheatgrass Ruderal Grassland Association 18
Table 12: Preliminary Reclamation Seed Mixture 22

LIST OF FIGURES

Figure 1: Location Map 2
Figure 2: Permit Area Map 3
Figure 3: Terrestrial Vegetation Study Area and Survey Areas 5
Figure 4: Field-Verified Vegetation Communities and Daubenmire and Plot Transect Locations 9
Figure 5: ORBIC Sensitive Species Data (Confidential – submitted separately) 20

LIST OF APPENDICES

Appendix A: **BLM State of Oregon Sensitive Plant Species List**
Appendix B: **Photographic Log**
Appendix C: **Malheur County Noxious Weed Species List**
Appendix D: **Comprehensive Plant Species List for the Study Area**
Appendix E: **2017 Vegetation Field Sampling Forms**
Appendix F: **USFWS IPaC Consultation Letter**
Appendix G: **ORBIC Data Response (Confidential – submitted separately)**

LIST OF ATTACHMENTS

Attachment A: **Draft Terrestrial Vegetation Baseline Study, May 2014; and Draft Terrestrial Vegetation Baseline Study Addendum #1, July 2015 by HDR Engineering, Inc.**
Attachment B: **Sagebrush Identification Test for the Grassy Mountain Mine Project; Malheur County, Oregon, Memo from EM Strategies to DOGAMI, dated October 2, 2018**
Attachment C: **Botanical Survey & Vegetation Community Mapping Report, Grassy Mountain Mine Project, Malheur County, Oregon; June 2019**

LIST OF ABBREVIATIONS AND ACRONYMS

amsl	above mean sea level
BLM	Bureau of Land Management
cm	centimeter
DOGAMI	Department of Geology and Mineral Industries
EMS	EM Strategies, Inc.
ESA	Endangered Species Act of 1972 as Amended
GPS	Global Positioning System
HDR	HDR Engineering, Inc.
IPaC	Information for Planning and Consultation
N	North
OAR	Oregon Administrative Rules
ODA	Oregon Department of Agriculture
ODFW	Oregon Department of Fish and Wildlife
ORBIC	Oregon Biodiversity Information Center
ORS	Oregon Revised Statutes
Project	Grassy Mountain Mine Project
TES	Threatened, Endangered, and Sensitive Species
USFWS	United States Fish and Wildlife Service
W	West

CALICO RESOURCES USA CORP.
GRASSY MOUNTAIN MINE PROJECT
TERRESTRIAL VEGETATION BASELINE REPORT

1 INTRODUCTION

The purpose of this terrestrial vegetation baseline study is to characterize existing conditions prior to the start of proposed mining operations at the Grassy Mountain Mine Project (Project), located in Malheur County, Oregon. This study characterizes the terrestrial vegetation communities, including species diversity; presence or absence of federally-listed threatened, endangered and sensitive (TES) species; presence or absence of Oregon and Bureau of Land Management (BLM) sensitive species; and presence of noxious weeds.

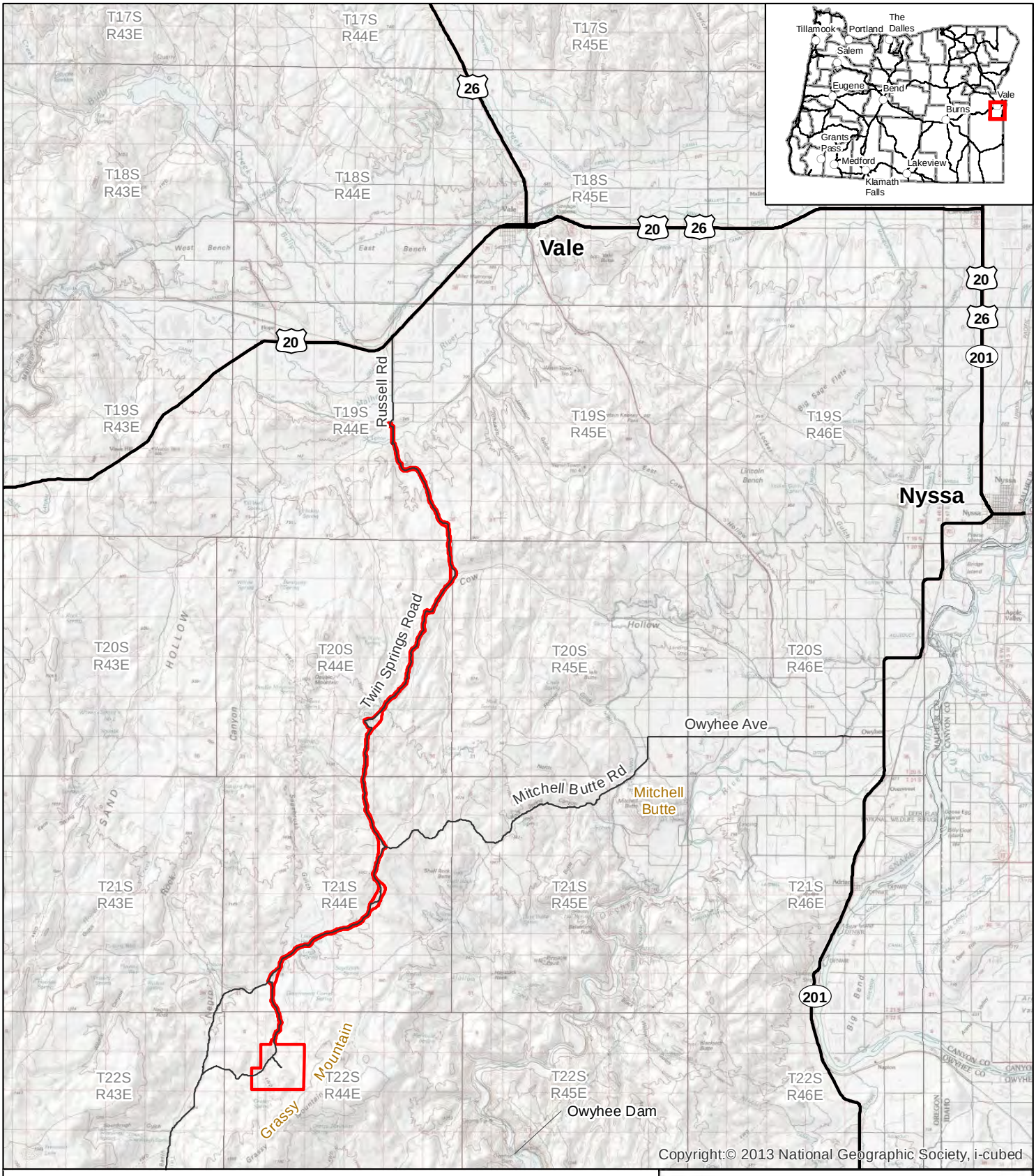
This terrestrial vegetation baseline study has been prepared to meet the following objectives:

- Clearly describe accepted field procedures, methodologies, and documentation requirements needed to characterize existing vegetation baseline conditions at the mine site and road access corridor, as well as the regional setting, as it relates to the predominant terrestrial vegetation communities.
- Describe methodology to inventory vegetation.
- Identify other current land uses which could affect the condition of existing terrestrial vegetation resources at the site (i.e., grazing).
- Survey and record potential threatened, endangered, candidate and sensitive plant species within the permit area.
- Survey for noxious weeds that occur in the permit area.
- Make recommendations for natural revegetation, wildlife habitat restoration, and reclamation at the end of the potential mine life.

A portion of the text and data used in this report has been incorporated from the July 2012 Draft Terrestrial Vegetation Report; May 2014 *Draft Terrestrial Vegetation Baseline Study* and the July 2015 *Draft Terrestrial Vegetation Baseline Study Addendum #1* prepared for the Project by HDR Engineering, Inc. (HDR), for previously surveyed areas in the current permit area; however, most of this report documents new survey results from a 2017 survey that occurred from a revision to the permit area. The 2012, 2014, and 2015 HDR reports are included as Attachment A. Based on comments received on the January 2018 version of this report from the Oregon Department of Fish and Wildlife (ODFW) and the Oregon Department of Geology and Mineral Industries (DOGAMI), plant collection of sagebrush in the area was conducted on September 18, 2018, and testing occurred on September 19, 2018. The methodology and results of this testing are described in a technical memorandum and included as Attachment B to this report.

2 RESOURCE STUDY AREA

The Project is located in Malheur County, Oregon, approximately 22 miles south-southwest of Vale (Figure 1) and consists of two areas: the Mine and Process Area, and the Access Road Area (Permit Area) (Figure 2).



Explanation

- Permit Area
- Existing Road

Projection: UTM Zone 11 North, NAD83, meters

0 5,000 10,000 Feet

0 1 2 Miles

N

CALICO RESOURCES USA CORP.

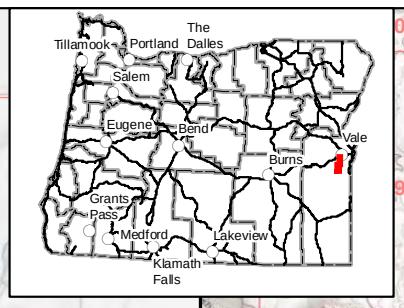
GRASSY MOUNTAIN MINE PROJECT

Location Map

Figure 1

Date:	12/19/2017	Drawn By:	JDB
Revised:		Project No.:	3672
Base Map:	USGS 100K quads: Boise, Brogan, Vale, Weiser		
File Name:	3672G_GrassyMtn_BL__Fig01_Location.mxd		

EM STRATEGIES



Russell Road

Twin Springs Road

Match Line

T19S R44E

T20S R44E

T21S R44E

T20S R45E

T22S R44E

Copyright:© 2013 National Geographic Society, i-cubed

Copyright:© 2013 National Geographic Society, i-cubed

Explanation

- Permit Area
- Mine and Process Area
- Access Road Area
- Patented Lode Claims
- Proposed Access Road
- Possible Road Realignment

Projection: UTM Zone 11 North, NAD83, meters

0 2,000 4,000 6,000 8,000 10,000 Feet

0 1 2 Miles

N

CALICO RESOURCES USA CORP.

GRASSY MOUNTAIN MINE PROJECT

Permit Area Map

Figure 2

Date:	12/19/2017	Drawn By:	JDB
Revised:		Project No.:	3672
Base Map:	USGS 7.5' quads: Double Mountain, Grassy Mountain, Kane Spring Gulch, Sourdough Spring, Vale West		
File Name:	3672G_GrassyMtn_BL__Fig02_PermitArea.mxd		

EM STRATEGIES

The Mine and Process Area is located on three patented lode mining claims and unpatented lode mining claims that cover an estimated 886 acres. These patented and unpatented lode mining claims are part of a larger land position that includes 419 unpatented lode mining claims and nine mill site claims on lands administered by the BLM (Figure 2). All proposed mining would occur on the patented claims, with some mine facilities on unpatented claims. The Mine and Process Area is in all or portions of Sections 5 through 8, Township 22 South, Range 44 East (T22S, R44E) (Willamette Meridian).

The Access Road Area is located on public land administered by the BLM, and private land controlled by others (Figure 2). A portion of the Access Road Area is a Malheur County Road named Twin Springs Road. The Access Road Area extends north from the Mine and Process Area to Russell Road, a paved Malheur County Road. The Access Road Area is in portions of Section 5, T22S, R44E, Sections 3, 10, 11, 14, 15, 21 through 23, 28, 29, and 32, T21S, R44E, Sections 1, 12 through 14, 23, 26, 27, and 34, T20S, R44E, Sections 6 and 7, T20S, R45E, and Sections 22, 23, 26, 35, and 36, T19S, R44E (Willamette Meridian). The width of the Access Road Area is 300 feet (150 feet on either side of the access road centerline) to accommodate possible minor widening or re-routing, and a potential powerline adjacent to the access road. There are several areas shown that are significantly wider than 300 feet on the Permit Area Map (Figure 2), which are areas where the final alignment has not yet been determined. The final engineering of the road will be consistent throughout, and within the Permit Area. The Access Road Area also includes a buffer on either side of the proposed road width for the collection of environmental baseline data. The road corridor will be 40 feet wide, which includes a 24-foot wide road travel width (12 feet on either side of the road centerline), four-foot wide shoulders on each side of the road, minimum one-foot wide ditches on each side of the road, and appropriate cut and fill. The Access Road Area totals approximately 876 acres.

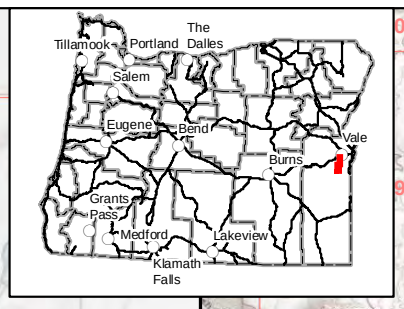
Vegetation has been previously characterized by HDR in the July 2012 report, the May 2014 baseline study, and the July 2015 addendum for portions of the Mine and Process Area and the Access Road Area that are within the current Permit Area (HDR 2012/2014/2015 Survey Area). The 2017 Vegetation Survey Area (2017 Survey Area) is limited to a total of approximately 415 acres in the Mine and Process Area and Access Road Area that were not previously studied and characterized. The two survey areas combined are the Terrestrial Vegetation Study Area (Study Area) (Figure 3).

3 REGULATORY FRAMEWORK

3.1 Federal

3.1.1 Noxious Weeds

The Federal Noxious Weed Act of 1974 (7 U.S.C. 2801-2813) as amended by Sec. 15, Management of Undesirable Plants on Federal Lands 1990 requires that each Federal Agency: 1) designate a lead office and person trained in the management of undesirable plants; 2) establish and fund an undesirable plant management program; 3) complete and implement cooperative agreements with State agencies; and 4) establish integrated management systems to control undesirable plant species.



Russell Road

Match Line

T19S R44E

T20S R44E

T21S R44E

T22S R44E

T20S R45E

Copyright:© 2013 National Geographic Society, i-cubed

Copyright:© 2013 National Geographic Society, i-cubed

Explanation

- Permit Area
- Terrestrial Vegetation Study Area
- 2017 Survey Area
- HDR 2014/2015 Survey Area

Projection: UTM Zone 11 North, NAD83, meters

0 2,000 4,000 6,000 8,000 10,000 Feet

0 1 2 Miles

N

CALICO RESOURCES USA CORP.

GRASSY MOUNTAIN MINE PROJECT

Terrestrial Vegetation Study Area and Survey Areas

Figure 3

Date:	12/19/2017	Drawn By:	JDB
Revised:		Project No.:	3678
Base Map:	USGS 7.5' quads: Double Mountain, Grassy Mountain, Kane Spring Gulch, Sourdough Spring, Vale West		
File Name:	3678G_GrassyMtn_BL_V_Fig03_StudyAreas.mxd		

EM STRATEGIES

The BLM defines a noxious weed as "any plant designated by a federal, state or county government as injurious to public health, agriculture, recreation, wildlife or property," and "invasive plants include not only noxious weeds, but also other plants that are not native to this country or to the area where they are growing" (BLM 2017). BLM Manual 9011 (*Chemical Pest Control*) (BLM 2007), BLM Handbook H-9011-1 (*Chemical Pest Control*) (BLM 1994), and BLM Manual 9014 (*Control Use of Biological Control Agents of Pests on Public Lands*) (BLM 1990) provide policy for the planning and implementation of biological controls within an integrated pest management program. These policies further require that all ground disturbing projects are evaluated to determine the risk of introducing or spreading noxious weeds.

3.1.2 United States Fish and Wildlife Service

The United States Fish and Wildlife Service (USFWS) is responsible for administering and implementing the Endangered Species Act of 1972 as Amended (ESA) to conserve, protect, and recover federally-listed species.

3.1.3 Bureau of Land Management

The BLM's policy for management of special status species is in the BLM Manual Section 6840 (*Special Status Species Management*) (BLM 2008). Special status species include the following:

- Federally-listed Threatened or Endangered Species: Any species the USFWS has listed as an endangered or threatened species under the ESA throughout all or a significant portion of its range;
- Proposed Threatened or Endangered Species: Any species the USFWS has proposed for listing as a federally endangered or threatened species under the ESA;
- Candidate Species: Plant and animal taxa under consideration for possible listing as threatened or endangered under the ESA;
- Delisted Species: Any species in the five years following their delisting;
- BLM Sensitive Species: Species designated as Sensitive by the BLM State Director because they meet the following criteria: Native species found on BLM-administered lands for which the BLM has the capability to significantly affect the conservation status of the species through management, and either: 1) there is information that a species has undergone, is undergoing, or is predicted to undergo a downward trend such that the viability of the species or a distinct population segment of the species is at risk across all or a significant portion of the species range; or 2) the species depends on ecological refugia or specialized or unique habitats on BLM-administered lands, and there is evidence that such areas are threatened with alteration such that the continued viability of the species in that area would be at risk (BLM 2008); and
- State of Oregon Listed Species: State-protected plants and animals that have been determined to meet interagency policy IM-OR-2015-028, "Criteria for determining FS R6 and OR/WA BLM Sensitive and Strategic Species July 13, 2015".

It is BLM policy to provide sensitive species with the same level of protection that is given to federal candidate species. The major objective of this protection is to preclude the need for federal listing. The BLM resource management plans provide management direction for the many multiple

uses, including outdoor recreation, range, timber, watershed, fish and wildlife, minerals, wilderness, and cultural resources. A total of 139 plant species are considered special status for the Vale District of the BLM (Appendix A).

3.2 State

3.2.1 Oregon Administrative Rules

The environmental baseline data methodology for terrestrial vegetation resources was prepared to meet the requirements of Oregon Administrative Rules (OAR) 632-037-0055, 632-037-0040 and OAR 635, Division 420.

OAR 632, Division 037, Section 0130 Reclamation and Mine Closure Standards that pertain to revegetation include the following:

- Surface reclamation of a chemical process mine shall require certification by ODFW and the Oregon Department of Agriculture (ODA) that a self-sustaining ecosystem, comparable to undamaged ecosystems in the area, has been established to satisfy the permittee's habitat restoration obligations;

- Native species shall be established unless the use of non-native species is justified and approved by the technical review team;

- Seed mixtures, fertilizer rates, and other requirements will be derived from departmental experience and advice from such sources as ODA, Natural Resources Conservation Service (formerly U.S. Soil Conservation Service), Oregon State University Extension Service, the Oregon Department of Transportation, BLM, United States Forest Service, local soil conservation districts, and private sector experts;

- Establishment of a self-sustaining ecosystem, comparable to undamaged ecosystems in the area of the mine;

- Revegetation shall be considered successful if it is consistent with the establishment of a self-sustaining ecosystem, comparable to undamaged ecosystems in the area of the mine; and

- Vegetation test plots and chemical/physical soil and subsoil analysis may be required to insure establishment feasibility.

OAR 635, Division 420 rules prescribe the standards for the ODFW to review proposed chemical process mining operations for developing conditions for protection of wildlife and their habitat, to further the Wildlife Policy (Oregon Revised Statutes [ORS] 496.012 and Food Fish Management Policy (ORS 506.109) of the State of Oregon.

3.2.2 Oregon Endangered Species Act

The Oregon Department of Agriculture states the following:

> *Native plants that are listed as threatened or endangered in Oregon are protected on all non-federal public lands (state, county, city, etc.) under the Oregon Revised Statute (ORS)*

564, commonly known as the Oregon Endangered Species Act. The Oregon Department of Agriculture is given the responsibility for conservation of native plants under the Oregon Administrative Rules (OAR) 603-073-0001. These rules outline the list of activities that require a listed plant permit in Oregon.

4 STUDY METHODOLOGY

The protocols for the field studies were established in the *Environmental Baseline Study Work Plans* (EM Strategies, Inc. [EMS] 2017). The survey methodologies as they were applied in the field are summarized in this section.

4.1 Literature Review

A portion of the baseline characterization outlined in this report has been incorporated from the June 2012, May 2013, May 2014, and July 2015 HDR reports (Attachment A). Prior to initiating the 2017 field surveys, the results of the literature review in the HDR reports were reviewed, and updated information on special status species occurrences was requested from the Oregon Biodiversity Information Center (ORBIC) and the USFWS. An updated list of Sensitive Species was requested from the BLM. A current list of noxious weeds for Malheur County, Oregon, was also obtained from the Malheur County Weed Advisory Board website.

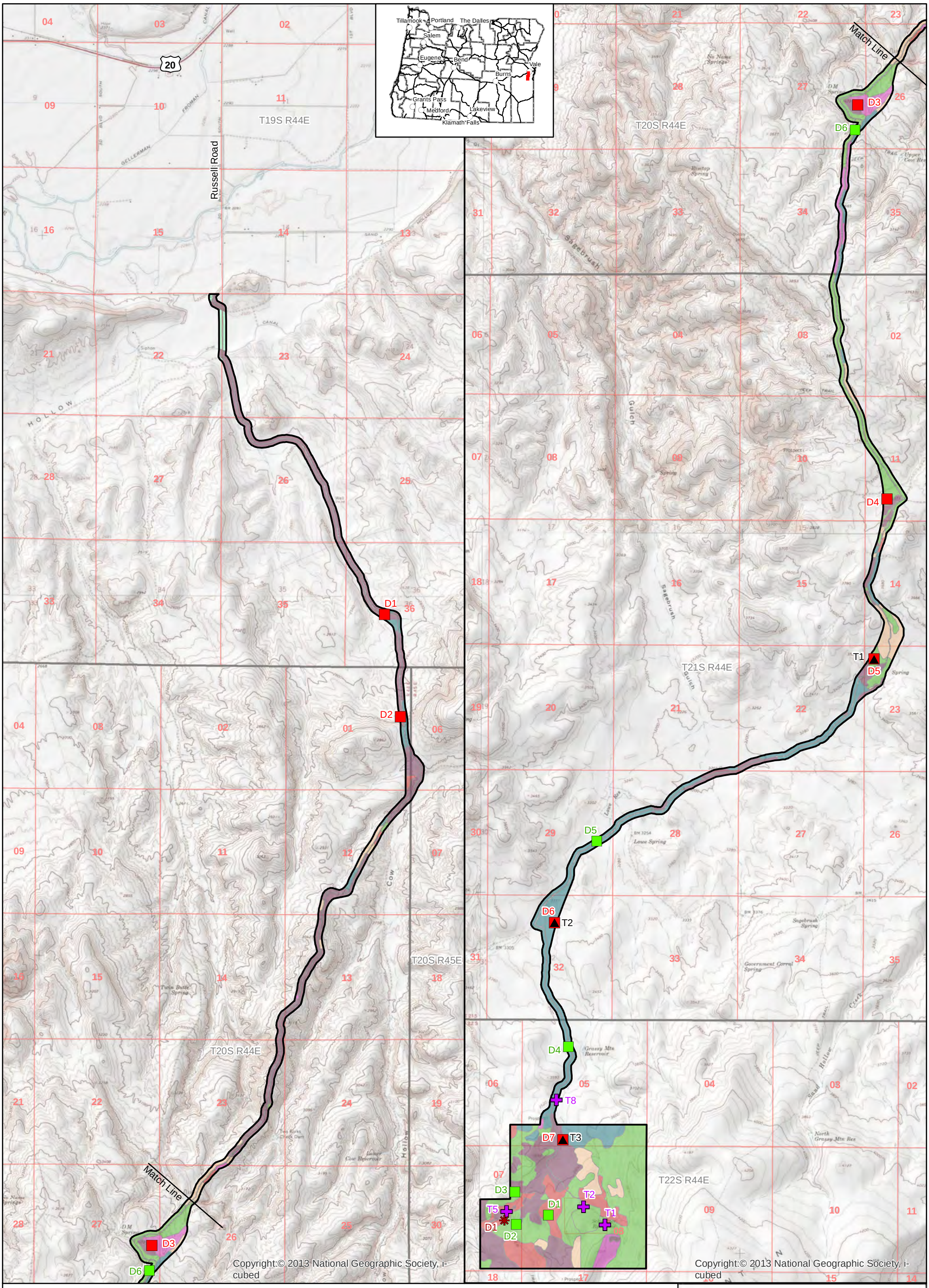
4.2 Field Studies

The 2017 vegetation survey was conducted over a three-day period from May 20 to May 22, 2017. The tasks performed during the survey were the same as those performed in the 2012, 2013, 2014, and 2015 surveys conducted by HDR. Based on comments received on the January 2018 version of this report from ODFW and DOGAMI, plant collection of sagebrush in the area was conducted on September 18, 2018, and testing occurred on September 19, 2018. The methodology and results of this testing are described in a technical memorandum and included as Attachment B to this report.

In 2019, Siskiyou BioSurvey LLC (Siskiyou) performed a botanical survey and vegetation community mapping of both the Mine and Process Area and the Access Road Area (Attachment C). This report was reviewed by the BLM in the spring of 2020, and those comments have been incorporated into this report.

4.2.1 Vegetation Attributes

The Daubenmire method for sampling vegetation attributes consisted of systematically placing a 20-centimeter (cm) by 50-cm quadrant frame at 50 points along a 100-foot measuring tape and determining vegetation characteristics of canopy cover, frequency, and composition by canopy cover. The information collected in the field was recorded on standardized Daubenmire field forms. Seven Daubenmire transects were sampled (Figure 4). Global Positioning System (GPS) and photo points were established at each of the transects (Appendix B).



Explanation

- Permit Area
- Transect Location (2017)
- Daubenmire Location (2017)
- Daubenmire Location (2015, HDR)
- Daubenmire Location (2014, HDR)
- Transect Location (2014, HDR)

- A1262 Indian Ricegrass-Bluebunch Wheatgrass-Sandhill Muhly Grassland Alliance
- A4148 Crested Wheatgrass Western Ruderal Perennial Grassland Alliance
- CEGL001009 Wyoming Big Sagebrush/Bluebunch Wheatgrass Shrubland Alliance
- CEGL003019 Cheatgrass Ruderal Grassland Association
- CEGL005477 Wyoming Big Sagebrush/Cheatgrass Ruderal Shrubland Association
- CEGL005594 Yellow Rabbitbrush/Bluebunch Wheatgrass Shrubland Association
- CGR019 Vegetable Crop Cultural Group

0 2,000 4,000 6,000 8,000 10,000 Feet

0 1 2 Miles

N

Projection: UTM Zone 11 North, NAD83, meters

CALICO RESOURCES USA CORP.

GRASSY MOUNTAIN MINE PROJECT

Field-Verified Vegetation Communities and Daubenmire and Plot Transect Locations

Figure 4

Date:	10/12/2020	Drawn By:	JDB
Revised:		Project No.:	3678
Base Map:	USGS 7.5' quads: Double Mountain, Grassy Mountain, Kane Spring Gulch, Sourdough Spring, Vale West		
File Name:	3678G_GrassyMtn_BL_V_Fig04_Transects.mxd		

EM STRATEGIES

In addition, three ten-foot wide by ten-foot long vegetation plots were sampled to determine primary vegetation composition within three vegetation communities for the Mine and Process Area and the Access Road Area (Figure 4). GPS and photo points were established at each plot (Appendix B). Plants were classified by growth form (shrub, forb, grass), identified, and counted. Dominant and co-dominant species were identified.

4.2.1.1 Special Status Species

A survey was conducted within suitable habitat for any plant species with protected status; specifically, federally-listed or State-listed threatened or endangered species, and BLM Sensitive species.

4.2.1.2 Noxious Weeds

A list of noxious weeds for Malheur County, Oregon, was obtained from the Malheur County Weed Advisory Board website (Appendix C). Malheur County has prioritized control and/or eradication of noxious weeds by A, B, and C classes, with category A having the highest priority. A noxious weed inventory is the basis for the development of the Project's noxious weed control strategy and plan, which are key components of the overall plan of operations and part of the Division 37 process.

5 BASELINE CHARACTERIZATION

5.1 Plant Community Description

HDR performed vegetation community mapping in 2012, 2014, and 2015 within portions of the current Permit Area, and identified three vegetation communities: annual grass; crested wheatgrass/annual grass; and sagebrush/bunchgrass. The 2017 baseline survey performed by EMS identified two additional plant communities in areas that were not previously surveyed within the revised Permit Area: Wyoming big sagebrush/crested wheatgrass and burned yellow rabbitbrush/bluebunch wheatgrass (Figure 4). The 2019 survey performed by Siskiyou identified four additional plant communities, for a total of nine plant communities. A floral compendium is included in Appendix D. Based on the US National Vegetation Classification (USNVC 2019), these nine plant communities fall into five Groups, six Alliances, and four Associations (Table 1). These are described below.

Approximately 0.3 mile of the northern portion of the Access Road Area, or 11 acres, is irrigated agricultural row crops; these areas were not evaluated during the vegetation survey. Most of the vegetation within the Study Area is a desert-rangeland type where sagebrush and grasses are the dominant species. A large portion of the area has been impacted by grazing, fire, and range seeding programs. Cheatgrass (*Bromus tectorum*) was one of the dominant species in every plant community, likely due to disturbance from grazing and wildfire. Cattle and sheep were observed grazing at several locations within the 2017 Survey Area. Most grass species were fully emerged and spring flowering forb species were in peak bloom.

Table 1: National Vegetation Classification of Plant Communities in the Permit Area

2019 Plant Communities	Group	Alliance	Association
1. Bluebunch Wheatgrass/Cheatgrass/ Annual-Perennial Community	G311 Intermountain Semi-Desert Grassland Group	A1262 Indian Ricegrass-Bluebunch Wheatgrass-Sandhill Muhly Grassland Alliance	--
2. Crested Wheatgrass Seeded Community	G600 Great Basin-Intermountain Ruderal Dry Shrubland and Grassland Group	A4148 Crested Wheatgrass Western Ruderal Perennial Grassland Alliance	--
3. Big Sagebrush/Crested Wheatgrass Community	G600 Great Basin-Intermountain Ruderal Dry Shrubland and Grassland Group	A4148 Crested Wheatgrass Western Ruderal Perennial Grassland Alliance	--
4. Yellow Rabbitbrush/Bluebunch Wheatgrass Community	G310 Intermountain Semi-Desert Steppe and Shrubland Group	A3195 Yellow Rabbitbrush Steppe and Shrubland Alliance	CEGL005594 Yellow Rabbitbrush/Bluebunch Wheatgrass Shrubland Association
5. Big Sagebrush/Bluebunch Wheatgrass Community	G302 Intermountain Mesic Tall Sagebrush Steppe and Shrubland Group	A3182 Wyoming Big Sagebrush Mesic Steppe and Shrubland Alliance	CEGL001009 Wyoming Big Sagebrush/Bluebunch Wheatgrass Shrubland Association
6. Annual Weedy Grass-Forb Community	G600 Great Basin-Intermountain Ruderal Dry Shrubland and Grassland Group	A1814 Cheatgrass - Medusa-head Ruderal Annual Grassland Alliance	CEGL003019 Cheatgrass Ruderal Grassland Association
7. Big Sagebrush/Weedy Annual Grass-Forb Community	G600 Great Basin-Intermountain Ruderal Dry Shrubland and Grassland Group	A4213 Great Basin-Intermountain Ruderal Understory Shrubland Alliance	CEGL005477 Wyoming Big Sagebrush/Cheatgrass Ruderal Shrubland Association
8. Mixed Annual Weedy Grass-Forb/Native Bunch Grass Community	G600 Great Basin-Intermountain Ruderal Dry Shrubland and Grassland Group	A1814 Cheatgrass - Medusa-head Ruderal Annual Grassland Alliance	CEGL003019 Cheatgrass Ruderal Grassland Association
9. Irrigated Pasture/Agricultural Crop Plant Community	CGR019 Vegetable Crop Cultural Group	--	--

5.1.1 CEGL001009 Wyoming Big Sagebrush/Bluebunch Wheatgrass Shrubland Alliance

The Wyoming Big Sagebrush (*Artemisia tridentata* ssp. *wyomingensis*)/Bluebunch Wheatgrass (*Pseudoroegneria spicata*) Shrubland Alliance occurs throughout the two survey units, covering 571.5 acres of the Permit Area. This Alliance is dominated by a sparse to moderate cover of Wyoming big sagebrush, and a low to moderate cover of bluebunch wheatgrass. This plant community may include other native bunch grass and forb species, including tapertip crepis (*Crepis acuminata*), showy penstemon (*Penstemon speciosus*), Cusick's beardtongue (*P. cusickii*), death camas (*Toxicoscordion venenosum* var. *venenosum*), Sandberg bluegrass (*Poa secunda*), squirreltail (*Elymus elymoides*), Indian ricegrass (*Achnatherum hymenoides*), and needle and thread grass *(Hesperostipa comata* subsp. *comata*). Included in this community type is a less common sub-type consisting of scattered areas of Basin big sagebrush (*Artemisia tridentata* var.

tridentata) with a high native forb cover and a lower bunchgrass cover. Additional forbs include Modoc hawksbeard (*Crepis modocensis*), several species of milkvetch (*Astragalus* spp.), Gray's buscuitroot (*Lomatium grayi*), and whitestem blazingstar (*Mentzelia albicaulis*).

5.1.2 CEGL003019 Cheatgrass Ruderal Grassland Association

The Cheatgrass Ruderal Grassland Association represents a highly disturbed, weedy, non-native dominated vegetation type that covers 508.3 acres of the Permit Area. It occurs along the Access Road Area, and as smaller patches in the Mine and Process Area. Extensive areas occur in the far north on private rangeland ownership. Common grasses observed in this Association include cheatgrass and Sandberg bluegrass; common forbs include blue mustard (*Chorispora tenella*), western tansymustard (*Descurainia pinnata)*, desert madwort (*Allysum desertorum*), and tall tumblemustard (*Sisymbrium altissimum*). In addition, scattered to extensive patches of the noxious weeds Scotch thistle *(Onopordom acanthium*), burningbush (*Kochia scoparia*), and rush skeleton weed (*Chondrilla juncea*) were observed. Some native grasses are present in this Association; common species include squirreltail, Indian ricegrass, needle and thread grass, Idaho fescue (*Festuca idahoensis*), and occasional bluebunch wheatgrass. Areas with extensive medusahead grass (*Taeniatherum caput-medusae*) infestations do not occur as commonly as in the private rangeland ownership and are more extensive in the Mine and Process Area.

5.1.3 A4148 Crested Wheatgrass Western Ruderal Perennial Grassland Alliance

The Crested Wheatgrass Western Ruderal Perennial Grassland Alliance occurs in both the Mine and Process Area and the Access Road Area, covering a total of 283.4 acres. This Alliance represents a non-native vegetation type where non-native restoration seeding followed rangeland fires. Crested wheatgrass (*Agropyron cristatum*) is dominant, with cheatgrass and Sandberg bluegrass very common and often with high total cover. Native grasses and forbs are uncommon and bare soil ranges from scattered to larger openings. This community also includes a less weedy sub-type with scattered native grass species recovering, including squirreltail, Indian ricegrass, and occasional bluebunch wheatgrass. Scattered areas of Wyoming sagebrush occur in the northern region of the Mine and Process Area and throughout the Access Road Area. Included in this mapped community is a sub-type where Wyoming big sagebrush drops out and yellow rabbitbrush (*Chrysothamus viscidiflorus*) co-occurs or dominates, as a scattered to low shrub cover.

5.1.4 CEGL005477 Wyoming Big Sagebrush/Cheatgrass Ruderal Shrubland Association

The Wyoming Big Sagebrush/Cheatgrass Ruderal Shrubland Association is a disturbed native plant community type and occurs throughout the Permit Area, covering 138.4 acres. The Wyoming big sagebrush component indicates deeper soils and is an ecologically important component of native plant communities. However, the understory and openings within this Association are dominated by non-native annuals, including a moderate to heavy cover of cheatgrass, and scattered weedy forbs including tansymustard and clasping pepperweed (*Lepidium perfoliatum*); scattered to extensive areas of medusahead grass are common. Sandberg bluegrass may also be present.

5.1.5 A1262 Indian Ricegrass-Bluebunch Wheatgrass-Sandhill Muhly Grassland Alliance

The Indian Ricegrass-Bluebunch Wheatgrass-Sandhill Muhly Grassland Alliance occurs throughout the Permit Area, covering 118.5 acres. This Alliance is co-dominated by bluebunch wheatgrass and cheatgrass, and represents a relatively more native vegetation type, where native

perennial forbs and grasses are common. Common native species include tapertip crepis, showy penstemon, Cusick's beardtongue, Hooker's onion (*Allium acuminatum*), death camas, Sandberg bluegrass, squirreltail, and needle and thread grass. This Alliance also includes a weedier disturbed sub-type where cheatgrass and medusahead grass are co-dominant with the bluebunch wheatgrass, and/or non-native forbs are more common. This Alliance is most likely the result of shrub loss due to wildfire.

5.1.6 CEGL005594 Yellow Rabbitbrush/Bluebunch Wheatgrass Shrubland Association

The Yellow Rabbitbrush/Bluebunch Wheatgrass Shrubland Association covers 71.3 acres and is dominated by a sparse to moderate cover of yellow rabbitbrush with bluebunch wheatgrass in the understory. Also included in this mapped Association are areas where other native bunch grass species co-dominate with the bluebunch wheatgrass, including Sandberg bluegrass, squirreltail, needle and thread grass, and Indian ricegrass.

5.1.7 CGR019 Vegetable Crop Cultural Group

The Vegetable Crop Cultural Group occurs across 12 acres in the far northern Access Road Area on irrigated private agricultural cropped areas. This is a completely non-native converted plant Group. Annual crops dominate, and weedy species occur along fence lines and irrigation ditches. Common weedy species include tansymustard, burningbush, tall tumblemustard, and field bindweed (*Convolvulus arvense*).

5.2 Vegetation Transects

HDR (2012, 2014, 2015) established four transects within the current Permit Area in the Wyoming Big Sagebrush/Bluebunch Wheatgrass Shrubland Alliance. Three additional transects were established during the 2017 surveys in areas that were not previously surveyed within the revised Permit Area: one within the Wyoming Big Sagebrush/Bluebunch Wheatgrass Shrubland Alliance; one within the Crested Wheatgrass Western Ruderal Perennial Grassland Alliance; and one within the Cheatgrass Ruderal Grassland Association (Figure 4). The results of the surveys conducted by HDR are included in Attachment A. The results of the 2017 survey are discussed in Sections 5.2.1 to 5.2.3.

5.2.1 Transect 1

One ten-foot wide by ten-foot long transect was established on May 21, 2017, at North (N) 43.73541, West (W) 117.31324, in Section 23, T21S, R44E, adjacent to Daubenmire 5 (Figure 4). Transect 1 is located on a south-facing aspect with slopes ranging from four to 15 percent, within the Wyoming Big Sagebrush/Bluebunch Wheatgrass Shrubland Alliance. Approximately 70 percent of the slope is vegetated, 15 percent is bare ground, ten percent is litter, and five percent is rock. Information for Transect 1 is presented in Table 2. Photo Plate 6 (Appendix B) shows the characteristic vegetative cover surrounding Transect 1.

Table 2: Transect 1 - Wyoming Big Sagebrush/Bluebunch Wheatgrass Shrubland Alliance

Common Name	Scientific Name	Stem Count
Cheatgrass	*Bromus tectorum*	dominant
Bastard toadflax	*Commandra umbellata*	33
Prickly phlox	*Phlox hoodii*	13
Slimflower scurfpea	*Psoralidium tenuiflorum*	10
Bluebunch wheatgrass	*Pseudoroegneria spicata* ssp. *spicata*	6
Needle and thread	*Hesperostipa comata*	5
Tapertip hawksbeard	*Crepis acuminata*	2
Thistle	*Cirsium sp.*	1

5.2.2 Transect 2

One ten-foot wide by ten-foot long transect was established on May 21, 2017, at N 43.70473, W 117.36408, in Section 32, T21S, R44E, adjacent to Daubenmire 6 (Figure 4). Transect 2 is located on a north-facing aspect with a ten percent slope, within the Crested Wheatgrass Western Ruderal Perennial Grassland Alliance. Approximately 49 percent of the slope is vegetated, 40 percent is bare ground, ten percent is litter, and one percent is rock. Information for Transect 2 is presented in Table 3. Photo Plate 7 (Appendix B) shows the characteristic vegetative cover surrounding Transect 2.

Table 3: Transect 2 - Crested Wheatgrass Western Ruderal Perennial Grassland Alliance

Common Name	Scientific Name	Stem Count
Crested wheatgrass	*Agropyron cristatum*	33
Cheatgrass	*Bromus tectorum*	dominant
Curveseed butterwort	*Ceratocephala testiculata*	dominant
Gooseberryleaf globemallow	*Sphaeralcea grossulariifolia*	2
Small fescue	*Vulpia microstachys*	100

5.2.3 Transect 3

One ten-foot wide by ten-foot long transect was established on May 21, 2017, at N 43.67957, W 117.36263, in Section 5, T22S, R44E, adjacent to Daubenmire 7 (Figure 4). Transect 3 is located on a northwest-facing aspect with slopes ranging from five to six percent, within the Cheatgrass Ruderal Grassland Association. Approximately 75 percent of the slope is vegetated, 15 percent is rock, five percent is litter, and five percent is bare ground. Information for Transect 3 is presented in Table 4. Photo Plate 8 (Appendix B) shows the characteristic vegetative cover surrounding Transect 3.

Table 4: Transect 3 – Cheatgrass Ruderal Grassland Association

Common Name	Scientific Name	Stem Count
Cheatgrass	*Bromus tectorum*	dominant
Crested wheatgrass	*Agropyron cristatum*	47
Sandberg bluegrass	*Poa secunda*	32
Vetch	*Astragalus sp.*	1
Wyoming big sagebrush	*Artemisia tridentata* ssp. *wyomingensis*	1

5.3 Daubenmire Sampling Results

HDR (2012, 2014, 2015) established seven Daubenmire transects within the current Permit Area: three within the Wyoming Big Sagebrush/Bluebunch Wheatgrass Shrubland Alliance, two within the Crested Wheatgrass Western Ruderal Perennial Grassland Alliance, and two within the Wyoming Big Sagebrush/Cheatgrass Ruderal Shrubland Association. Seven additional Daubenmire transects were established during the 2017 survey in areas that were not previously surveyed within the revised Permit Area: three within the Cheatgrass Ruderal Grassland Association, two within the Wyoming Big Sagebrush/Bluebunch Wheatgrass Shrubland Alliance, one within the Yellow Rabbitbrush/Bluebunch Wheatgrass Shrubland Association, and one within the Crested Wheatgrass Western Ruderal Perennial Grassland Alliance (Figure 4). The results of the surveys conducted by HDR are included in Attachment A. The results of the 2017 survey are discussed in Sections 5.3.1 to 5.3.7.

5.3.1 Daubenmire 1 – Cheatgrass Ruderal Grassland Association

A Daubenmire vegetation survey was performed on May 20, 2017, at N 43.87277, W 117.27930, in Section 36, T19S, R44E (Figure 4). The sampling plot is located on BLM land within the Access Road Area within the Cheatgrass Ruderal Grassland Association. Information for Daubenmire 1 is presented in Table 5. Cheatgrass had the highest percentage of canopy cover, species composition, and frequency. Sandberg bluegrass also occurred at a high frequency within the 50 surveyed quadrats. Photo Plate 9 (Appendix B) shows Daubenmire 1. The completed survey form is included in Appendix E.

Table 5: Daubenmire 1 - Cheatgrass Ruderal Grassland Association

Plant Species	Percent Canopy Cover	Species Composition	Frequency
BRTE – *Bromus tectorum*	39	53	92
POSE – *Poa secunda*	33	45	90
SIAL – *Sisymbrium altissimum*	1	1.4	14
CANU – *Carduus nutans*	0.35	0.5	4
CETE5–*Ceratocephala testiculata*	0.05	0.07	2

5.3.2 Daubenmire 2 – Cheatgrass Ruderal Grassland Association

A Daubenmire vegetation survey was performed on May 20, 2017, at N 43.86094, W 117.27670, in Section 1, T20S, R44E (Figure 4). The sampling plot is located on BLM land within the Access Road Area within the Cheatgrass Ruderal Grassland Association. Information for Daubenmire 2 is presented in Table 6. Cheatgrass had the highest percentage of canopy cover, species composition, and frequency. Wyoming big sagebrush and Sandberg bluegrass also occurred at a high frequency within the 50 surveyed quadrats. Photo Plate 10 (Appendix B) shows Daubenmire 2. The completed survey form is included in Appendix E.

Table 6: Daubenmire 2 – Cheatgrass Ruderal Grassland Association

Plant Species	Percent Canopy Cover	Species Composition	Frequency
BRTE – *Bromus tectorum*	30	47	98
POSE – *Poa secunda*	21	33	76
PSSPS – *Pseudoroegneria spicata* ssp. *spicata*	4	6	36
ARTRW – *Artemisia tridentata* ssp. *wyomingensis*	8	13	34
CHVI – *Chrysothamnus viscidiflorus*	1	2	2
ERSP – *Eriastrum sparsiflorum*	1	2	2

5.3.3 Daubenmire 3 – Yellow Rabbitbrush/Bluebunch Wheatgrass Shrubland Association

A Daubenmire vegetation survey was performed on May 20, 2017, at N 43.79958, W 117.31617, in Section 1, T20S, R44E (Figure 4). The sampling plot is located on BLM land within the Access Road Area within the Yellow Rabbitbrush/Bluebunch Wheatgrass Shrubland Association. Information for Daubenmire 3 is presented in Table 7. Daubenmire survey results at this location show that Sandberg bluegrass had the highest percentage of canopy cover, species composition, and frequency. Bluebunch wheatgrass and cheatgrass also occurred at a high frequency within the 50 surveyed quadrats. Photo Plate 11 (Appendix B) shows Daubenmire 3. The completed survey form is included in Appendix E.

Table 7: Daubenmire 3 – Yellow Rabbitbrush/Bluebunch Wheatgrass Shrubland Association

Plant Species	Percent Canopy Cover	Species Composition	Frequency
POSE – *Poa secunda*	22	60	100
BRTE – *Bromus tectorum*	4	11	84
PSSPS – *Pseudoroegneria spicata* ssp. *spicata*	7	20	46
CHVI – *Chrysothamnus viscidiflorus*	2	5	20
ERCI – *Eragrostis cilianensis*	-	1	8
ELEL5 – *Elymus elymoides*	-	1	6
LECI4 – *Leymus cinereus*	1	3	6
LEPE2 – *Lepidium perfoliatum*	-	-	2

5.3.4 Daubenmire 4 – Wyoming Big Sagebrush/Bluebunch Wheatgrass Shrubland Alliance

A Daubenmire vegetation survey was performed on May 20, 2017, at N 43.75393, W 117.31122, in Section 11, T21S, R44E (Figure 4). The sampling plot is located on BLM land within the Access Road Area within the Wyoming Big Sagebrush/Bluebunch Wheatgrass Shrubland Alliance. Information for Daubenmire 4 is presented in Table 8. Daubenmire survey results at this location show that Sandberg bluegrass had the highest percentage of canopy cover, species composition, and frequency. Wyoming big sagebrush and cheatgrass also occurred at a high frequency within the 50 surveyed quadrats. Photo Plate 12 (Appendix B) shows Daubenmire 4. The completed survey form is included in Appendix E.

Table 8: Daubenmire 4 – Wyoming Big Sagebrush/Bluebunch Wheatgrass Shrubland Alliance

Plant Species	Percent Canopy Cover	Species Composition	Frequency
POSE – *Poa secunda*	14	37	90
BRTE – *Bromus tectorum*	7	19	80
FEID – *Festuca idahoensis*	3	7	34
ARTRW – *Artemisia tridentata* ssp. *wyomingensis*	10	28	30
VUMI – *Vulpia microstachys*	3	8	20
HECO26 – *Heterostipa comata*	-	1	8
DEPI – *Descurainia pinnata*	-	-	4
ELEL5 – *Elymus elymoides*	-	-	4
SIAL2 – *Sisymbrium altissimum*	-	-	2

5.3.5 Daubenmire 5 – Wyoming Big Sagebrush/Bluebunch Wheatgrass Shrubland Alliance

A Daubenmire vegetation survey was performed on May 21, 2017, at N 43.73541, W 117.31324, in Section 23, T21S, R44E (Figure 4). The sampling plot is located on BLM land within the Access Road Area within the Wyoming Big Sagebrush/Bluebunch Wheatgrass Shrubland Alliance. Information for Daubenmire 5 is presented in Table 9. Daubenmire survey results at this location show that cheatgrass had the highest percentage of canopy cover, species composition, and frequency. Bluebunch wheatgrass also occurred at a high frequency within the 50 surveyed quadrats. Photo Plate 13 (Appendix B) shows Daubenmire 5. The completed survey form is included in Appendix E.

Table 9: Daubenmire 5 – Wyoming Big Sagebrush/Bluebunch Wheatgrass Shrubland Alliance

Plant Species	Percent Canopy Cover	Species Composition	Frequency
BRTE – *Bromus tectorum*	39	72	100
PSSPS – *Pseudoroegneria spicata* spp. *spicata*	11	20	48
POSE – *Poa secunda*	1	2	22
CRAC2 – *Crepis acuminata*	1	2	12
MEAL6 – *Mentzelia albicaulis*	-	1	12
PHHO – *Phlox hoodii*	-	1	6
CHVI – *Chrysothamnus viscidiflorus*	-	-	6
COUM – *Comandra umbellata*	-	-	4
BASA3 – *Balsamorhiza sagittata*	-	-	2
CETE5–*Ceratocephala testiculata*	1	1	2
VUMI – *Vulpia microstachys*	-	-	2
PSTE5 – *Psoralidium tenuiflorum*	-	-	2
ERCI – *Eragrostis cilianensis*	-	-	2
CALOR – *Calorchortus* sp.	-	-	2

5.3.6 Daubenmire 6 – Crested Wheatgrass Western Ruderal Perennial Grassland Alliance

A Daubenmire vegetation survey was performed on May 21, 2017, at N 43.70473, W 117.36408, in Section 32, T21S, R44E (Figure 4). The sampling plot is located on BLM land in the Access Road Area within the Crested Wheatgrass Western Ruderal Perennial Grassland Alliance. Information for Daubenmire 6 is presented in Table 10. Daubenmire survey results at this location show that crested wheatgrass had the highest percentage of canopy cover and species composition. Cheatgrass and curveseed butterwort (*Ceratocephala testiculata*) also occurred at a high frequency within the 50 surveyed quadrats. Photo Plate 14 (Appendix B) shows Daubenmire 6. The completed survey form is included in Appendix E.

Table 10: Daubenmire 6 – Crested Wheatgrass Western Ruderal Perennial Grassland Alliance

Plant Species	Percent Canopy Cover	Species Composition	Frequency
CETE5 – *Ceratocephala testiculata*	4	11	100
BRTE – *Bromus tectorum*	11	33	98
AGCR – *Agropyron cristatum*	16	49	82
POSE – *Poa secunda*	2	7	28
PSSPS – *Pseudoroegneria spicata* ssp. *spicata*	-	-	4

5.3.7 Daubenmire 7 – Cheatgrass Ruderal Grassland Association

A Daubenmire vegetation survey was performed on May 21, 2017, at N 43.67957, W 117.36263, in Section 5, T22S, R44E (Figure 4). The sampling plot is located on BLM land within the Mine and Process Area within the Cheatgrass Ruderal Grassland Association. Information for Daubenmire 7 is presented in Table 11. Daubenmire survey results at this location show that cheatgrass had the highest percentage of canopy cover, species composition, and frequency. Bluebunch wheatgrass and Sandberg bluegrass also occurred at a high frequency within the 50 surveyed quadrats. Photo Plate 15 (Appendix B) shows Daubenmire 7. The completed survey form is included in Appendix E.

Table 11: Daubenmire 7 – Cheatgrass Ruderal Grassland Association

Plant Species	Percent Canopy Cover	Species Composition	Frequency
BRTE – *Bromus tectorum*	22	53	98
AGCR – *Agropyron cristatum*	9	22	56
POSE – *Poa secunda*	4	9	46
CETE5 – *Ceratocephala testiculata*	1	2	26
PSSPS – *Pseudoroegneria spicata ssp.* spicata	2	8	18
ZIVE – *Zigadenus venenosus*	1	2	10
ARTRW8 – *Artemisia tridentata ssp. wyomingensis*	1	2	8
COPA3 – *Collinsia parviflora*	-	-	6
ASPU9 – *Astragalus purshii*	1	1	4
EPILO – *Epilobium* sp.	-	-	2
CHVI – *Chrysothamnus viscidiflorus*	-	-	2

5.4 Special Status Plant Species

5.4.1 Threatened and Endangered Species

5.4.1.1 Federal

An Information from Planning and Conservation (IPaC) consultation with the USFWS (Consultation Code: 01EOFW00-2018-SLI-0114) reported that no federally threatened or endangered plant species are known to occur within the 2017 Survey Area (Appendix F). No federally threatened or endangered species were observed during the 2017 vegetation survey of the 2017 Survey Area, or during the surveys by HDR of the 2012, 2013, 2014, or 2015 Survey Areas (HDR 2012, 2014, 2015).

5.4.1.2 State

A list of rare, threatened, and endangered plant records was obtained from ORBIC in April 2017 (Appendix G). Two plant species were reported to occur within two miles of the Permit Area (Figure 5). Cronquist's stickseed (*Hackelia cronquistii*) is a State Threatened species and a BLM Sensitive species. Cronquist's stickseed inhabits shrub-steppe communities typically dominated by sagebrush. It occurs on sandy north-facing hillsides with slight to extreme slopes, sometimes on moist slopes in ravines, at elevations ranging from 2,000 to 3,640 feet above mean sea level (amsl) (ODA 2017a).

Mulford's milk-vetch (*Astragalus mulfordiae*) is a State Endangered species and a BLM Sensitive species. Mulford's milk-vetch inhabits sandy substrates including old river deposits, sandy areas near rivers, sandy bluffs, and dune-like talus in foothills at approximately 2,200 to 2,790 feet amsl. It is found mainly in shrub-steppe and desert shrub communities (ODA 2017b).

Both species have reported occurrences within the Access Road Area; however, neither species was observed within the 2017 Survey Area during the 2017 vegetation survey. No State-listed species were observed during the surveys by HDR of the 2012, 2013, 2014, or 2015 Survey Areas (HDR 2012, 2014, 2015).

5.4.2 BLM Sensitive Species

The *Final OR/WA State Director's Special Status Species List, July 13, 2015*, which lists BLM Sensitive plant species suspected or documented to occur within the Vale District is included in Appendix A. No Sensitive species were observed during the 2017 vegetation survey of the 2017 Survey Area, or during the surveys by HDR of the 2012, 2013, 2014, or 2015 Survey Areas (HDR 2012, 2014, 2015).

Figure 5: ORBIC Sensitive Species Data (Confidential – submitted separately)

5.5 Noxious Weed Species

A list of noxious weeds for Malheur County, Oregon (Appendix B), was obtained from the Malheur County Weed Advisory Board. Malheur County has prioritized control and/or eradication of noxious weeds by A, B, and C classes, with Class A having the highest priority. The following noxious weeds were observed during the 2017 vegetation survey:

- One Class B species, nodding thistle (*Carduus nutans*), along the Access Road Area within the northern portion of the 2017 Survey Area in the Daubenmire 1 transect. All Class B weeds are required to be controlled within 50 feet of all property lines, easements, and rights-of-way.

- One Class C species within the Study Area: cheatgrass. These species can be treated at the landowner's discretion. Cheatgrass is the most dominant grass species throughout the 2017 Survey Area.

During the 2013 vegetation survey, HDR found the following noxious weed species (HDR 2012, 2014):

- One small, isolated population of a Class A weed species, Austrian peaweed (*Sphaerophysa salusula*), adjacent to the Access Road Area. This species is subject to mandatory control/eradication where found.

- One Class B species, Canada thistle (*Cirsium arvense*), near the northern boundary of the Mine and Process Area. All Class B weeds are required to be controlled within 50 feet of all property lines, easements, and rights-of-way.

- Three Class C species: cheatgrass; medusahead (*Taeniatherum caput-medusae*); and field bindweed (*Convoculus arvensis*). These species can be treated at the landowner's discretion. Cheatgrass and medusahead are the most dominant grass species.

5.6 Description of Competing Land Uses

The primary adjacent land use to the Project has been and continues to be cattle grazing. Evidence of heavy grazing was present throughout much of the 2017 Study Area during the 2017 vegetation field surveys. The mine site and processing facilities will be fenced, and grazing will be excluded. It is likely that grazing would continue to occur on land adjacent to the Permit Area.

5.7 Revegetation and Reclamation Considerations and Opportunities

Disturbed sites will be reclaimed and revegetated during and after mining activities. Qualified personnel will analyze the pre-disturbance soil characteristics and determine the amount of soil that should be stockpiled for revegetation and reclamation. Disturbed areas will be seeded with a native seed mixture that is approved by the BLM and other state agencies, as appropriate. A preliminary reclamation seed mixture is presented in Table 12. The reclamation goal will be to establish a self-sustaining ecosystem, comparable to undamaged ecosystems in the area of the mine. Vegetation test plots and chemical/physical soil and subsoil analysis may be required to ensure establishment feasibility.

Table 12: Preliminary Reclamation Seed Mixture

Common Name	Scientific Name	Pure Live Seed (PLS) per Acre
Wyoming big sagebrush	*Artemisia tridentata* ssp. *Wyomingensis*	0.10
Bluebunch wheatgrass	*Pseudoroegneria spicata*	8.00
Bottlebrush squirreltail	*Elymus elymoides*	2.00
Sandberg's bluegrass	*Poa secunda*	2.00
Basin wildrye	*Leymus cinereus*	1.50
Goosefoot globemallow	*Sphaeralcea grossularifolia*	0.50
Total Application Rate (pounds pls/acre)		**14.10**

6 BIBLIOGRAPHY

Bureau of Land Management (BLM). 1990. *Control Use of Biological Control Agents of Pests on Public Lands*. BLM Manual MS-9014.

_____. 1994. *Chemical Pest Control*. BLM Handbook H-9011.1.

_____. 2007. *Chemical Pest Control*. BLM Manual 9011.

_____. 2008. Manual Transmittal Sheet. 6840 – Special Status Species Management. Rel. 6-125. 12/12/2008. https://www.blm.gov/sites/blm.gov/files/uploads/mediacenter_blmpolicymanual6840.pdf

_____. 2017. *About Weeds and Invasive Species*. https://www.blm.gov/programs/natural-resources/weeds-and-invasives/about. Accessed January 2018.

EM Strategies, Inc. 2017. *Environmental Baseline Study Work Plans*. Grassy Mountain Project. September 22, 2017.

_____. 2018. *Sagebrush Identification Test for the Grassy Mountain Mine Project; Malheur County, Oregon*. Memo from EM Strategies, Inc. to DOGAMI, dated October 2, 2018.

HDR Engineering, Inc. (HDR). 2014. *Draft Terrestrial Vegetation Baseline Study, Grassy Mountain Exploration Project*.

_____. 2015. *Draft Terrestrial Vegetation Baseline Study Addendum #1, Grassy Mountain Exploration Project*.

Oregon Department of Agriculture (ODA). 2017a. Cronquist's stickseed (*Hackelia cronquistii*). http://www.oregon.gov/ODA/shared/Documents/Publications/PlantConservation/HackeliaCronquistiiProfile.pdf. Accessed December 18, 2017.

_____. 2017b. Mulford's milkvetch (*Astragalus mulfordiae*). http://www.oregon.gov/ODA/shared/Documents/Publications/PlantConservation/AstragalusMulfordiaeProfile.pdf. Accessed December 18, 2017.

United States National Vegetation Classification (USNVC). 2019. United States National Vegetation Classification Database, V2.03. Federal Geographic Data Committee, Vegetation Subcommittee, Washington DC. [usnvc.org] Accessed September 14, 2020.

7 CONTACTS

Richard DeLong
EM Strategies, Inc.
1650 Meadow Wood Lane
Reno, Nevada 89502
775-826-8822
rich@emstrats.com

Kris Kuyper
EM Strategies, Inc.
1650 Meadow Wood Lane
Reno, Nevada 89502
775-826-8822
kris@emstrats.com

8 LIST OF PREPARERS

EM Strategies, Inc.
Sarah Harrelson – Report Preparation
Kris Kuyper – Report Preparation
Catherine Lee – Report Preparation Assistance
Jim Branch – GIS Figure Creation
Rich DeLong – Technical Review
Ellen Farley – Editorial Review

APPENDIX A

BLM STATE OF OREGON SENSITIVE PLANT SPECIES LIST

State Sensitive Species List (Vale District)

Scientific Name	Common Name	BLM Occurrence Status (Vale District)
ANTHELIA JULACEA	LIVERWORT	Suspected
BARBILOPHOZIA LYCOPODIOIDES	LIVERWORT	Suspected
JUNGERMANNIA POLARIS	LIVERWORT	Suspected
LOPHOZIA GILLMANII	LIVERWORT	Suspected
PELTOLEPIS QUADRATA	LIVERWORT	Suspected
PREISSIA QUADRATA	LIVERWORT	Suspected
PTILIDIUM PULCHERRIMUM	LIVERWORT	Suspected
SCHISTIDIUM CINCLIDODONTEUM	MOSS	Suspected
TEXOSPORIUM SANCTI-JACOBI	LICHEN	Suspected
ABRONIA TURBINATA	TRANS MONTANE ABRONIA	Documented
ACHNATHERUM SPECIOSUM	DESERT NEEDLEGRASS	Suspected
ACHNATHERUM WALLOWAENSIS	WALLOWA RICEGRASS	Suspected
AGASTACHE CUSICKII	CUSICK'S GIANT-HYSSOP	Documented
ALLENROLFEA OCCIDENTALIS	IODINE BUSH	Documented
ALLIUM GEYERI VAR. GEYERI	GEYER'S ONION	Suspected
AMSINCKIA CARINATA	MALHEUR VALLEY FIDDLENECK	Documented
ARGEMONE MUNITA	PRICKLY-POPPY	Documented
ARTEMISIA ARBUSCULA SSP. LONGICAULIS	LAHONTAN SAGEBRUSH	Documented
ARTEMISIA PAPPOSA	OWYHEE SAGEBRUSH	Documented
ASPLENIUM TRICHOMANES-RAMOSUM	GREEN SPLEENWORT	Suspected
ASTRAGALUS CALYCOSUS	KING'S RATTLEWEED	Documented
ASTRAGALUS CUSICKII VAR. STERILIS	STERILE MILK-VETCH	Documented
ASTRAGALUS GEYERI VAR. GEYERI	GEYER'S MILK-VETCH	Documented
ASTRAGALUS MULFORDIAE	MULFORD'S MILK-VETCH	Documented
ASTRAGALUS PLATYTROPIS	BROAD-KEELED MILK-VETCH	Documented
BOTRYCHIUM ASCENDENS	UPWARD-LOBED MOONWORT	Suspected
BOTRYCHIUM CAMPESTRE	PRAIRIE MOONWORT	Suspected
BOTRYCHIUM CRENULATUM	CRENULATE MOONWORT	Suspected
BOTRYCHIUM HESPERIUM	WESTERN MOONWORT	Suspected
BOTRYCHIUM LINEARE	SLENDER MOONWORT	Suspected
BOTRYCHIUM LUNARIA	MOONWORT	Suspected
BOTRYCHIUM MONTANUM	MOUNTAIN GRAPE-FERN	Suspected
BOTRYCHIUM PARADOXUM	TWIN-SPIKED MOONWART	Suspected
BOTRYCHIUM PEDUNCULOSUM	STALKED MOONWORT	Suspected
BUPLEURUM AMERICANUM	BUPLEURUM	Documented
CALOCHORTUS MACROCARPUS VAR. MACULOSUS	GREEN-BAND MARIPOSA-LILY	Documented
CALOCHORTUS NITIDUS	BROAD-FRUIT MARIPOSA-LILY	Suspected
CAMISSONIA PYGMAEA	DWARF EVENING-PRIMROSE	Suspected
CAREX ATROSQUAMA	BLACKENED SEDGE	Suspected
CAREX CAPILLARIS	HAIRLIKE SEDGE	Suspected
CAREX CORDILLERANA	CORDILLERAN SEDGE	Documented
CAREX GYNOCRATES	YELLOW BOG SEDGE	Suspected
CAREX IDAHOA	IDAHO SEDGE	Suspected
CAREX LASIOCARPA VAR. AMERICANA	SLENDER SEDGE	Suspected
CAREX MEDIA	INTERMEDIATE SEDGE	Suspected
CAREX MICROPODA	PYRENAEAN SEDGE	Suspected
CAREX NARDINA	SPIKENARD SEDGE	Suspected
CAREX PELOCARPA	NEW SEDGE	Suspected
CAREX RETRORSA	RETRORSE SEDGE	Suspected
CAREX SUBNIGRICANS	DARK ALPINE SEDGE	Suspected
CAREX VERNACULA	NATIVE SEDGE	Suspected

State Sensitive Species List (Vale District)

Scientific Name	Common Name	BLM Occurrence Status (Vale District)
CASTILLEJA FLAVA VAR. RUSTICA	RURAL PAINTBRUSH	Documented
CASTILLEJA FRATERNA	FRATERNAL PAINTBRUSH	Suspected
CASTILLEJA RUBIDA	PURPLE ALPINE PAINTBRUSH	Suspected
CAULANTHUS CRASSICAULIS VAR. GLABER	SMOOTH WILD CABBAGE	Documented
CAULANTHUS MAJOR VAR. NEVADENSIS	SLENDER WILD CABBAGE	Documented
CHAENACTIS XANTIANA	DESERT CHAENACTIS	Documented
CHAETADELPHA WHEELERI	WHEELER'S SKELETON-WEED	Documented
CHEILANTHES FEEI	FEE'S LIP-FERN	Suspected
COLLOMIA RENACTA	BARREN VALLEY COLLOMIA	Documented
CRYPTOGRAMMA STELLERI	STELLER'S ROCKBRAKE	Suspected
CYMOPTERUS ACAULIS VAR. GREELEYORUM	GREELEY'S CYMOPTERUS	Documented
CYMOPTERUS IBAPENSIS	IBAPAH WAVEWING	Documented
CYPERUS LUPULINUS SSP. LUPULINUS	A CYPERUS	Suspected
CYPRIPEDIUM FASCICULATUM	CLUSTERED LADY'S-SLIPPER	Suspected
DELPHINIUM BICOLOR	FLATHEAD LARKSPUR	Documented
DODECATHEON PULCHELLUM VAR. SHOSHONENSE	DARKTHROAT SHOOTINGSTAR	Documented
ELATINE BRACHYSPERMA	SHORT SEEDED WATERWORT	Documented
ELEOCHARIS BOLANDERI	BOLANDER'S SPIKERUSH	Documented
ERIGERON DISPARIPILUS	WHITE CUSHION ERIGERON	Suspected
ERIGERON ENGELMANNII VAR. DAVISII	ENGELMANN'S DAISY	Suspected
ERIGERON LATUS	BROAD FLEABANE	Documented
ERIOGONUM CHRYSOPS	GOLDEN BUCKWHEAT	Documented
ERIOGONUM HOOKERI	HOOKER'S WILD BUCKWHEAT	Documented
ERIOGONUM PROCIDUUM	PROSTRATE BUCKWHEAT	Documented
ERIOGONUM SALICORNIOIDES	PLAYA BUCKWHEAT	Documented
GEUM ROSSII VAR. TURBINATUM	SLENDER-STEMMED AVENS	Suspected
HACKELIA CRONQUISTII	CRONQUIST'S STICKSEED	Documented
HACKELIA OPHIOBIA	THREE FORKS STICKSEED	Documented
HELIOTROPIUM CURASSAVICUM	SALT HELIOTROPE	Documented
HYMENOXYS LEMMONII	COOPER'S GOLDFLOWER	Documented
IVESIA RHYPARA VAR. RHYPARA	GRIMY IVESIA	Documented
IVESIA SHOCKLEYI	SHOCKLEY'S IVESIA	Documented
JUNCUS TRIGLUMIS VAR. ALBESCENS	THREE-FLOWERED RUSH	Suspected
KOBRESIA MYOSUROIDES	BELLARD'S KOBRESIA	Suspected
KOBRESIA SIMPLICIUSCULA	SIMPLE KOBRESIA	Suspected
LEPIDIUM DAVISII	DAVIS' PEPPERGRASS	Documented
LIPOCARPHA ARISTULATA	ARISTULATE LIPOCARPHA	Suspected
LISTERA BOREALIS	NORTHERN TWAYBLADE	Suspected
LOMATIUM ERYTHROCARPUM	RED-FRUITED LOMATIUM	Suspected
LOMATIUM FOENICULACEUM SSP. FIMBRIATUM	FRINGED DESERT-PARSLEY	Documented
LOMATIUM ROSEANUM	ROSE'S LOMATIUM	Documented
LUPINUS CUSICKII VAR. CUSICKII	CUSICK'S LUPINE	Documented
LUPINUS NEVADENSIS	NEVADA LUPINE	Documented
LYCOPODIUM COMPLANATUM	GROUND CEDAR	Suspected
MALACOTHRIX SONCHOIDES	LYRATE MALACOTHRIX	Documented
MENTZELIA CONGESTA	UNITED BLAZINGSTAR	Documented
MENTZELIA MOLLIS	SMOOTH MENTZELIA	Documented
MIMULUS EVANESCENS	DISAPPEARING MONKEYFLOWER	Documented
MIMULUS HYMENOPHYLLUS	MEMBRANE-LEAVED MONKEYFLOWER	Suspected
MIRABILIS MACFARLANEI	MACFARLANE'S FOUR O'CLOCK	Suspected

State Sensitive Species List (Vale District)

Scientific Name	Common Name	BLM Occurrence Status (Vale District)
MUHLENBERGIA MINUTISSIMA	ANNUAL DROPSEED	Documented
OPHIOGLOSSUM PUSILLUM	ADDER'S-TONGUE	Suspected
OXYTROPIS SERICEA VAR. SERICEA	WHITE LOCOWEED	Documented
PELLAEA BRIDGESII	BRIDGES' CLIFF-BRAKE	Suspected
PHACELIA INUNDATA	PLAYA PHACELIA	Documented
PHACELIA LUTEA VAR. MACKENZIEORUM	MACKENZIE'S PHACELIA	Documented
PHACELIA MINUTISSIMA	DWARF PHACELIA	Suspected
PHLOX HENDERSONII	HENDERSON'S PHLOX	Suspected
PHLOX MULTIFLORA	MANY-FLOWERED PHLOX	Suspected
PHYSARIA CHAMBERSII	CHAMBERS' TWINPOD	Documented
PINUS ALBICAULIS	WHITEBARK PINE	Documented
PLATANTHERA OBTUSATA	SMALL NORTHERN BOG-ORCHID	Suspected
PLEUROPOGON OREGONUS	OREGON SEMAPHOREGRASS	Suspected
POGOGYNE FLORIBUNDA	PROFUSE-FLOWEREED MESA MINT	Documented
POTAMOGETON DIVERSIFOLIUS	RAFINESQUE'S PONDWEED	Documented
PRENANTHELLA EXIGUA	DESERT PRENANTHELLA	Documented
PYRROCOMA RADIATA	SNAKE RIVER GOLDENWEED	Documented
PYRROCOMA SCABERULA	ROUGH PYRROCOMA	Documented
RAFINESQUIA CALIFORNICA	CALIFORNIA CHICORY	Documented
RORIPPA COLUMBIAE	COLUMBIA CRESS	Suspected
RUBUS BARTONIANUS	BARTONBERRY	Documented
SALIX FARRIAE	FARR'S WILLOW	Suspected
SALIX WOLFII	WOLF'S WILLOW	Suspected
SAXIFRAGA ADSCENDENS SSP. OREGONENSIS	WEDGE-LEAF SAXIFRAGE	Suspected
SENECIO ERTTERAE	ERTTER'S SENECIO	Documented
SILENE SPALDINGII	SPALDING'S CATCHFLY	Documented
STANLEYA CONFERTIFLORA	BIENNIAL STANLEYA	Documented
SUKSDORFIA VIOLACEA	VIOLET SUKSDORFIA	Suspected
SYMPHORICARPOS LONGIFLORUS	LONG-FLOWERED SNOWBERRY	Documented
THALICTRUM ALPINUM	ALPINE MEADOWRUE	Suspected
THELYPODIUM EUCOSMUM	ARROW-LEAF THELYPODY	Suspected
THELYPODIUM HOWELLII SSP. SPECTABILIS	HOWELL'S SPECTACULAR THELYPODY	Suspected
TOWNSENDIA MONTANA	MOUNTAIN TOWNSENDIA	Suspected
TOWNSENDIA PARRYI	PARRY'S TOWNSENDIA	Suspected
TRIFOLIUM DOUGLASII	DOUGLAS' CLOVER	Suspected
TRIFOLIUM LEIBERGII	LEIBERG'S CLOVER	Documented
TRIFOLIUM OWYHEENSE	OWYHEE CLOVER	Documented
TROLLIUS LAXUS SSP. ALBIFLORUS	AMERICAN GLOBEFLOWER	Suspected
UTRICULARIA MINOR	LESSER BLADDERWORT	Suspected

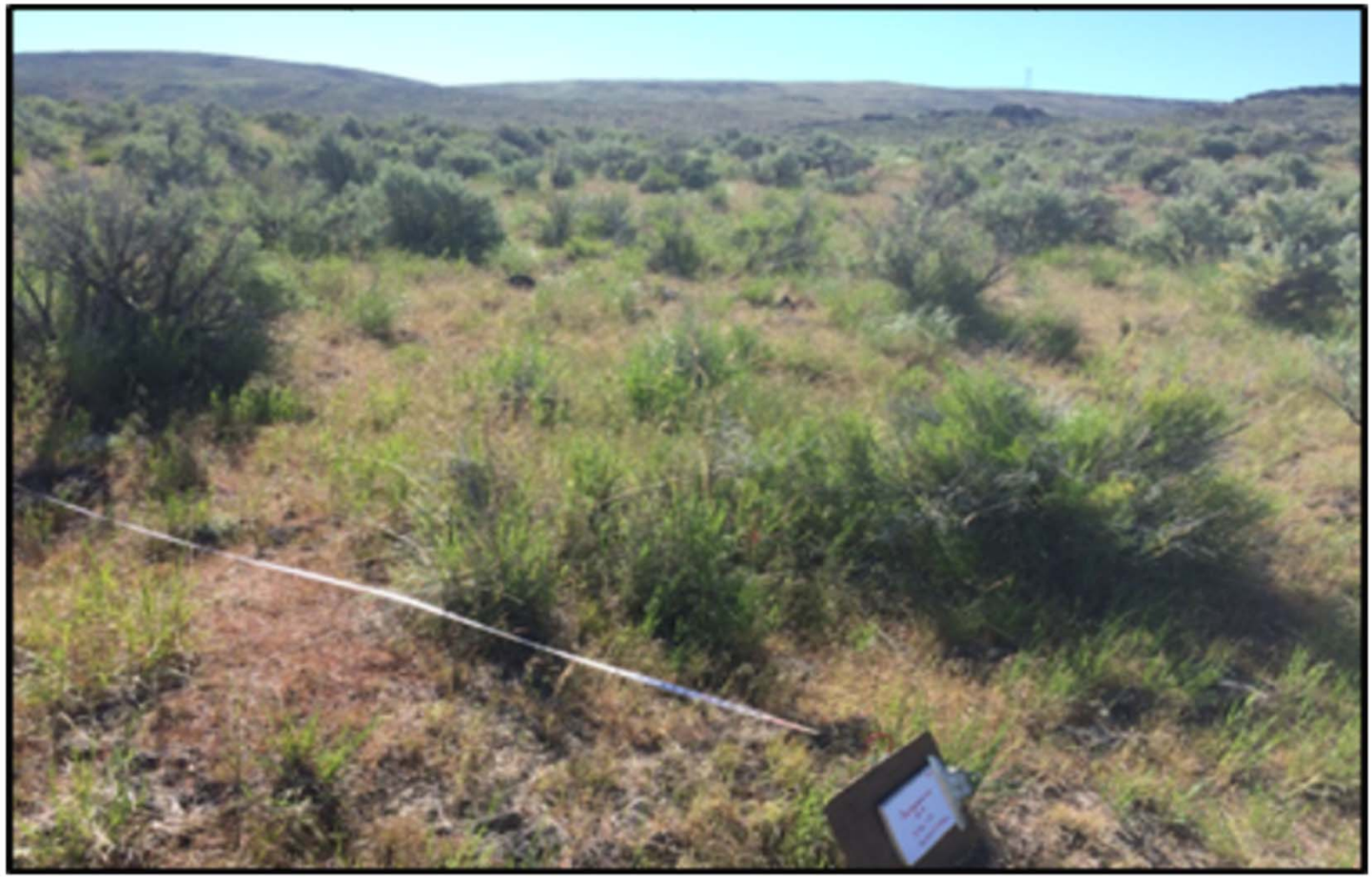
APPENDIX B

PHOTOGRAPHIC LOG

Grassy Mountain Mine Project - 2017 Baseline Vegetation Survey Report

Photo Plate 1

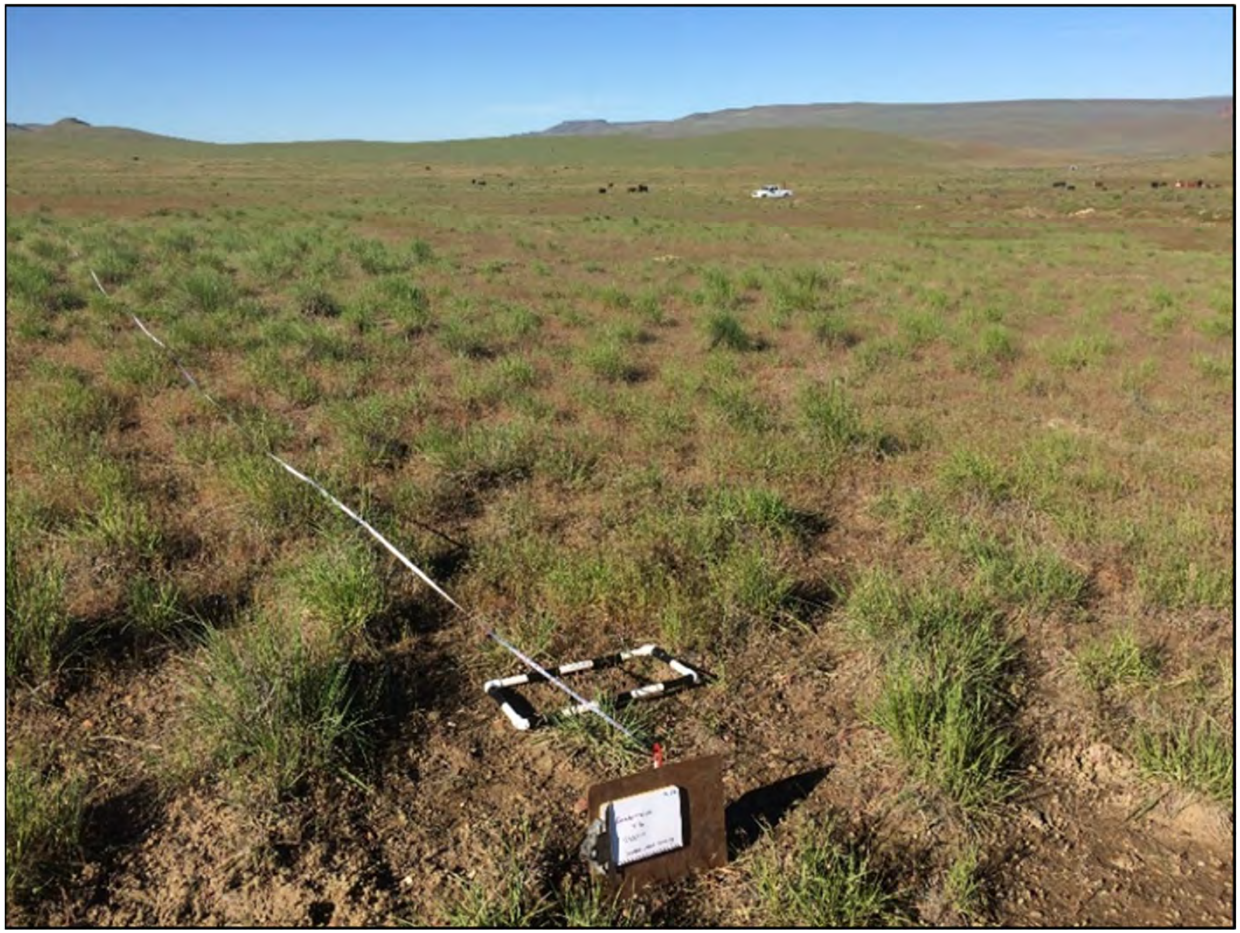
Typical Mountain Big Sagebrush/Crested Wheatgrass Community



Grassy Mountain Mine Project - 2017 Baseline Vegetation Survey Report

Photo Plate 2

Typical Crested Wheatgrass Seeding Community



Grassy Mountain Mine Project - 2017 Baseline Vegetation Survey Report

Photo Plate 3

Typical Bluebunch Wheatgrass/Cheatgrass/Annual Community

Grassy Mountain Mine Project - 2017 Baseline Vegetation Survey Report

Photo Plate 4

Typical Mountain Big Sagebrush/Bluebunch Wheatgrass Community

Grassy Mountain Mine Project - 2017 Baseline Vegetation Survey Report

Photo Plate 5

Typical Yellow Rabbitbrush/Bluebunch Wheatgrass Community

Grassy Mountain Mine Project - 2017 Baseline Vegetation Survey Report

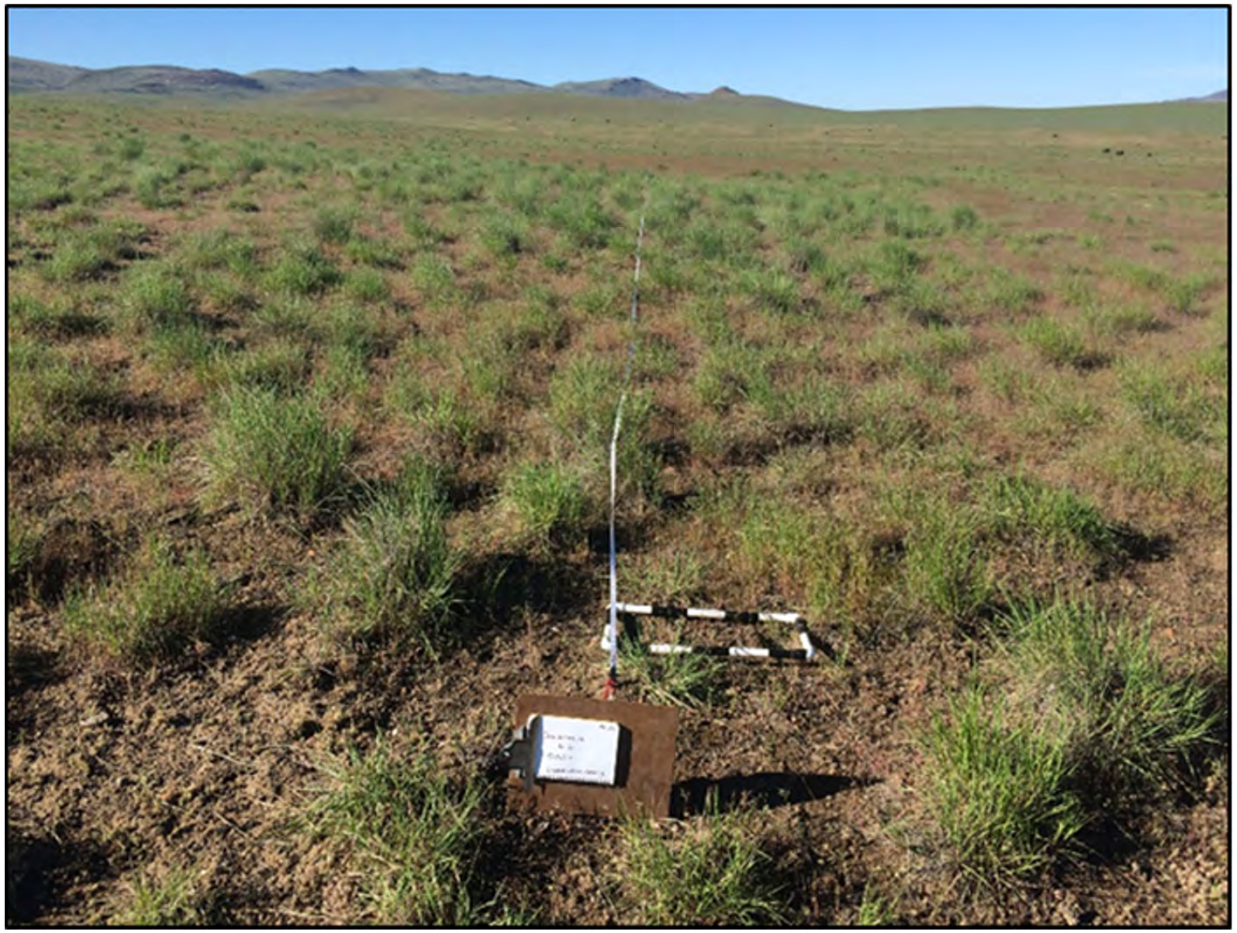
Photo Plate 6

Transect 1

Grassy Mountain Mine Project - 2017 Baseline Vegetation Survey Report

Photo Plate 7

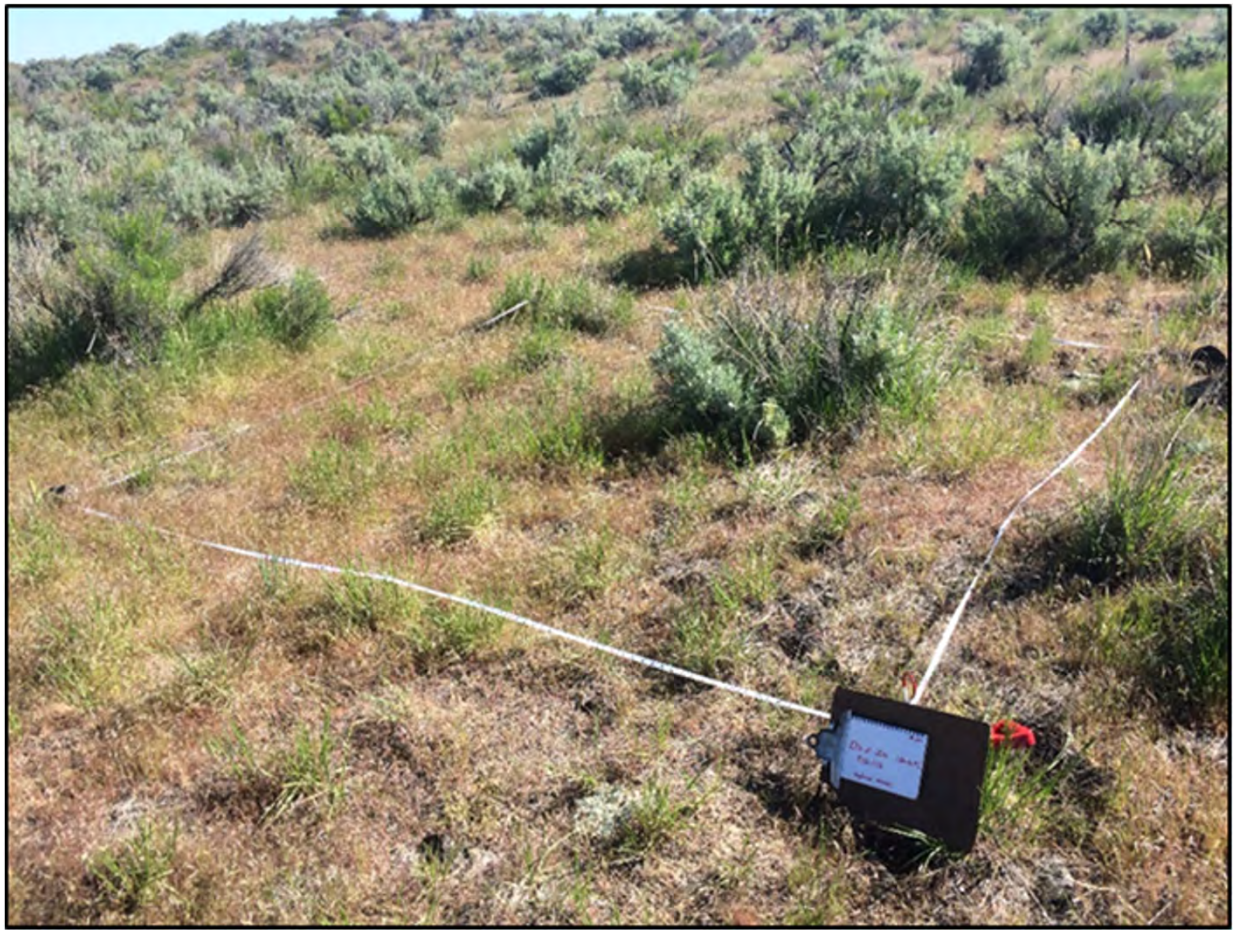
Transect 2



Grassy Mountain Mine Project - 2017 Baseline Vegetation Survey Report

Photo Plate 8

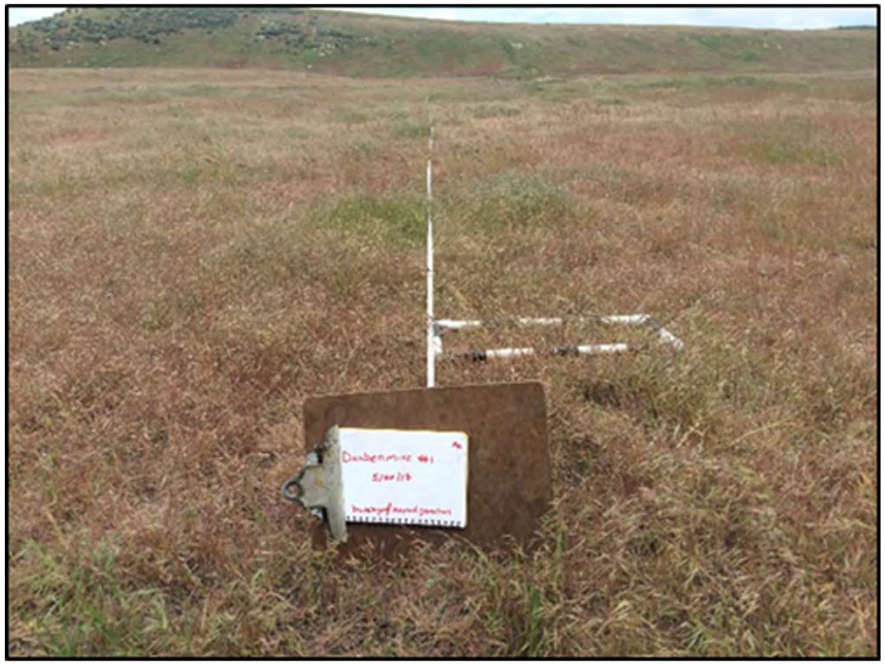
Transect 3

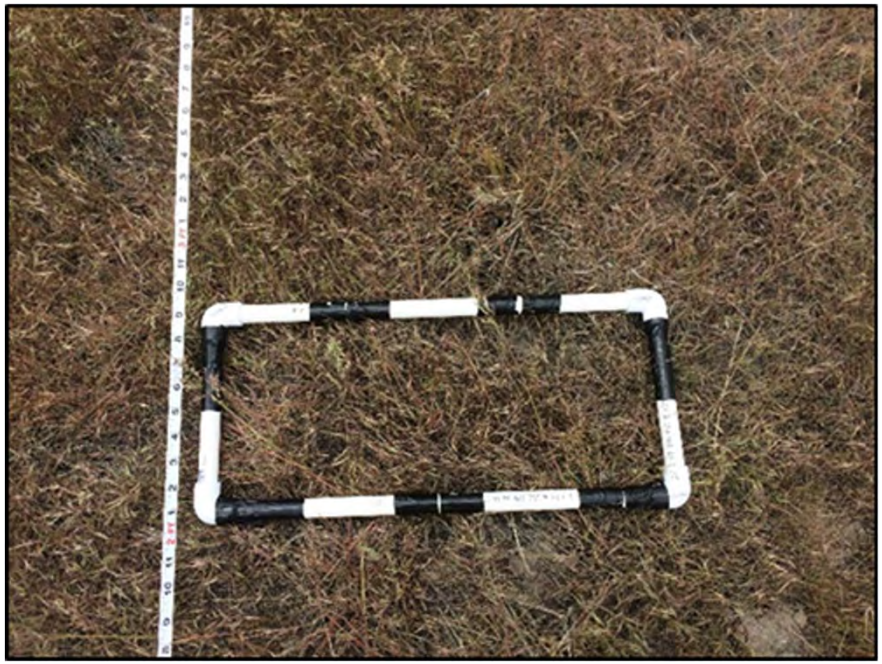


Grassy Mountain Mine Project - 2017 Baseline Vegetation Survey Report

Photo Plate 9

Daubenmire 1

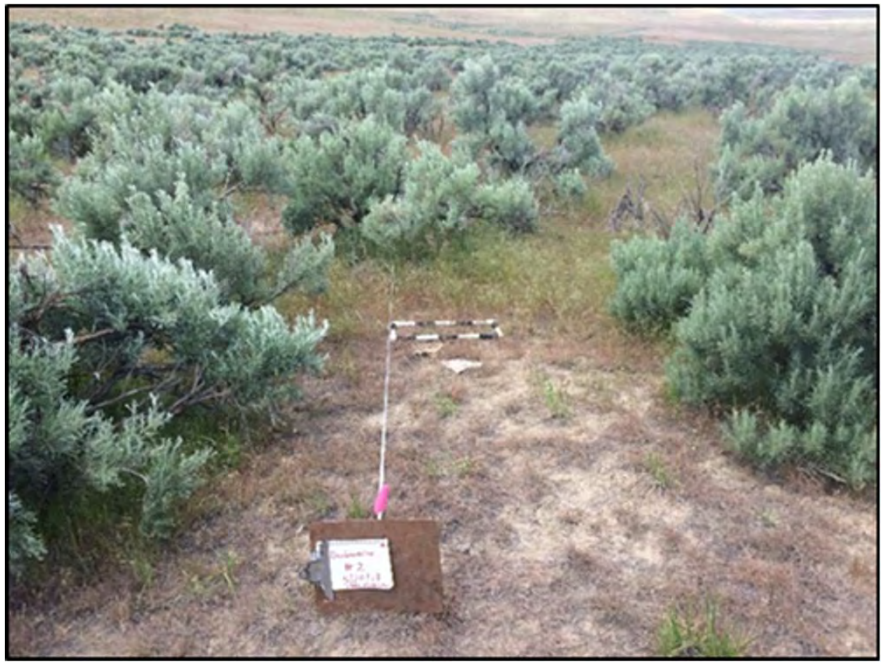


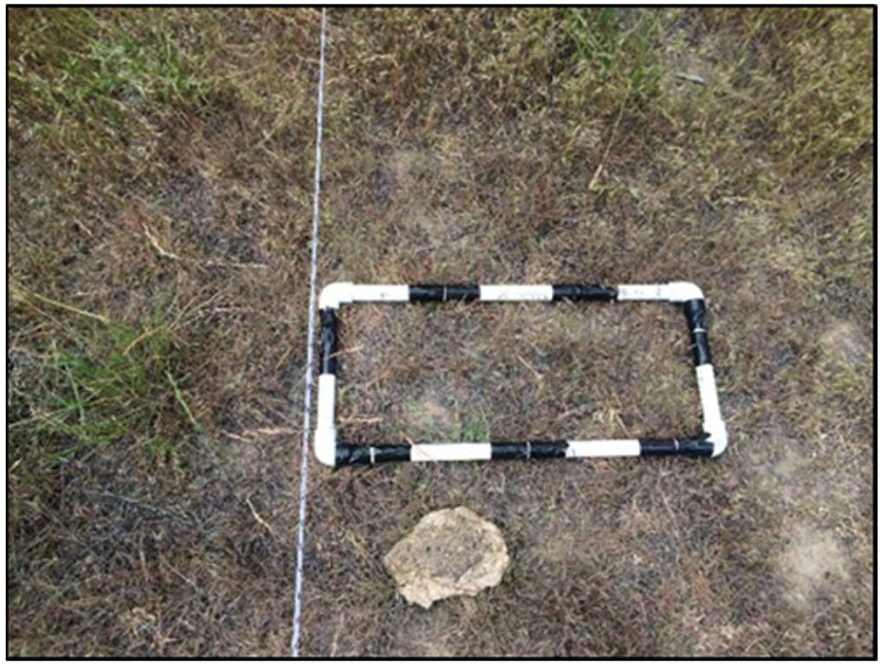


Grassy Mountain Mine Project - 2017 Baseline Vegetation Survey Report

Photo Plate 10

Daubenmire 2





Grassy Mountain Mine Project - 2017 Baseline Vegetation Survey Report

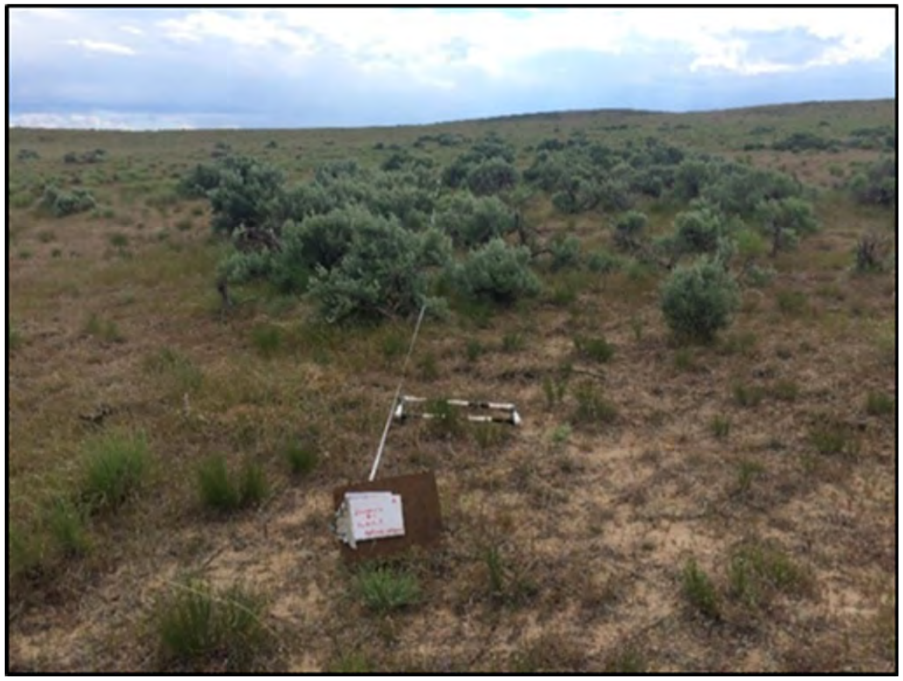
Photo Plate 11

Daubenmire 3

Grassy Mountain Mine Project - 2017 Baseline Vegetation Survey Report

Photo Plate 12

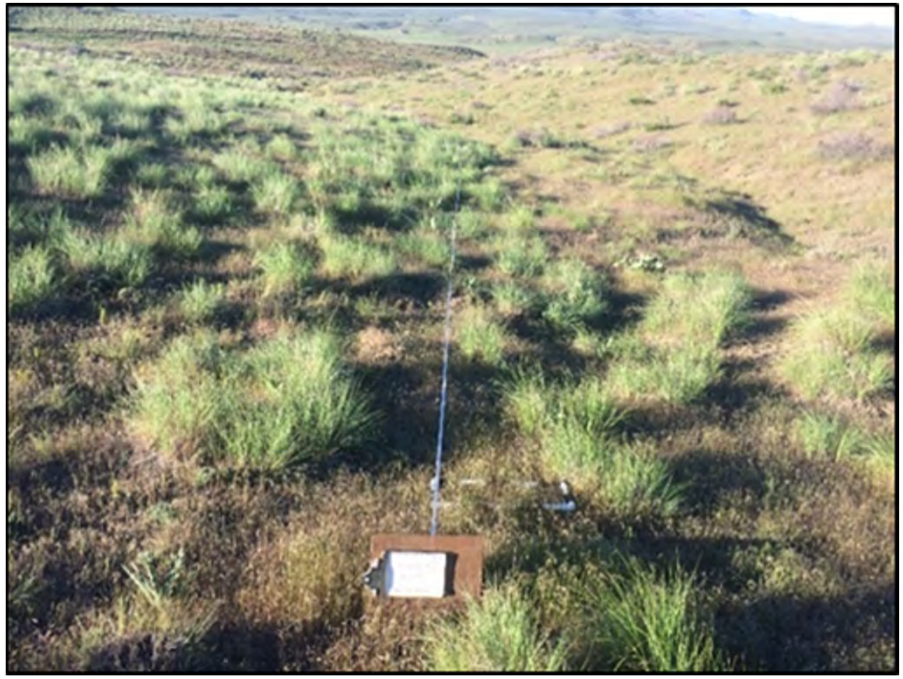
Daubenmire 4



Grassy Mountain Mine Project - 2017 Baseline Vegetation Survey Report

Photo Plate 13

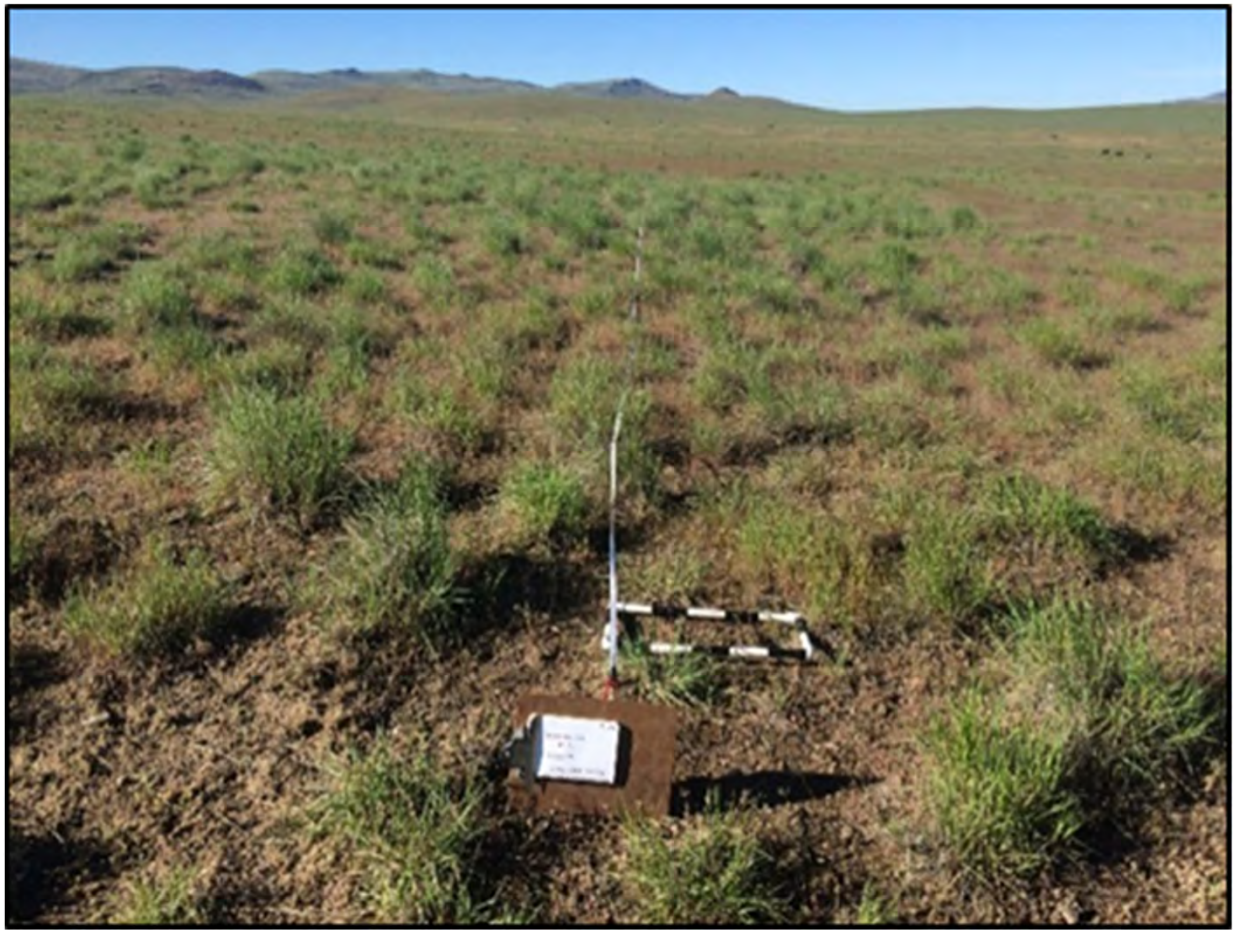
Daubenmire 5



Grassy Mountain Mine Project - 2017 Baseline Vegetation Survey Report

Photo Plate 14

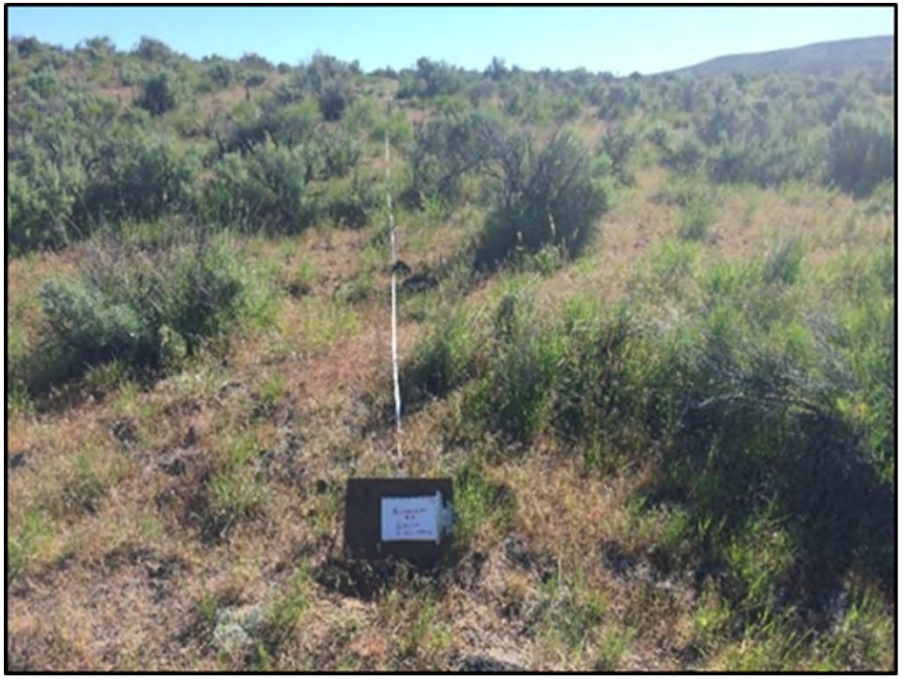
Daubenmire 6



Grassy Mountain Mine Project - 2017 Baseline Vegetation Survey Report

Photo Plate 15

Daubenmire 7



APPENDIX C

MALHEUR COUNTY NOXIOUS WEED SPECIES LIST

Public Notice
Malheur County Noxious Weed Control

WEED DISTRICT: The entire Malheur County is a weed control district known as the Malheur County Weed District. The weed district is governed by the Malheur County Court upon recommendations from the Malheur County Weed Advisory Board.

DESIGNATION OF NOXIOUS WEEDS: Pursuant to ORS 570.575 the following named plants are designated by the Malheur County Court to be injurious to public health, crops, livestock, land, or other property and are noxious.

It is the responsibility of private landowners the County, State and Federal governments to eradicate and control these weeds on their respective jurisdictions. Malheur County has prioritized control and/or eradication of these noxious weeds by "A" "B" & "C" classes, with Class A having the highest priority. Priorities may be adjusted by geographic areas at the recommendation of the Weed Advisory Board.

CLASS "A" WEED: A weed of known economic/environmental importance known to occur in the county in very small numbers to make eradication practicable, or not known to occur but its status in surrounding counties makes future occurrence seem imminent.

ACTION – infestations are subject to mandatory control/eradication where found with possible county assistance when funds are available.

COMMON NAME	*SCIENTIFIC NAME*
Austrian Peaweed	*Sphaerophysa salusula*
Common Crupina	*Crupina Vulgaris*
Big-Headed knapweed	*Centaurea macrocephala*
Buffalobur	*Solanum rostratum*
Camelthorn	*Alhagi pseudalhagi*
Dalmation toadflax	*Centaurea diffusa*
Dyers woad	*Isatis tinctoria*
Featherheaded knapweed	*Centaurea trichocephala*
Hydrilla	*Hydrilla venticillata*
Iberian starthistle	*Centaurea iberica*
Italian thistle	*Carduus pycnocephalus*
Jimsonweed	*Datera stramonium*
Johnsongrass	*Sorgum halepense*
Jointed goatgrass	*Aegilops cylindrical*

COMMON NAME	*SCIENTIFIC NAME*
Leafy spurge	*Euphorbia esula*
Meadow knapweed	*Centaurea pratensis*
Mediterranean sage	*Salvia aethiopis*
Milk thistle	*Silybum marianum*
Perennial pepperweed	*Lepidium latifolium*
Purple nutsedge	*Cyperus rotundus*
Purple starthistle	*Centaurea calcitrapa*
Rush skeletonweed	*Chondrilla juncea*
Short-fringe knapweed	*Centaurea nigrescens*
Silverleaf knightshade	*Solanum elaegnifolium*
Skeletonleaf bursage	*Ambrosia tomentosa*
Slender-flowered thistle	*Carduus tenuiflorus*
Smooth distaff thistle	*Carthamus baericus*
Spiny cocklebur	*Xanthium spinosum*
Spotted knapweed	*Centaurea maculosa*
Squarrose knapweed	*Centaurea virgata*
St. Johnswort (Klamath weed)	*Hypericum perforatum*
Sulfur cinquefoil	*Potentilla recta*
Wild proso millet	*Panicum miliaceum*
Tansy ragwort	*Senecio jacobaea*
Wooly distaff thistle	*Carthamus lanatus*
Yellow toadflax	*Linaria vulgaris*
Yellow starthistle	*Centaurea solstitialis*

* *Class "A" Weed only in that part of Malheur County south of the road leading from the junction of Malheur County line and McBride Creek Road, west to Leslie Gulch Road, to Lake Owyhee and the area south of the road leading from the Rinehart Ranch to the Crowley Road west to Highway 78, north to the Malheur County line.*

CLASS "B" WEED – A weed of known economic/environmental importance and of moderate to wide distribution and highly invasive, subject to intensive control or eradication where feasible at the county level.

ACTION – Infestations are subject to control where found, with possible county assistance when funds are available. All CLASS"B" weeds are required to be controlled within 50 feet of all property lines, easements and rights of way, pursuant to ORS 570.525

COMMON NAME	*SCIENTIFIC NAME*
Canada thistle	*Cirsium arvense*
Houndstongue	*Cynoglossum officinale*
Musk thistle	*Carduus nutans*
Perennial pepperweed	*Lepidium latifolium*
Purple loosestrife	*Lythrum salicaria*
Scotch thistle	*Onopordum acanthium*
Hoary cress (White Top)	*Lepidium spp.*
Russian knapweed	*Acroptilon repens*

** Owners or occupants having Russian knapweed are required to control a minimum 20% of their annual infestation per discreet parcel of land per year. This includes the 50 foot buffer plus additional amounts to total 20% of the infestation.

<u>CLASS "C" WEED</u> – A weed of known economic/environmental importance and of general distribution, that is subject to control or eradication as local conditions warrant.

ACTION – Infestations treated at landowners discretion.

COMMON NAME	***SCIENTIFIC NAME***
Bull thistle	*Cirsium vulgare*
Cheatgrass	*Bromus tectorum*
Dodder	*Cuscutta spp.*
Field bindweed	*Convolvulus arvensis*
Halogeton	*Halogeton glomeratus*
Kochia	*Kochia scoparia*
Medusahead rye	*Taeniatherum caput-medusae*
Poison hemlock	*Conium maculatum*
Puncturevine	*Tribulus terrestris*
Quackgrass	*Agropyron repens*
Common ragweed	*Ambrosia artimisiifolia*
Salt cedar	*Tamarix parviflora*
Sweet clover	*Melilotus officinalis*
Western horsetail	*Equisetum arvense*
Yellow nutsedge	*Cyperus esculentus*

APPENDIX D

COMPREHENSIVE PLANT SPECIES LIST FOR THE STUDY AREA

Grassy Mountain Mine Project
Terrestrial Vegetation Report -- Vegetation Species Observed in the Study Area

Scientific Name	Common Name	Family Name	Plant Description
Shrubs (Shrub Stratum)			
Artemisia tridentata ssp. *wyomingensis*	Wyoming big sagebrush	Asteraceae	Perennial shrub
Chrysothamnus nauseosus	rubber rabbitbrush	Asteraceae	Perennial shrub
Chrysothamnus viscidiflorus	yellow rabbitbrush	Asteraceae	Perennial shrub
Opuntia polyacantha	plains prickly pear	Cactaceae	Perennial shrub
Rosa woodsii	Wood's rose	Rosaceae	Perennial shrub
Sarcobatus vermiculatus	greasewood	Chenopodiaceae	Perennial shrub
Forbs (Herbaceous Stratum)			
Achillea millefolium	common yarrow	Asteraceae	Perennial forb
Arnica sp.	arnica	Asteraceae	Perennial forb
Astragalus purshii	woollypod milkvetch	Fabaceae	Perennial forb
Astragalus sp.	milkvetch	Fabaceae	Perennial forb
Balsamorhiza sagittata	arrowleaf balsamroot	Asteraceae	Perennial forb
Calochortus sp.	mariposa lily	Liliaceae	Perennial forb
Carduus nutans	nodding plumeless thistle	Asteraceae	Biennial/Perennial forb
Ceratocephala testiculata	curveseed butterwort	Ranunculaceae	Annual forb
Chorispora tenella	blue mustard	Brassicaceae	Annual forb
Cirsium arvense	Canada thistle	Asteraceae	Noxious weed
Cirsium undulatum	wavyleaf thistle	Asteraceae	Perennial forb
Cirsium sp.	thistle	Asteraceae	forb
Collinsia parviflora	maiden blue eyed Mary	Scrophulariaceae	Annual forb
Comandra umbellata	bastard toadflax	Santalaceae	Perennial forb
Convolvulus arvensis	field bindweed	Convolvulaceae	Perennial forb
Crepis acuminata	tapertip hawksbeard	Asteraceae	Perennial forb
Descurainia pinnata	western tansymustard	Brassicaceae	Annual/biennial/perennial forb
Epilobium sp.	willowherb	Onagraceae	forb
Eriastrum sparsiflorum	Great Basin woollystar	Polemoniaceae	Annual forb
Eriogonum spergulinum	buckwheat	Polygonaceae	Annual forb
Haplopappus carthamoides	large-flowered goldenweed	Asteraceae	Perennial forb
Kochia scoparia	kochia	Chenopodiaceae	Annual forb
Lepidium perfoliatum	clasping pepperweed	Brassicaceae	Annual/biennial forb
Melilotus alba	white sweet clover	Fabaceae	Perennial forb
Melilotus officinalis	yellow sweet clover	Fabaceae	Perennial forb
Mentzelia albicaulis	whitestem blazingstar	Loasaceae	Annual forb
Phlox hoodii	spiny phlox	Polemoniaceae	Perennial forb
Phlox sp.	phlox	Polemoniaceae	Perennial forb
Psoralidium tenuiflorum	slimflower scurfpea	Fabaceae	Perennial forb
Rumex crispus	curly dock	Polygonaceae	Perennial forb
Sisymbrium altissimum	tall tumblemustard	Brassicaceae	Annual/biennial forb
Sphaeralcea grossulariifolia	gooseberryleaf globemallow	Malvaceae	Perennial forb
Sphaeralcea munroana	Munro's gobemallow	Malvaceae	Perennial forb
Sphaerophysa salusula	Austrian peaweed	Fabaceae	Noxious weed
Taraxacum officinale	common dandelion	Asteraceae	Perennial forb
Tragopogon dubius	salsify	Asteraceae	Annual/biennial forb
Verbascum blattaria	moth mullein	Scrophulariaceae	Biennial forb
Zigadenus venenosus	meadow deathcamas	Liliaceae	Perennial forb
Grasses and Grass-like Plants (Herbaceous Stratum)			
Agropyron cristatum	crested wheatgrass	Poaceae	Perennial grass
Bromus tectorum	cheatgrass	Poaceae	Annual grass

Scientific Name	Common Name	Family Name	Plant Description
Eleocharis sp.	spikerush	Cyperaceae	Monocot
Elymus caput-medusae	medusahead	Poaceae	Annual grass
Elymus elymoides	squirreltail	Poaceae	Perennial grass
Eragrostis cilianensis	stinkgrass	Poaceae	Annual grass
Festuca idahoensis	Idaho fescue	Poaceae	Perennial grass
Hesperostipa comata	needle and thread	Poaceae	Perennial grass
Hordeum jubatum	foxtail barley	Poaceae	Perennial grass
Juncus sp.	rush	Juncaceae	Monocot
Leymus cinereus	basin wildrye	Poaceae	Perennial grass
Poa secunda	Sandberg bluegrass	Poaceae	Perennial grass
Polypogon monspeliensis	rabbit's foot grass	Poaceae	Annual grass
Pseudoroegneria spicata	bluebunch wheatgrass	Poaceae	Perennial grass
Vulpia microstachys	small fescue	Poaceae	Annual grass

APPENDIX E

2017 VEGETATION FIELD SAMPLING FORMS

Calico Resources Grassy Mountain Project
Vegetation Survey *Reporting Form*

Project: Calico Resources – Grassy Mountain Exploration Project	**Transect Name/#:** 1

Field Surveyor(s): 1. Annie Overlin 2. Sarah M. Harrelson	Date: 5/21/17 Time: Weather:
Location Description: Daubenmire 6; bunchgrass/annual	GPS Coordinates N: 43.73541 E: 117.31324
Vegetation Class: (i.e., sagebrush/grassland: grassland) grassland	
Plot Size: 10'X10'	
Section, Township, Range: 23, 21S, 44E	Datum: WGS84
Land Ownership (BLM, private): BLM	Accuracy: +/- 1meter

Est. % bare ground: 15	Aspect: S
Slope: +/-15%	Vegetation Height: 18"
Disturbance (grazing, roads, etc.): fire	

Common Name	Botanical Name	Quantity
bastard toadflax	Commandra umbellata	33
prickly phlox	Phlox hoodii	13
tapertip hawksbeard	Crepis acuminata	2
bluebunch wht-grass	Pseudoregneria spicata	6
cheatgrass	Bromus tectorum	dom
slimflower scurfpea	Psoralidium tenuiflorum	10
needle & thread	Hesperostipa comata	5
thistle	Cirsium sp.	1

Calico Resources Grassy Mountain Project
Vegetation* Survey *Reporting Form

TES Species Observed (circle one): **YES** **NO**

☐ USFWS
☐ BLM
☐ State of Oregon

Common Name	Botanical Name	Quantity

Population Notes:

Noxious Weeds/Invasive Species Observed (circle one): **YES** **NO**

☐ Class A
☐ Class B
☒ Class C

Common Name	Botanical Name	Quantity
Cheatgrass	Bromus tectorum	dom

Population Notes:

Additional Vegetation Survey Notes:

Cheatgrass forms a mat of cover; Not able to count individual plants

Site Photographs (include photo #, brief description and direction):

Photos 5945, 5946 Annie Overlin

Calico Resources Grassy Mountain Project
Vegetation Survey *Reporting Form*

Project: Calico Resources – Grassy Mountain Exploration Project	**Transect Name/#:** 2

Field Surveyor(s): 1. Annie Overlin 2. Sarah M. Harrelson	Date: 5/21/17 Time: Weather:
Location Description: @ Doubenmire 6 Crested wheat seeding	GPS Coordinates N: 43.70473 E: 117.36408
Vegetation Class: (i.e., sagebrush/grassland: grassland) grassland	
Plot Size: 10' X 10'	
Section, Township, Range: 32, 21S, 44E	Datum: WGS84
Land Ownership (BLM, private): BLM	Accuracy: +/- 1 meter

Est. % bare ground: 40	Aspect: North
Slope: 10%	Vegetation Height: 12-18"
Disturbance (grazing, roads, etc.): fire, grazing	

Common Name	Botanical Name	Quantity
Crestedwheatgrass	Agropyron cristatum	33
Cheatgrass	Bromus tectorum	dom
Curvested buttercup	Ceratocephala testiculata	dom
gooseberryleaf globemallow	Sphaeralcea grossulariifolia	2
Small fescue	Vulpia microstachys	100

Calico Resources Grassy Mountain Project
Vegetation* Survey *Reporting Form

TES Species Observed (circle one): **YES** **NO**

☐ USFWS
☐ BLM
☐ State of Oregon

Common Name	Botanical Name	Quantity

Population Notes:

Noxious Weeds/Invasive Species Observed (circle one): **YES** **NO**

☐ Class A
☐ Class B
☒ Class C

Common Name	Botanical Name	Quantity
Cheatgrass	Bromus tectorum	dom

Population Notes:

Additional Vegetation Survey Notes:

Cheatgrass forms a mat; unable to count individual plants

Site Photographs (include photo #, brief description and direction):

photos 5947, 5948 Annie Overlin

Calico Resources Grassy Mountain Project
Vegetation Survey *Reporting Form*

Project: Calico Resources – Grassy Mountain Exploration Project	**Transect Name/#:** 3

Field Surveyor(s): 1. Annie Overlin 2. Sarah M. Harrelson	Date: 5/21/17 Time: Weather:
Location Description: @ Daubenmire 7 mtn sagebrush / crested wheat	GPS Coordinates N: 43.679957 E: 117.362163
Vegetation Class: (i.e., sagebrush/grassland: grassland) Sagebrush / grassland	
Plot Size: 10' x 10'	
Section, Township, Range: 5, 22S, 44E	Datum: WGS 84
Land Ownership (BLM, private): BLM	Accuracy: +/- 1 meter

Est. % bare ground: 5	Aspect: NW
Slope: 5-60%	Vegetation Height: 3-5'
Disturbance (grazing, roads, etc.): fire / grazing	

Common Name	Botanical Name	Quantity
Crested wheatgrass	Agropyron cristatum	47
Cheatgrass	Bromus tectorum	dom
Sandberg's bluegrass	Poa secunda	32
mountain big sagebrush	Artemisia tridentata ssp. vaseyana	1
Astragalus	Astragalus sp.	1

Calico Resources Grassy Mountain Project
Vegetation* Survey *Reporting Form

TES Species Observed (circle one): **YES** **NO**

☐ USFWS
☐ BLM
☐ State of Oregon

Common Name	Botanical Name	Quantity

Population Notes:

Noxious Weeds/Invasive Species Observed (circle one): **YES** **NO**

☐ Class A
☐ Class B
☒ Class C

Common Name	Botanical Name	Quantity
Cheatgrass	Bromus tectorum	dom

Population Notes:

Additional Vegetation Survey Notes:

Cheatgrass forms a mat; unable to count individuals

Site Photographs (include photo #, brief description and direction):

photos 5953, 5954, 5955 Annie Overlin

N 48.87277

Daubenmire W 117.27930

Page 1 of 1

Study Number	Date 5/20/17	Examiner A. Overlin	Allotment Name & Number Annual grass	Pasture
Transect Number and Location Daubenmire #1; 50ft West of Twin Spring Rd.			Number of Quadrats 50	

Plant Species	Quadrat																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
~~AG~~ BRTE	5	4	5	4	5		1	2	4	5	4	3	4	3	3	4	4	5	3	4	3	4	3	4	3
POSE	1	2	1	2	1	3	4	4	1	1	2	2	1	2	3	3	3	1	4	3	2	2	3	3	4
SIAL				1																					
~~GA~~																									

Plant Species	Quadrat																								
	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
BRTE	3	2	3	3	4	4	5	5	2	1	1	2	3	1	3	1	1		1		1	2	3	1	
POSE	4	4	1	4	3			1		5	5	5	3	5	4			5	5	5	5	1	1	1	2
SIAL			3			1	1		1							1	1								
CANU						2			1																
RATE									1																

Illustration 9

Daubenmire Summary

Study Number | Date 5.20.17 | Examiner A. Overlin | Allotment Name & Number Annual grass | Pasture

Study Location Daubenmire #1 Soft W. of Twin Springs Rd. | Number of Quadrats 50

Cover Class	Mid-Point	Species BRTE Number	BRTE Product	Species POSE Number	POSE Product	Species SIAL Number	SIAL Product	Species CANU Number	CANU Product	Species RATE Number	RATE Product	Species Number	Species Product	Species Number	Species Product	Species Number	Species Product	Species Number	Species Product	Species Number	Species Product	Species Number	Species Product
1 1-5%	2.5	9	22.5	12	30	6	15	1	2.5	1	2.5												
2 5-25%	15	5	75	8	120	0		1	15														
3 26-50%	37.5	13	487.5	9	337.5	1	37.5																
4 51-75%	62.5	12	750	8	500																		
5 76-95%	85	7	595	8	680																		
6 96-100%	97.5																						
Total canopy			1930.5		1667.5		52.5		17.5		2.5												
Number of Samples			50		50		50		50		50												
% canopy cover			39		33		1		.35		.05												
Species composition			53		45		1.4		.5		.07												
Frequency			92		90		14		4		2												

Illustration 10

N. 43.86094
W. 117.27670

Daubenmire

Page 1 of 2

Study Number	Date	Examiner	Allotment Name & Number	Pasture
Daubenmire 2	5/20/17	A. Overlin	sagebrush/ bunchgrass	

Transect Number and Location: -30ft west of Access Road

Number of Quadrats: 50

Plant Species	Quadrat																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
ARTRV						4	3	1							2	2	2		1						
CHVI																									
POSE	4	3	4	2	3		1	3	1	2	2	3	3	2	1	1	2		3	4	4	1	3	3	2
AGSP																									
ESP3																	3								
BRTE	1	1	1	4	4	1	2	4	4	4	3	4	3	4	3	3	2	2	1	2	1	4	2	1	4

Plant Species	Quadrat																								
	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
ARTRV			1	4	3		2			2	5							2		1			1	1	
CHVI																									3
POSE	2	2	2		1	1		3	3						3	1	4	1	2	2	4	2	3		
BRTE	3	3	2	2	3	1	1	2	2	3	3	4	4		2	4	2	4	3	3	1	3	1	3	2

Illustration 9

Illustration 10

Daubenmire Summary

Study Number	Date 5.20.17	Examiner A. Overlin	Allotment Name & Number burned area sagebrush/grass	Pasture
Study Location Daubenmire 2				Number of Quadrats 50

Cover Class	Mid-Point	Species ARTRV		Species CHVI		Species POSE		Species AGSP		Species ERSP		Species BRTE		Species		Species		Species		Species		Species	
		Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product
1 1-5%	2.5	6	15		0	8	20	9	22.5			11	27.5										
2 5-25%	15	6	90		0	12	180	8	120			12	180										
3 26-50%	37.5	2	75	1	37.5	12	450	1	37.5	1	37.5	13	488										
4 51-75%	62.5	2	125		0	6	375					13	813										
5 76-95%	85	1	85		0																		
6 96-100%	97.5																						
Total canopy			390		37.5		1025		180		37.5		1568										
Number of Samples			50		50		50		50		50		50										
% canopy cover			8		1		21		4		1		30										
Species composition			13		2		33		6		2		47										
Frequency			34		2		76		36		2		98										

N 43.79958

Daubenmire W 117.31617 Was Sagebrush

Study Number	Date 5/20/17	Examiner A. Overlin	Allotment Name & Number Burned CHVI burngrass	Pasture

Transect Number and Location: Daubenmire 3; 300ft. East of Twin Springs Rd.

Number of Quadrats: 50

Plant Species	Quadrat																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
BRTE		1	1	1	1			1	1	1		1	1	1	1	1	2	1	2	1	1	1	1	1	2
POSE	3	3	2	2	3	3	2	3	3	2	2	2	3	3	2	2	1	2	2	2	2	1	2	2	2
AGSP			2						2	3			2	2	2	2	3					2	2		
CHVI	2			3		2	1				1				1										
EL EL								1				1						2							
ERCI																			1						
LECI																				1		3		2	
LEPE																									1

Plant Species	Quadrat																								
	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
BRTE	1	1	1	1	1	2	1	1	1	2	1	1	1	2		1	1	2	1			1		1	1
POSE	2	3	3	2	3	2	3	1	2	2	2	3	3	2	1	2	3	2	3	3	2	2	2	2	3
AGSP	2			2			2	3	1			1			2	2			1		2		2	2	1
CHVI									1						1				1	1					
ERCI																1				1				1	

Daubenmire Summary

Study Number	Date 5.20.17	Examiner A. Overlin	Allotment Name & Number	Pasture
Study Location Daubenmire #3 was sagebrush, burned, now CHVI + bunchgrass, seeded			Number of Quadrats 50	

Cover Class	Mid-Point	Species BRTE Number	BRTE Product	Species POSE Number	POSE Product	Species AGSP Number	AGSP Product	Species CHVI Number	CHVI Product	Species ERCI Number	ERCI Product	Species ELEL Number	ELEL Product	Species LECI Number	LECI Product	Species LEDE Number	LEDE Product	Species Number	Species Product	Species Number	Species Product	Species Number	Species Product
1 1-5%	2.5	35	87.5	4	10	4	10	7	17.5	4	10	2	5	1	2.5	1	2.5						
2 5-25%	15	7	105	28	420	16	240	2	30			1	15	1	15								
3 26-50%	37.5			18	675	3	112.5	1	37.5					1	37.5								
4 51-75%	62.5																						
5 76-95%	85																						
6 96-100%	97.5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–							
Total canopy			192.5		1105		362.5		85		10		20		55		2.5						
Number of Samples			50		50		50		50		50		50		50		50						
% canopy cover			4		22		7		2		–		–		1		+						
Species composition			V.1		60		20		5		1		1		3		–						
Frequency			84		100		46		20		8		6		6		2						

Illustration 10

[redacted]

Daubenmire

N 43.75393
W 117.31122

Page 1 of 1

Study Number	Date	Examiner	Allotment Name & Number	Pasture
Daubenmire 4	5/20/17	A. Overlin	Sagebrush bunchgrass	

Transect Number and Location: 100yds West of Intersection of Twin Springs & Mitchell Butte Rd.

Number of Quadrats: 50

Plant Species	Quadrat																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
ARTRV				1	3	2		4	3	3			3	2	2		2	3					3		
POSE	2	2	3	3	1	3	1	2	2	2	3		2		2	3	3	2	2	1		1		1	1
BRTE	2	1	1	1	1	1		1	1	1	1			1	1	1	2	2	2	2		2	2		
VUMI							2				1	2	1	2									1	3	3
FEID			1		1		2					2							1	2				1	
HECO26																							1		
DEPI																									

Plant Species	Quadrat																								
	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
ARTRV		5	4	2																					
POSE	1		1	1	3	2	1	2	1	3	2	2	1	2	3	2	2	1	2	2	1	1	2	2	2
BRTE		1	2	1	1	3	3	2	3	2		1	1	1	1	1		X	1	1	1	1	2	2	1
VUMI				2														1							
FEID	3	1		1	1					1			2				1			1	2		1		1
HECO26		1		1													1			1					
DEPI		1																							
SIAL											1														
ELEL																					1	1			

Illustration 9

Daubenmire Summary

Study Number	Date 5.20.17	Examiner A. Overlin	Allotment Name & Number Sagebrush bunchgrass	Pasture
Study Location Daubenmire #4				Number of Quadrats 50

Cover Class	Mid-Point	Species ARTR		Species BRTE		Species POSE		Species VUMI		Species FEID		Species DEPI		Species HELO26		Species SIAL		Species ELEL		Species		Species	
		Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product
1 1-5%	2.5	1	2.5	25	62.5	15	37.5	4	10	12	30	2	5	4	10	1	2.5	2	5				
2 5-25%	15	5	75	12	180	21	315	4	60	4	60												
3 26-50%	37.5	6	225	3	112.5	9	337.5	2	75	1	37.5												
4 51-75%	62.5	2	125																				
5 76-95%	85	1	85																				
6 96-100%	97.5		-	-	-	-		-		-		-		-		-		-					
Total canopy			512.5		355		690		145		127.5		5		10		2.5		5				
Number of Samples			50		50		50		50		50		50		50		50		50				
% canopy cover			10		7		14		3		3		-		-		-		-				
Species composition			28		19		37		8		7		-		1		-		-				
Frequency			30		80		90		20		34		4		8		2		4				

Illustration 10

Illustration 9

Daubenmire N 43.73541 W 117.31324 Page 1 of 3

Study Number	#5 Daub	Date	5/21/17	Examiner	AO	Allotment Name & Number		Pasture	
Transect Number and Location	Bunchgrass / cheatgrass					Number of Quadrats	50		

Plant Species	Quadrat																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
AGSP	1	2		3		2				2	4	1	2			2	3	1	2	3	3	3			
BRTE	5	4	3	2	4	2	2	3	2	3	3	3	3	5	5	3	2	3	3	3	2	2	2	2	2
HECO26					1	1																			
BASA											1														
CRAC		1																	1			2	·		
POSE		5	1										2					2			1		1		
PHHO				2	1		1																		
RATE				1																					
COUM				1		1																			
CHVI						1													1						
VUMI									1																
MEAL																									1

Plant Species	Quadrat																								
	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
AGSP	4	1			4	1	2	2	2	3	3	2													
BRTE	1	3	5	3	2	5	2	2	1	2	1	4	5	4	4	4	4	3	3	3	3	4	4	4	3
POSE			1	1					1		1									1	1				
CRAC				2					1	2															
PSTES													1												
~~AGSP~~ MEAL													1	1											1
HECO26																	1	2	1		1	1			
CHVI																			1						
ERCI																				1					
Calochortus																				1	1				

Daubenmire Summary

Study Number	Date 5.21.17	Examiner	Allotment Name & Number	Pasture
Study Location Daubenmire 5 100 yrds East of Twin Springs Rabunchgrass/ annual grass			Number of Quadrats 50	

Cover Class	Mid-Point	Species AGSP		Species BRTE		Species HECO26		Species BASA		Species CRAC		Species POSE		Species PHTO		Species RATE		Species COUM		Species CHVI		Species VUMI	
		Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product
1 1-5%	2.5	5	12.5	4	10	4	10	1	2.5	3	7.5	9	22.5	2	5	1	2.5	2	5	3	7.5	1	2.5
2 5-25%	15	10	150	14	210	1	15			3	45	2	30	1	15		30						
3 26-50%	37.5	7	262.5	16	600																		
4 51-75%	62.5	2	125	10	625																		
5 76-95%	85			6	510																		
6 96-100%	97.5				-		-																
Total canopy			550		1955		25		2.5		52.5		52.5		20		32.5		5		7.5		2.5
Number of Samples			50		50		50		50		50		50		50		50		50		50		50
% canopy cover			11		39		1		-		1		1		-		1		-		-		-
Species composition			20		72		1		-		2		2		1		1		-		-		-
Frequency			48		100		10		2		12		22		6		2		4		6		2

Illustration 10

2727.5

Cont.

Daubenmire Summary

Page 3 of 3

Study Number	Date 5.21.17	Examiner A. Overlin	Allotment Name & Number	Pasture
Study Location	Daubenmire #5 cont.		Number of Quadrats	50

Cover Class	Mid-Point	Species: MEAL		Species: POSTES		Species: ERCF		Species: Calochortus		Species		Species		Species		Species		Species		Species		Species	
		Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product
1 1-5%	2.5	6	15	1	2.5	1	2.5	1	2.5														
2 5-25%	15																						
3 26-50%	37.5																						
4 51-75%	62.5																						
5 76-95%	85																						
6 96-100%	97.5																						
Total canopy			15		2.5		2.5		2.5														
Number of Samples			50		50		50		50														
% canopy cover			–		–		–		–														
Species composition			1		–		–		–														
Frequency			12		2		2		2														

Illustration 10

1% rock
10% litter
40 So bare ground

4/9% grass
- no shrubs

N 43.70473
W 117.36408

Daubenmire

Page 1 of 2

Study Number	Date 5/21/17	Examiner	Allotment Name & Number	Pasture

Transect Number and Location Daub. 6 Crested Wht Seeding | Number of Quadrats 50

Plant Species	Quadrat																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
AGSP	1	1	3	3	2	2	2	2	2	1	3	4	4	2	3	1	1	3	3	2	2	3	2	2	1
BRTE	1	2	1	2	2	2	2	2	2	2	2	1	2	1	1	1	1	1	2	2	1	1	1	1	1
RATE	1	2	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
POSE						2					1		1	1	2	2	2					1		1	1

Plant Species	Quadrat																								
	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
AGSP	1	2	3		3			2	2	1		3			1	1	1	2		1	2	2	3		
BRTE	1	1	1	1	2	1	1	1	2	1	2		2	3	3	2	2	3	2	3	2	1	2	2	2
RATE	1	1	2	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1
POSE		2							1				1				1		1		2			1	
AGSP							4	1																	

Illustration 9

Daubenmire Summary

Page 2 of 2

Study Number	Date 5.21.17	Examiner A. Overlin	Allotment Name & Number	Pasture
Study Location	Daubenmire #6 Crested wheat seeding			Number of Quadrats 50

Cover Class	Mid-Point	Species AGCR		Species BRTE		Species RATE		Species POSE		Species AGSP		Species		Species		Species		Species		Species		Species	
		Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product
1 1-5%	2.5	12	30	22	55	46	115	8	20	1	2.5												
2 5-25%	15	16	240	23	345	4	60	6	90														
3 26-50%	37.5	11	412.5	4	150																		
4 51-75%	62.5	2	125							1													
5 76-95%	85																						
6 96-100%	97.5	–	–	–	–	–	–	–	–	–	–												
Total canopy			807.5		550		175		110		2.5												
Number of Samples			50		50		50		50		50												
% canopy cover			16		11		4		2		–												
Species composition			49		33		11		7		–												
Frequency			82		98		100		28		4												

Illustration 10

1645

N 43.07957
W 117.36263

Daubenmire

Study Number	Date 5/21/17	Examiner	Allotment Name & Number	Pasture

Transect Number and Location: Daub. 7 Mtn. Sagebrush crested wht

Number of Quadrats: 50

Plant Species	Quadrat																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
AGSM	2	1	2	2		2	2	2		2	3	1		3	1	3		2							
POSE	2	2	2	1	1	1		1	2					1	3							1	2	1	
BRTE	1	1	2	2	2	1	2	2	2	2	1	3	3	2		2	3	2	3	3	1	3	2	2	X 3
RATE	1	1		1	1		1	1																	
ARTRV									2	2													2		
Epilobium sp		1																							
ASPU			2																						
ZIVE					1			1				X	2		2		1								1
AGSP									2	1									2	X	4				
COPA									1	1	1														
CHVI															1										

Plant Species	Quadrat																								
	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
AGSM		1						2	2	3	1		2	1	2	3		1	3		2			1	1
POSE	1	1								1			1	1	2				1	1				2	2
BRTE	3	3	2	3	2	2	2	2	X 4	2	3	5	2	1	1	2	3	3	1	X 3	3	2	2	2	2
ARTRV		1																							
AGSP					2	2	3	1																	
RATE					1	1	1								1	1						1	1		
LEPE														1											

Illustration 9

Daubenmire Summary

Page 2 of 2

Study Number	Date 5.21.17	Examiner A. Overlin	Allotment Name & Number	Pasture
Study Location Daubenmire #7 sagebrush & crested wheat			Number of Quadrats 50	

Cover Class	Mid-Point	Species AGCR		Species POSE		Species BRTE		Species RATE		Species ARTRV		Species Eriogonum		Species ASPU		Species ZIVE		Species AGSO		Species COPA		Species CHVI		Species EPPE
		Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	
1 1-5%	2.5	9	22.5	14	35	8	20	13	32.5	1	2.5	1	2.5			3	7.5	3	7.5	3	7.5	1	2.5	1
2 5-25%	15	13	195	8	120	24	360			3	45			2	30	2	30	4	60					
3 26-50%	37.5	6	225	1	37.5	15	562.5											1	37.5					
4 51-75%	62.5					1	62.5											1	62.5					
5 76-95%	85					1	85																	
6 96-100%	97.5	—	—		—		—		—		—		—		—		—		—		—		—	
Total canopy		442.5		1925		1090		32.5		47.5		2.5		30		37.5		1,167.5		7.5		2.5		2.5
Number of Samples		50		50		50		50		50		50		50		50		50		50		50		50
% canopy cover		9		4		22		1		1		—		1		1		2		—		—		
Species composition		22		9		53		2		2		—		1		2		8		—		—		—
Frequency		56		46		98		26		8		2		4		10		18		6		2		1

total = 1250.5

Illustration 10

APPENDIX F

USFWS IPAC CONSULTATION LETTER

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Oregon Fish And Wildlife Office
2600 Southeast 98th Avenue, Suite 100
Portland, OR 97266-1398
Phone: (503) 231-6179 Fax: (503) 231-6195
https://www.fws.gov/oregonfwo/articles.cfm?id=149489416

In Reply Refer To:
Consultation Code: 01EOFW00-2018-SLI-0114
Event Code: 01EOFW00-2018-E-00212
Project Name: Grassy Mountain

December 01, 2017

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the

human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 et seq.), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to investigate opportunities for incorporating conservation of threatened and endangered species into project planning processes as a means of complying with the Act. If you have questions regarding your responsibilities under the Act, please contact the Endangered Species Division at the Service's Oregon Fish and Wildlife Office at (503) 231-6179. For information regarding listed marine and anadromous species under the jurisdiction of NOAA Fisheries Service, please see their website (http://www.nwr.noaa.gov/habitat/habitat_conservation_in_the_nw/habitat_conservation_in_the_r).

Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Oregon Fish And Wildlife Office
2600 Southeast 98th Avenue, Suite 100
Portland, OR 97266-1398
(503) 231-6179

Project Summary

Consultation Code: 01EOFW00-2018-SLI-0114

Event Code: 01EOFW00-2018-E-00212

Project Name: Grassy Mountain

Project Type: MINING

Project Description: Exploration project permit area and access road

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/43.78722054961776N117.31858383599294W

Counties: Malheur, OR

Endangered Species Act Species

There is a total of 0 threatened, endangered, or candidate species on this species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

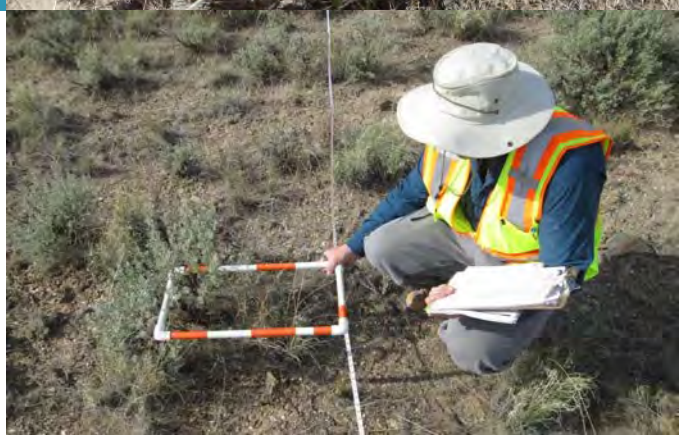
APPENDIX G

ORBIC DATA RESPONSE, APRIL 21, 2017

CONFIDENTIAL – SUBMITTED SEPARATELY

ATTACHMENT A

DRAFT TERRESTRIAL VEGETATION BASELINE STUDY, MAY 2014
DRAFT TERRESTRIAL VEGETATION BASELINE STUDY ADDENDUM #1, JULY 2015
BY HDR ENGINEERING, INC.



Draft Terrestrial Vegetation Baseline Study

Grassy Mountain Exploration Project

Calico Resources USA Corporation

Malheur County, Oregon

May 2014

Table of Contents

Section 1: Introduction 1-1

1.1 Purposes and objectives 1-1
1.2 Project Background 1-1

Section 2: Resource Study Area 2-1

Section 3: Methodology 3-1

3.1 Oregon Administrative Rules 3-1
3.2 Oregon Biodiversity Information Center 3-2
3.3 U.S. Fish and Wildlife Service Threatened, Endangered and Sensitive Species 3-2
3.4 Bureau of Land Management Special Status Species (BLM Manual, Section 6840) 3-2
3.5 Oregon Endangered Species Act 3-3
3.6 Literature Review 3-3
3.7 Field Studies 3-4

Section 4: Baseline Characterization 4-1

4.1 Plant Community Description 4-1
4.2 Vegetation Transects 4-2
4.2.1 Transect 1 4-2
4.2.2 Transect 2 4-5
4.2.3 Transect 3 4-6
4.2.4 Transect 4 4-7
4.2.5 Transect 5 4-8
4.2.6 Transect 6 4-9
4.2.7 Transect 7 4-10
4.2.8 Transect 8 4-11
4.4 Daubenmire Sampling Results 4-12
4.4.1 Daubenmire #1 – Sagebrush/Bunchgrass Community 4-12
4.4.2 Daubenmire #2 – Crested Wheatgrass Community 4-13
4.4.3 Daubenmire #3 – Annual Grass Community 4-14
4.5 Additional Vegetation Survey Results 4-15
4.5.1 Threatened and Endangered Species (federal) 4-15
4.5.2 Sensitive Species (state) 4-15
4.5.3 Noxious weed species 4-15

Section 5: Description of Competing Land Uses 5-1

Section 6: Revegetation and Reclamation Considerations and Opportunities 6-1

Section 7: Bibliography 7-1

Section 8: Contacts 8-1

List of Figures

Figure 1-1. Vicinity Map 1-3
Figure 1-2. Project Area Map 1-5
Figure 4-1. Plant Community Types 4-3

List of Photos

Photo 4-1. Typical sagebrush/bunchgrass plant community. 4-1
Photo 4-2. Typical crested wheatgrass/annual grass community. 4-1
Photo 4-3. Transect 1 occurs in a sagebrush/ bunchgrass plant community. 4-2
Photo 4-4. Vegetation ranges from 6- to 30-inch height with 25 to 30 percent bare ground. 4-2
Photo 4-5. Transect 2 occurs in a sagebrush/ bunchgrass plant community. 4-5
Photo 4-6. Vegetation ranges from 6- to 42-inch height with 50 to 55 percent bare ground. 4-5
Photo 4-7. Transect 3 occurs in a crested wheatgrass/annual grass plant community. 4-6
Photo 4-8. Vegetation ranges from 3- to 24-inch height with 50 to 55 percent bare ground. 4-6
Photo 4-9. Transect 4 occurs in an annual grass plant community. 4-7
Photo 4-10. Vegetation ranges from 4- to 30-inch height with 10 to 15 percent bare ground. 4-7
Photo 4-11. Transect 5 occurs in a sagebrush/ bunchgrass plant community. 4-8
Photo 4-12. Vegetation ranges from 4- to 42-inch height with 30 to 35 percent bare ground. 4-8
Photo 4-13. Transect 6 occurs in a sagebrush/ bunchgrass plant community. 4-9
Photo 4-14. Vegetation ranges from 4- to 42-inch height with 60 percent bare ground. 4-9
Photo 4-15. Transect 7 occurs in an annual grass plant community. 4-10
Photo 4-16. Vegetation ranges from 4- to 12-inch height with 10 percent bare ground. 4-10
Photo 4-17. Transect 8 occurs in a sagebrush/ bunchgrass plant community. 4-11
Photo 4-18. Vegetation ranges from 4- to 30-inch height with 65 to 70 percent bare ground. 4-11
Photo 4-19. Using the Daubenmire frame placed along a 100-foot-long measuring tape, HDR measured 50 quadrats. 4-12
Photo 4-20. Daubenmire #1 was located approximately 30 feet from the proposed access road within the sagebrush/bunchgrass plant community. 4-12
Photo 4-21. Clumps of crested wheatgrass are visible within sampling area. 4-13
Photo 4-22. Daubenmire #2 was located approximately 100 yards from Twin Springs Road within the crested wheatgrass plant community. 4-13
Photo 4-23. Sampling in the annual grass plant community. 4-14
Photo 4-24. Daubenmire #3 was located approximately 200 feet west of Twin Springs Road within the annual grass plant community. 4-14

List of Tables

Table 4-1. Transect #1 Sagebrush/Bunchgrass Community 4-2
Table 4-2. Transect #2 Sagebrush/ Bunchgrass Community 4-5
Table 4-3. Transect #3 Crested Wheatgrass/Annual Grass Community 4-6
Table 4-4. Transect #4 Annual Grass Community 4-7
Table 4-5. Transect #5 Sagebrush/Bunchgrass Community 4-8
Table 4-6. Transect #6 Sagebrush/Bunchgrass Community 4-9
Table 4-7. Transect #7 Annual Grass Community 4-10
Table 4-8. Transect #8 Sagebrush/Bunchgrass Community 4-11
Table 4-9. Daubenmire #1 Sagebrush/Bunchgrass Community 4-12
Table 4-10. Daubenmire #1 Crested Wheatgrass Community 4-13
Table 4-11. Daubenmire #3 Annual Grass Community 4-14
Table 6-1. Preliminary Reclamation Seed Mixture 6-1

Appendices

Appendix A: Vegetation Species Observed
Appendix B: Vegetation Field Sampling Forms
Appendix C: State of Oregon Sensitive Plant Species List
Appendix D: Malheur County Noxious Weed Species List

Acronyms

Atlas	Atlas Precious Metals
BLM	Bureau of Land Management
Calico	Calico Resources USA Corporation
ESA	Endangered Species Act
GPS	global positioning system
HDR	HDR Engineering, Inc.
NEPA	National Environmental Policy Act
NMC	Newmont Grassy Mountain Corporation
NRCS	Natural Resources Conservation Service
OAR	Oregon Administrative Rules
OBDIC	Oregon Biodiversity Information Center
ODA	Oregon Department of Agriculture
ODFW	Oregon Department of Fish and Wildlife
ODOT	Oregon Department of Transportation
ORNHP	Oregon Natural Heritage Program
ORS	Oregon Revised Statutes
POO	plan of operations
TES	threatened and endangered species
TRT	technical review team
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service

Section 1: Introduction

1.1 Purposes and objectives

The purpose of the terrestrial vegetation baseline study is to characterize existing conditions prior to the start of proposed mining operations at the Calico Resources USA Corporation (Calico) Grassy Mountain Exploration Project, located in Malheur County, Oregon. This study characterizes the pre-project terrestrial vegetation communities, including species diversity; presence or absence of federally-listed threatened, endangered and sensitive (TES) species; Oregon and Bureau of Land Management (BLM) sensitive species; and condition and presence of noxious weeds. HDR Engineering, Inc. (HDR) has prepared this vegetation study to meet the following objectives:

- Describe field procedures, methodologies and documentation requirements used in the field surveys to characterize existing vegetation baseline conditions at the mine and mill sites and access road corridor, as well as the regional setting, as it relates to the predominant terrestrial vegetation communities.
- Describe methodology used to inventory vegetation.
- Identify other current land uses which could affect the condition of existing terrestrial vegetation resources at the site (i.e., grazing).
- Survey and record potential threatened, endangered, candidate, and sensitive plant species within the project area.
- Survey for noxious weeds that occur in the project area and describe potential management options for controlling weeds while constructing and operating a mine at the site.

A key goal of this study is to develop a baseline program focused on natural revegetation, wildlife habitat restoration, and reclamation at the end of the potential mine life.

1.2 Project Background

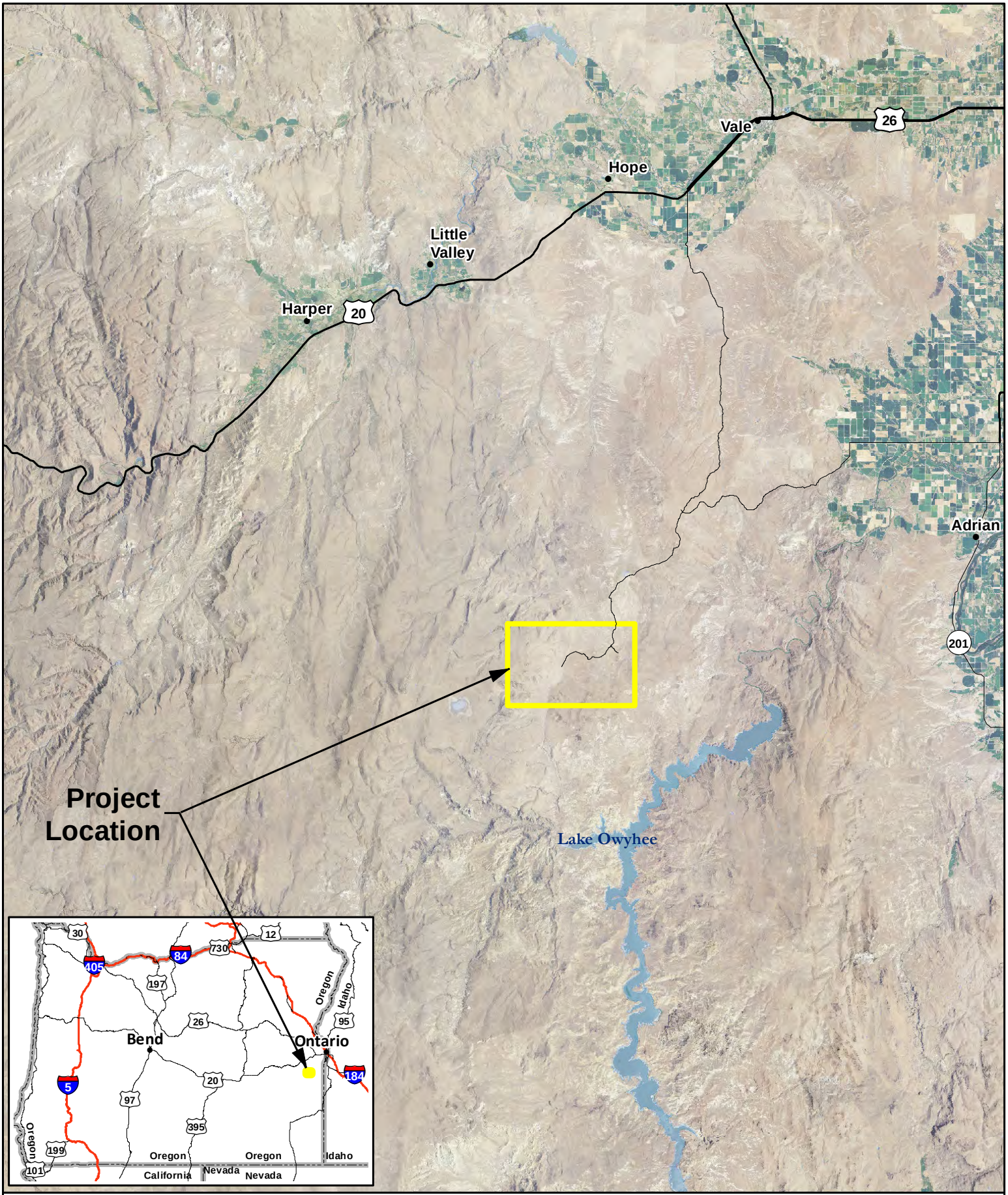
As shown in **Figure 1-1**, the Grassy Mountain project is located in Malheur County, Oregon, about 25 miles south-southwest of Vale. The mine is located on three patented lode mining claims that cover an estimated 62 acres. The three patented lode claims are part of a larger land position defined as three patented lode claims; 419 un-patented lode claims managed by BLM; and 1,300 acres of the land, including six association placer claims all controlled by Calico.

The Grassy Mountain project area is shown in **Figure 1-2**. The proposed action would potentially directly and indirectly affect up to 388 acres of upland plant species. This includes the mine area, processing facilities and tailings disposal, and haul road between the mine area and processing facility. More specifically, the project study area is broken down as follows:

- Project mine area – 62 acres
- Processing facility and tailings disposal – 281 acres
- Access road – 45 acres

The project area encompasses portions of Section 32, Township 21 South, Range 44 East; Sections 1 and 12, Township 22 South, Range 43 East; Sections 5, 6, 7, and 8, Township 22 South, Range 43 East.

The project is accessed via Highway 20, west from Vale, Oregon, to Rock Creek Road. The site is approximately 25 to 30 miles up Rock Creek Road.



0 5 10

Miles

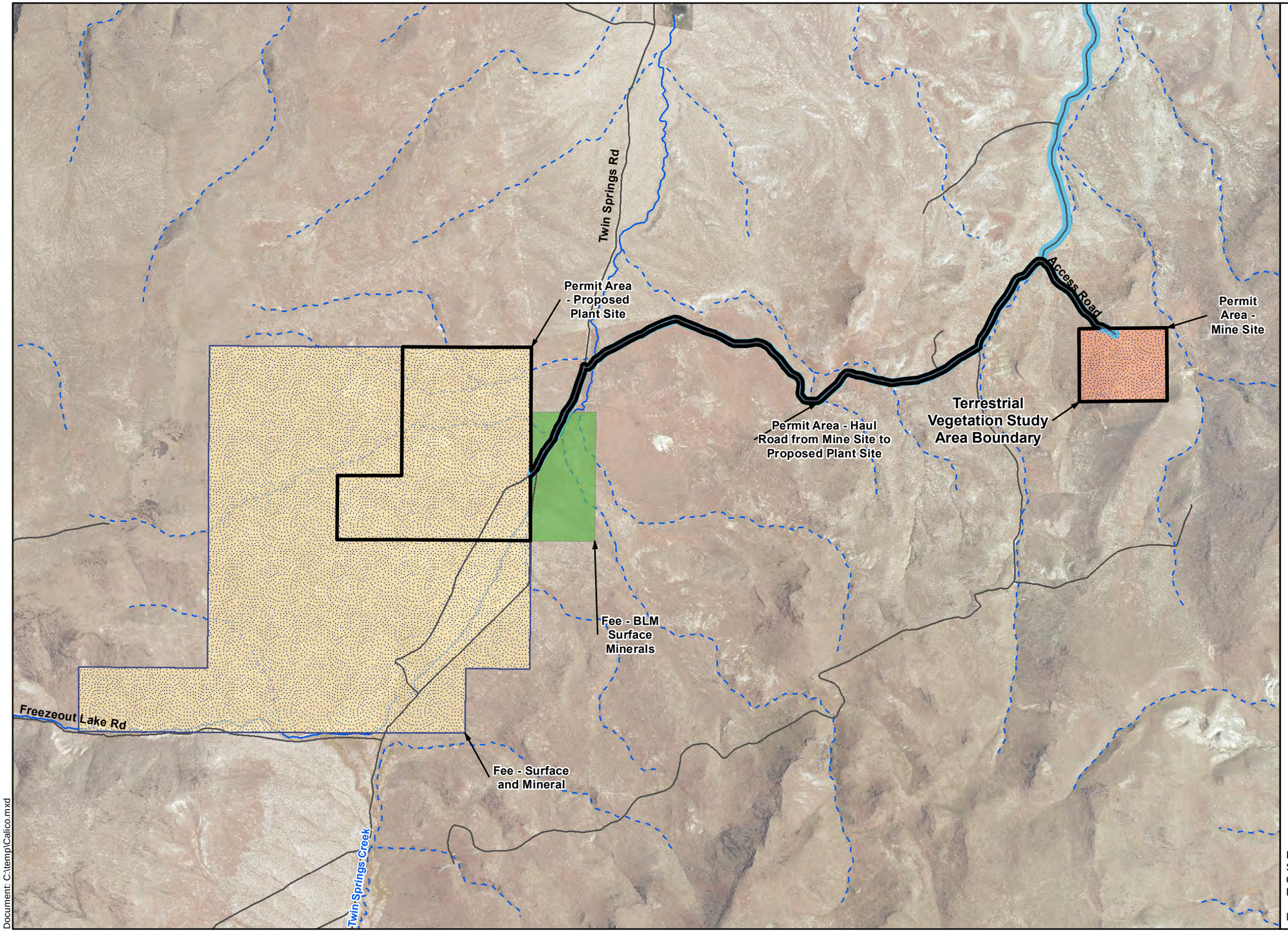
Figure 1-1. Vicinity Map

Calico Resources, Grassy Mountain Project

Malheur County, OR

Imagery: 2012 NAIP 1 meter resolution
Source: NRCS/USDA Digital Gateway
Other Data Sources: USGS; US Census Bureau

Map Production Date: 5/19/2014
Document: Q:\CalicoResources\GrassyMountain\map_docs\Vicinity_LetPort.mxd



Legend

- Permit Area
- Road to be Upgraded
- Terrestrial Vegetation Study Area
- Public Roads
- Perennial Stream
- Intermittent/Ephemeral Stream

Calico Resources Properties/Interests

- Fee - BLM Surface Mineral
- Fee - Surface and Mineral
- Patented Claims - Surface and Mineral

0 2,000 4,000
Feet

Imagery: 2011 NAIP 1 meter resolution
Source: NRCS/USDA Digital Gateway
Other Data Sources: BLM, Oregon Department of Fisheries, USGS, US Fish and Wildlife Service

Map Production Date: 12/10/2012

Document: C:\temp\Calico.mxd

Figure 1-2. Project Area Map
Calico Resources, Grassy Mountain Project
Malheur County, OR

Section 2: Resource Study Area

The study area for terrestrial vegetation resources includes the entire project area shown on **Figure 1-2** and covers approximately 388 acres.

Terrestrial vegetation in the study area is a typical, cold-desert type. Vegetation communities include big sagebrush/bunchgrass community, crested wheatgrass/annual community, annual grassland community, and wetland area(s). Invasive species such as cheatgrass (*Bromus tectorum*) and/or medusahead (*Taeniatherum caput-medusae*) dominate most of the vegetation communities.

Much of the study area consists of rocky rangeland with numerous rock outcroppings. Most of the area has been affected by extensive cattle grazing, fire, and range reseeding programs. Access roads are also present throughout much of the study area.

Section 3: Methodology

The environmental baseline data methodology for terrestrial vegetation resources was prepared to meet the requirements of Oregon Administrative Rules (OAR) 632-037-0055, 632-037-0040 and OAR 635, Division 420.

- The federal program to control the spread of noxious weeds as addressed in the Federal Noxious Weed Act of 1974, as amended in 1990 by the U.S. Fish and Wildlife Service (USFWS). BLM Manual 9011 (2007), BLM Handbook H-9011-1 (1994), and BLM Manual 9014 (1990) provide policy for the planning and implementation of biological controls within an integrated pest management program. These policies further require that all ground disturbing projects are evaluated to determine the risk of introducing or spreading noxious weeds.
- The National Environmental Policy Act (NEPA) is expected to be employed in components or all of the mining and processing operations. This baseline study is intended to meet all applicable federal guidelines, as described in the BLM NEPA Handbook H-1790-1 (2008).
- OAR 635, Division 420 rules prescribe the standards for the Oregon Department of Fish and Wildlife (ODFW) to review of proposed chemical process mining operations for the purpose of developing conditions for protection of wildlife and their habitat, to further the Wildlife Policy (ORS [Oregon Revised Statutes] 496.012 and Food Fish Management Policy (ORS 506.109) of the State of Oregon.

3.1 Oregon Administrative Rules

OAR 632, Division 037, Section 0130 Reclamation and Mine Closure Standards that pertain to revegetation include the following:

- Surface reclamation of a chemical process mine shall require certification by ODFW and the Oregon Department of Agriculture (ODA) that a self-sustaining ecosystem, comparable to undamaged ecosystems in the area, has been established to satisfy the permittee's habitat restoration obligations.
- Native species shall be established unless the use of non-native species is justified and approved by the technical review team (TRT).
- Seed mixtures, fertilizer rates and other requirements will be derived from departmental experience and advice from such sources as ODA, Natural Resources Conservation Service (NRCS) (formerly U.S. Soil Conservation Service), Oregon State University Extension Service, the Oregon Department of Transportation (ODOT), BLM, U.S. Forest Service (USFS), local soil conservation districts, and private sector experts.
- Establishment of a self-sustaining ecosystem, comparable to undamaged ecosystems in the area of the mine.
- Revegetation shall be considered successful if it is consistent with the establishment of a self-sustaining ecosystem, comparable to undamaged ecosystems in the area of the mine. Vegetation test plots and chemical/physical soil and subsoil analysis may be required to ensure establishment feasibility.

3.2 Oregon Biodiversity Information Center

The Oregon Biodiversity Information Center (OBDIC) maintains a computerized inventory of the wildlife, plant, and ecological community resources of Oregon. As part of the Natural Heritage Network and NatureServe, OBDIC contributes to a better understanding of global biodiversity and provides tools for managers and the public to better protect plant and animal species and communities.

The Oregon Natural Heritage Program (ORNHP) works to establish natural areas in Oregon and manages the Oregon Natural Heritage Databank, which contains comprehensive information on ecologically and scientifically significant natural areas in the state. ORNHP's mission statement is "to acquire, maintain and distribute information on the organisms and ecosystems that constitute Oregon's natural heritage, and to ensure, through a public planning process and through voluntary public and private efforts, that the full range of Oregon's natural heritage resources is represented within a statewide system of recognized natural areas."

The Oregon Natural Heritage Act (ORS 273.563-273.591) provides the following:

- A natural heritage data management system for Oregon, with an office to manage the system and the other parts of the act;
- A Natural Heritage Advisory Council, with nine citizens appointed by the governor, and a representative from each of the state's natural resources agencies;
- An ORNHP, outlining strategies for protecting examples of Oregon's natural heritage and the natural heritage program;
- An Oregon register of natural heritage areas, a voluntary program which recognizes important natural areas in Oregon; and
- A system of dedicated and protected natural areas, including state natural heritage conservation areas, private reserves, and federal research natural areas.

3.3 U.S. Fish and Wildlife Service Threatened, Endangered and Sensitive Species

USFWS is responsible for administering and implementing the Endangered Species Act (ESA) to conserve, protect, and recover federally-listed species. One plant species is protected under the ESA for Malheur County, Oregon. USFWS listed Howell's spectacular thelypody (*Thelypodium howellii spectabilis*) as a federally-threatened species on May 26, 1999. Habitat for this species is found in moist alkaline meadow habitats, typically adjacent to streams that experience springtime flooding (USFWS 2013).

3.4 Bureau of Land Management Special Status Species (BLM Manual, Section 6840)

Management of Oregon BLM special status species follows agency policy documented in Section 6840 of the BLM manual. Section 6840 defines sensitive species as follows:

> *"... [T]hose species not already included as BLM special status species under (1) federal listed, proposed, or candidate species, or (2) State of Oregon listed species. Native species may be listed as 'sensitive' if one of the following applies: (1) could become endangered or extirpated from a state or significant portion of its range; (2) is under review by the USFWS; (3) numbers or habitat capability are declining so rapidly that federal listing may become necessary; (4) has typically small and widely dispersed populations; (5) inhabits ecological refugia, specialized, or unique habitats; or (6) is state-listed; although, is better conserved through application of the BLM sensitive species status."*

It is BLM policy to provide sensitive species with the same level of protection given to federal candidate species. The major objective of this protection is to preclude the need for federal listing. The federal land management plans and the BLM resource management plans provide management direction for the many multiple uses, including outdoor recreation, range, timber, watershed, fish and wildlife, minerals, wilderness, roadless areas, and cultural resources. These plans were amended by the *Northwest Forest Plan* on the west side of the state and the *Interior Columbia Basin Strategy* on the east side of the state. The Interior Columbia Basin Ecosystem Management Project developed a framework for ecosystem management and a scientific assessment of the ecological, biophysical, social, and economic conditions of the Columbia basin, including all of eastern Oregon. Instead of a formal, basin-wide decision from the project, federal decision makers adopted a strategy of incorporating the science into ongoing BLM land management plans.

A total of 139 plant species are considered special status for the BLM's Vale District.

3.5 Oregon Endangered Species Act

ODA states the following:

> *Native plants that are listed as threatened or endangered in Oregon are protected on all non-federal public lands (state, county, city, etc.) under the Oregon Revised Statute (ORS) 564, commonly known as the Oregon Endangered Species Act. The Oregon Department of Agriculture is given the responsibility for conservation of native plants under the Oregon Administrative Rules (OAR) 603-073-0001. These rules outline the list of activities that require a listed plant permit in Oregon.*

There are no non-federal public lands within the terrestrial vegetation study area; therefore, the Oregon Endangered Species Act does not apply to this project.

3.6 Literature Review

Before beginning vegetation field studies, the HDR team reviewed existing information from past studies and reports for relevant information pertaining to terrestrial vegetation within the project study area.

HDR reviewed the following existing reports:

- BLM, Vale District Office. 1983. *Draft Report, Southern Malheur Grazing Management Program. Environmental Impact Statement*.

- BLM. 2001. *Environmental Impact Statement and Related Appendices (Vegetation and Grazing)*.
- Cedar Creek Associates Inc. 1991. *Vegetation Technical Memorandum*.
- HDR. 2012. *Terrestrial Vegetation Report, Grassy Mountain Project*.
- IMS, Inc. 1989. *Final Report: Soil, Vegetation, and Wildlife Resources of the Grassy Mountain Project Area*.
- Wright, Caroline E. 1991. *Grassy Mountain Project Botanical Survey.*
- Wright, Caroline E. 1989. *Preliminary Grassy Mountain Botanical Report*.

HDR reviewed these additional key references:

- Adrian Brown Consultants, Inc. 1992. *Draft Grassy Mountain Environmental Impact Statement*.
- BLM. 1999. *Overview of BLM's NEPA Process*.
- BLM, Vale District Office. April 2001. *Proposed Southeastern Oregon, Resource Management Plan and Final Environmental Statement*. http://www.blm.gov/or/districts/vale/plans/files/seormp/SEORMP-FEIS-Vol1Txt.pdf
- BLM. 2008. *NEPA Handbook*, H-1790-1.
- BLM. 2008. Manual Section, "6840 – Special Status Species."
- Consolidated State Agency Response. 1993. *Consolidated State Agency Response to Newmont Grassy Mountain Corporations Environmental Baseline Proposed Work Plan*.
- Grassy Mountain Oregon Department of Geology and Mineral Industries (DOGAMI) Technical Review Team (TRT). 2012. *Suggested Baseline Data Methodologies Submittal – Oregon Chemical Processing Mining*.
- Newmont Grassy Mountain Corporation (NMC). 1993. *Vegetation Baseline Study for Newmont Grassy Mountain Mine Project*.
- Oregon Natural Heritage Database. 1989. *Rare, Threatened and Endangered Plants and Animals of Oregon*.
- Pacific Northwest Interagency. 2013. *Final Oregon / Washington State Director Special Status Species List*.

To address potential direct and residual environmental impacts and to form the basis for reclamation planning at the Grassy Mountain site, HDR also reviewed the following prior to beginning field surveys:

- TRT-approved *Grassy Mountain Terrestrial Vegetation Work Plan*.
- Existing reports, mapping and other materials relative to the site, which address terrestrial vegetation resources. These included reports prepared by NMC and Atlas Precious Metals (Atlas), their contractors, ODFW, USFWS, BLM, Malheur County Weed Control Board, and other related documents.

3.7 Field Studies

During preliminary field studies conducted during the summer of 2012, HDR identified three vegetation community types within the study area: sagebrush/bunchgrass, crested wheatgrass/annual grass, and annual grass. HDR's activities included the following:

- Inventoried eight 10-foot-wide by 10-foot-long vegetation transects to determine primary vegetation composition within three vegetation communities for the mine site, transportation access corridor, and the processing plant location.
- Located the eight transects with a global positioning system (GPS) unit.
- Documented the plants by common name, scientific name and the quantity of each species within each transect. Plants inventoried include shrubs, forbs and grasses.
- Identified and documented dominant and co-dominant species.
- Described the ground slope associated with each transect.
- Photo-documented the eight transect sites.

During the early spring of 2013, prior to grazing, HDR used the Daubenmire method for sampling vegetation attributes within each vegetation community to survey an additional transect. This method consists of systematically placing a 20-centimeter by 50-centimeter quadrant frame along a 100-foot measuring tape and determining vegetation characteristics of canopy cover, frequency, and composition by canopy cover. HDR recorded the information collected in the field on standardized Daubenmire field forms, which are included in **Appendix B**.

HDR also conducted a search for any federally-listed TES plant species and sensitive plant species for BLM and State of Oregon. Much of the project study area is located adjacent to BLM land. The list of sensitive plant species for the State of Oregon is included in **Appendix C**.

HDR obtained a list of noxious weeds for Malheur County, Oregon, from the Malheur County Weed Advisory Board website. The list is included in **Appendix D**. Malheur County has prioritized control and/or eradication of noxious weeds by A, B, and C classes, with category A having the highest priority. Noxious weeds that HDR observed on site are described in the baseline characterization section of this report. This inventory will be the basis for Calico developing a noxious weeds control strategy and plan, which are key components of the overall plan of operations (POO) to be submitted as part of the Division 37 process.

Section 4: Baseline Characterization

4.1 Plant Community Description

Vegetation within the study area is a desert-rangeland type where sagebrush and grasses are the dominant species. The area has been extensively grazed for a number of years. Portions of the study area appear to have been re-seeded at one time with a crested wheatgrass (*Agropyron cristatum*) dominated seed mix.

Figure 4-1 shows the three vegetation community types identified within the study area: sagebrush/bunchgrass, crested wheatgrass/annual grass, and annual grass. Cheatgrass and/or medusahead were often the most dominant species in nearly every plant community.

The sagebrush/bunchgrass plant community type is characteristic of the native sagebrush community found throughout much of Eastern Oregon. This plant community typically occurs on rocky slopes. Bare ground in these areas often ranges from 25 to 50 percent. The shrub stratum is typically dominated by big sagebrush (Artemisia tridentata), rubber rabbitbrush (*Chrysothamnus nauseosus*) and green rabbitbrush (*Chrysothamnus viscidiflorus*). The understory typically includes Sandberg's bluegrass (*Poa secunda*), Idaho fescue (*Festuca idahoensis*), and bluebunch wheatgrass (*Agropyron spicatum*) with a cheatgrass and/or medusahead mat. **Photo 4-1** shows typical characteristics of the sagebrush/bunchgrass plant community.

Photo 4-1. Typical sagebrush/bunchgrass plant community.

The crested wheatgrass/annual grass plant community occurs throughout portions of the study area. Soil in these areas is typically less rocky with 25- to 50-percent bare ground. The crested wheatgrass is likely a result of past seedings. Grazing is common in these areas and a cheatgrass and/or medusahead mat is prevalent throughout. **Photo 4-2** shows typical characteristics of the crested wheatgrass/annual grass community.

Photo 4-2. Typical crested wheatgrass/annual grass community.

Some of the study area is dominated by an annual grass plant community. Slopes in these areas are gentle and invasive species such as cheatgrass and medusahead are abundant.

4.2 Vegetation Transects

4.2.1 Transect 1

HDR established one 10-foot-wide by 10-foot-long transect at 117.355E, 43.669N, located in Section 8, Township 22 South, Range 44 East (**Figure 4-1**). Transect 1 is located on an east-facing aspect with slopes ranging from 5 to 8 percent. Approximately 70 to 75 percent of the slope is vegetated. The shrub stratum consists of rubber rabbitbrush with an understory co-dominated by cheatgrass and medusahead. Bunchgrasses are present in the herbaceous stratum. Information for Transect 1 is presented in **Table 4-1**. **Photo 4-3** and **Photo 4-4** show the characteristic vegetative cover in the area of Transect 1.

Table 4-1. Transect #1 Sagebrush/Bunchgrass Community

Coordinates; 117.355E, 43.669N		**Investigators:** Waldher, Modlin **Date:** June 18, 2012
Common Name	**Scientific Name**	**Quantity**
Shrubs		
rubber rabbitbrush	*Chrysothamnus nauseosus*	9
Forbs		
large-flowered goldenweed	*Happlopappus carthamoides*	2
Grasses		
bluebunch wheatgrass	*Agropyron spicatum*	7
cheatgrass	*Bromus tectorum*	Co-dominant herbaceous species
Sandberg's bluegrass	*Poa secunda*	2
medusahead	*Taeniatherum caput-medusae*	Co-dominant herbaceous species

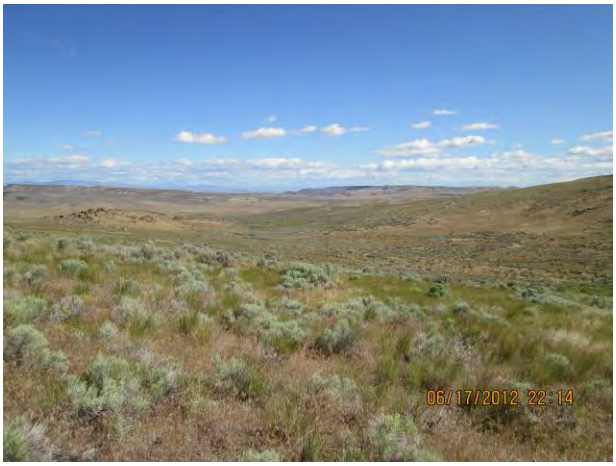


Photo 4-3. Transect 1 occurs in a sagebrush/ bunchgrass plant community.

Photo 4-4. Vegetation ranges from 6- to 30-inch height with 25 to 30 percent bare ground.

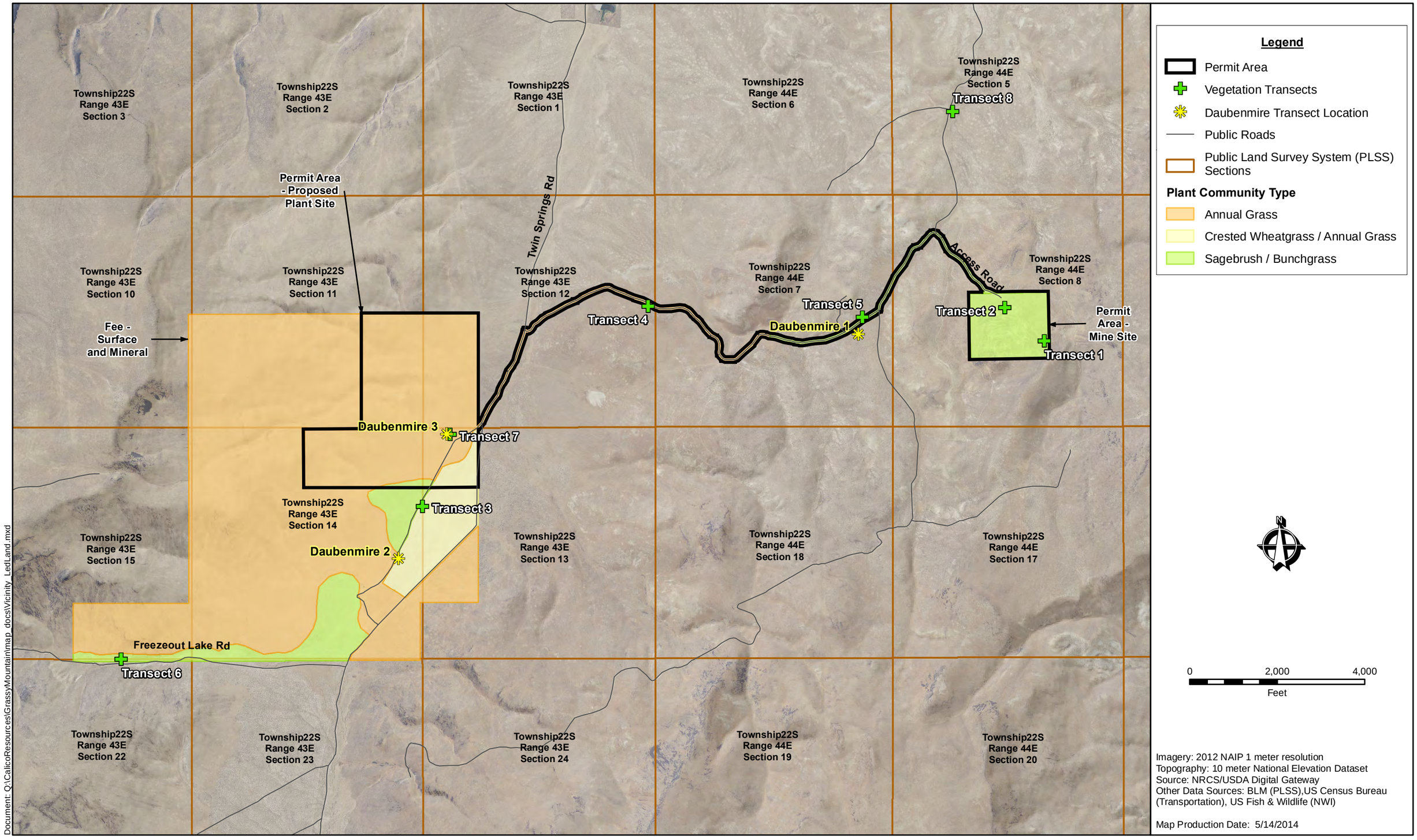


Figure 4-1. Vegetation Community Types
Calico Resources, Grassy Mountain Project
Malheur County, OR

4.2.2 Transect 2

HDR established one 10-foot-wide by 10-foot-long transect at 117.359E, 43.671N, located in Section 8, Township 22 South, Range 44 East (**Figure 4-1**). Transect 2 is located on a north-facing aspect with slopes ranging from 3 to 5 percent. Approximately 45 to 50 percent of the slope is vegetated. The shrub stratum consists of big sagebrush, green rabbitbrush, and greasewood (*Sarcobatus vermiculatus*) with an understory co-dominated by cheatgrass and medusahead. Bunchgrasses are present in the herbaceous stratum. Information for Transect 2 is presented in **Table 4-2**.
Photo 4-5 and **Photo 4-6** show the characteristic vegetative cover in the area of Transect 2.

Table 4-2. Transect #2 Sagebrush/ Bunchgrass Community

Coordinates: 117.359E, 43.671N		**Investigators:** Waldher, Modlin **Date:** June 18, 2012
Common Name	**Scientific Name**	**Quantity**
Shrubs		
big sagebrush	*Artemisia tridentata*	5
green rabbitbrush	*Chrysothamnus viscidiflorus*	1
greasewood	*Sarcobatus vermiculatus*	1
Grasses		
bluebunch wheatgrass	*Agropyron spicatum*	8
cheatgrass	*Bromus tectorum*	Co-dominant herbaceous species
Sandberg's bluegrass	*Poa secunda*	2
medusahead	*Taeniatherum caput-medusae*	Co-dominant herbaceous species

Photo 4-5. Transect 2 occurs in a sagebrush/ bunchgrass plant community.

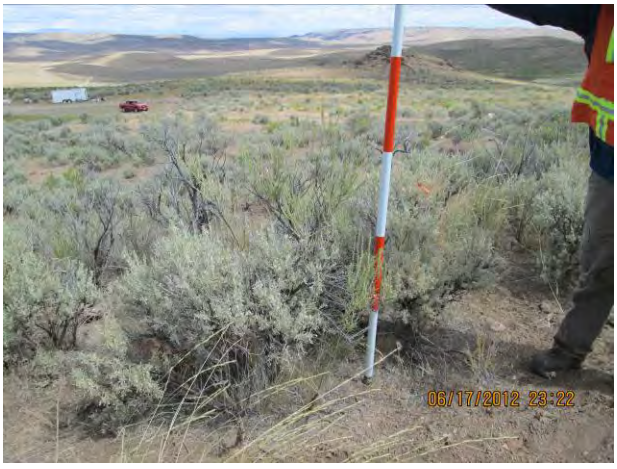


Photo 4-6. Vegetation ranges from 6- to 42-inch height with 50 to 55 percent bare ground.

4.2.3 Transect 3

HDR established one 10-foot-wide by 10-foot-long transect at 117.409E, 43.659N, located in Section 13, Township 22 South, Range 43 East (**Figure 4-1**). Transect 3 is located in a valley bottom with slopes ranging from 1 to 2 percent. Approximately 55 to 60 percent of the area is vegetated. The area appears to be re-seeded with a crested wheatgrass seed mix, but cheagrass and medusahead have invaded throughout. Information for Transect 3 is presented in **Table 4-3**. **Photo 4-7** and **Photo 4-8** show the characteristic vegetative cover in the area of Transect 2.

Table 4-3. Transect #3 Crested Wheatgrass/Annual Grass Community

Coordinates: 117.409E, 43.659N		**Investigators:** Waldher, Modlin **Date:** June 18, 2012
Common Name	**Scientific Name**	**Quantity**
Forbs		
buckwheat	*Erigonum sp.*	1
mustard	*Sisymbrium sp.*	3
Grasses		
crested wheatgrass	*Agropyron cristatum*	29
cheatgrass	*Bromus tectorum*	Co-dominant herbaceous species
Sandberg's bluegrass	*Poa secunda*	17
medusahead	*Taeniatherum caput-medusae*	Co-dominant herbaceous species

Photo 4-7. Transect 3 occurs in a crested wheatgrass/annual grass plant community.

Photo 4-8. Vegetation ranges from 3- to 24-inch height with 50 to 55 percent bare ground.

4.2.4 Transect 4

HDR established one 10-foot-wide by 10-foot-long transect at 117.995E, 43.671N, located in Section 12, Township 22 South, Range 43 East (**Figure 4-1**). Transect 4 is located on a west-facing aspect, with slopes ranging from 3 to 5 percent. Approximately 85 percent of the slope is vegetated. Dominant vegetation within the transect consists of invasive annual grasses such as cheatgrass and medusa head. A small population of Austrian peaweed (*Sphaerophysa salusula*), a noxious weed species, occurs at this location. Information for Transect 4 is presented in **Table 4-4**. **Photo 4-9** and **Photo 4-10** show the characteristic vegetative cover in the area of Transect 4.

Table 4-4. Transect #4 Annual Grass Community

Coordinates: 117.995E, 43.671N		**Investigators:** Waldher, Modlin **Date:** June 18, 2012
Common Name	**Scientific Name**	**Quantity**
Forbs		
pepperweed	*Lepidium perfoliatum*	2
tumble mustard	*Sisymbrium altissimum*	2
Austrian peaweed	*Sphaerophysa salusula*	3
moth mullein	*Verbascum blattaria*	6
Grasses		
crested wheatgrass	*Agropyron cristatum*	6
cheatgrass	*Bromus tectorum*	Co-dominant herbaceous species
Idaho fescue	*Festuca idahoensis*	86
medusahead	*Taeniatherum caput-medusae*	Co-dominant herbaceous species
small fescue	*Vulpia mierostaehys*	3

Photo 4-9. Transect 4 occurs in an annual grass plant community.

Photo 4-10. Vegetation ranges from 4- to 30-inch height with 10 to 15 percent bare ground.

4.2.5 Transect 5

HDR established one 10-foot-wide by 10-foot-long transect at 117.371E, 43.671N, located in Section 7, Township 22 South, Range 44 East (**Figure 4-1**). Transect 5 is located on a south-facing aspect with slopes ranging from 0 to 2 percent. Approximately 65 to 70 percent of the slope is vegetated. The shrub stratum consists of big sagebrush with an understory of Idaho fescue (*Festuca idahoensis*) and cheatgrass. Information for Transect 5 is presented in **Table 4-5**. **Photo 4-11** and **Photo 4-12** show the characteristic vegetative cover in the area of Transect 5.

Table 4-5. Transect #5 Sagebrush/Bunchgrass Community

Coordinates: 117.371E, 43.671N		**Investigators:** Waldher, Modlin **Date:** June 18, 2012
Common Name	**Scientific Name**	**Quantity**
Shrubs		
big sagebrush	*Artemisia tridentata*	13
Grasses		
bluebunch wheatgrass	*Agropyron spicatum*	1
cheatgrass	*Bromus tectorum*	Dominant herbaceous species
Idaho fescue	*Festuca idahoensis*	66
Sandberg's bluegrass	*Poa secunda*	3

Photo 4-11. Transect 5 occurs in a sagebrush/ bunchgrass plant community.

Photo 4-12. Vegetation ranges from 4- to 42-inch height with 30 to 35 percent bare ground.

4.2.6 Transect 6

HDR established one 10-foot-wide by 10-foot-long transect at 117.435E, 43.649N, located in Section 22, Township 22 South, Range 43 East (**Figure 4-1**). Transect 6 is located on a rocky, north-facing aspect with slopes ranging from 2 to 5 percent. Approximately 40 percent of the slope is vegetated. The shrub stratum consists of big sagebrush and green rabbitbrush with an understory of cheatgrass and various bunchgrasses that are un-identifiable because of heavy grazing. Information for Transect 6 is presented in **Table 4-6**. **Photo 4-13** and **Photo 4-14** show the characteristic vegetative cover in the area of Transect 6.

Table 4-6. Transect #6 Sagebrush/Bunchgrass Community

Coordinates: 117.435E, 43.649N		**Investigators:** Waldher, Modlin **Date:** June 19, 2012
Common Name	**Scientific Name**	**Quantity**
Shrubs		
big sagebrush	*Artemisia tridentata*	5
green rabbitbrush	*Chrysothamnus viscidiflorus*	1
Grasses		
cheatgrass	*Bromus tectorum*	Dominant herbaceous species
misc. bunchgrass	*Misc. sp.*	Grasses Heavily Grazed (Unable to identify)

Photo 4-13. Transect 6 occurs in a sagebrush/ bunchgrass plant community.

Photo 4-14. Vegetation ranges from 4- to 42-inch height with 60 percent bare ground.

4.2.7 Transect 7

HDR established one 10-foot-wide by 10-foot-long transect at 117.407E, 43.663N, located in Section 13, Township 22 South, Range 43 East (**Figure 4-1**). Transect 7 is located on an east-facing aspect with slopes ranging from 2 to 3 percent. Approximately 90 percent of the slope is vegetated by a cheatgrass/medusahead mat. Evidence of grazing is present throughout the area. Information for Transect 7 is presented in **Table 4-7**. **Photo 4-15** and **Photo 4-16** show the characteristic vegetative cover in the area of Transect 7.

Table 4-7. Transect #7 Annual Grass Community

Coordinates: 117.407E, 43.663N		**Investigators:** Waldher, Modlin **Date:** June 19, 2012
Common Name	**Scientific Name**	**Quantity**
Forbs		
blue mustard	*Chorispora tenalla*	1
prickly lettuce	*Lactuca serriola*	1
tumble mustard	*Sisymbrium altissimum*	9
Grasses		
cheatgrass	*Bromus tectorum*	dominant herbaceous species

Photo 4-15. Transect 7 occurs in an annual grass plant community.

Photo 4-16. Vegetation ranges from 4- to 12-inch height with 10 percent bare ground.

4.2.8 Transect 8

HDR established one 10-foot-wide by 10-foot-long transect at 117.363E, 43.684N, located in Section 5, Township 22 South, Range 44 East (**Figure 4-1**). Transect 8 is located in a valley bottom with slopes ranging from 0 to 2 percent. Approximately 30 to 35 percent of the area is vegetated. The shrub stratum consists of big sagebrush and green rabbitbrush with an understory dominated by Sandberg's bluegrass. Evidence of heavy grazing is present in the area. Information for Transect 8 is presented in **Table 4-8**. **Photo 4-17** and **Photo 4-18** show the characteristic vegetative cover in the area of Transect 8.

Table 4-8. Transect #8 Sagebrush/Bunchgrass Community

Coordinates: 117.363E, 43.684N		**Investigators:** Waldher, Modlin **Date:** June 19, 2012
Common Name	**Scientific Name**	**Quantity**
Shrubs		
big sagebrush	*Artemisia tridentata*	3
green rabbitbrush	*Chrysothamnus viscidiflorus*	2
Grasses		
crested wheatgrass	*Agropyron cristatum*	4
cheatgrass	*Bromus tectorum*	17
Sandberg's bluegrass	*Poa secunda*	112

Photo 4-17. Transect 8 occurs in a sagebrush/ bunchgrass plant community.

Photo 4-18. Vegetation ranges from 4- to 30-inch height with 65 to 70 percent bare ground.

4.4 Daubenmire Sampling Results

4.4.1 Daubenmire #1 – Sagebrush/Bunchgrass Community

HDR performed a Daubenmire vegetation survey at 117.372E, 43.669N, located in Section 7, Township 22 South, Range 44 East (**Figure 4-1**). The sampling plot is located approximately 30 feet south of the proposed access road within the sagebrush/bunchgrass vegetation community. Information for Daubenmire #1 is presented in **Table 4-9**. Daubenmire survey results at this location show that bluebunch wheatgrass had the highest percentage of canopy cover and the highest composition at this location. Cheatgrass has the highest frequency of occurrence within the 50 surveyed quadrats. **Photo 4-19** and **Photo 4-20** show the Daubenmire survey completed at this location and the completed survey form is included in **Appendix B**.

Table 4-9. Daubenmire #1 Sagebrush/Bunchgrass Community

Coordinates: 117.372E, 43.670N 30 feet south of proposed access road		**Investigator:** Waldher **Date:** May 7, 2013	
Plant Species	**Percent Canopy Cover**	**Species Composition**	**Frequency**
ARTR – Artemisia tridentata	8	23	34
CHVI – Chrysothamnus nauseosus	-	-	4
POSE – Posa secunda	6	17	48
AGSP – Agropyron spicatum	10	29	42
ERSP – Erigonum spergulinum	3	9	26
PHLOX – Phlox sp.	1	3	38
BRTE – Bromus tectorum	7	20	70

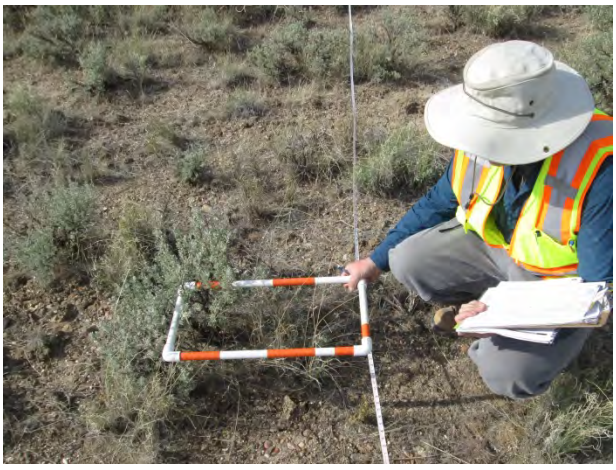


Photo 4-19. Using the Daubenmire frame placed along a 100-foot-long measuring tape, HDR measured 50 quadrats.

Photo 4-20. Daubenmire #1 was located approximately 30 feet from the proposed access road within the sagebrush/bunchgrass plant community.

4.4.2 Daubenmire #2 – Crested Wheatgrass Community

HDR performed a Daubenmire vegetation survey at 117.411E, 43.656N, located in Section 13, Township 22 South, Range 43 East (**Figure 4-1**). The sampling plot is located approximately 100 yards west of Twin Springs Road within the crested wheatgrass vegetation community. Information for Daubenmire #2 is presented in **Table 4-10**. Daubenmire survey results at this location show that crested wheatgrass has the highest percentage of canopy cover and the highest composition at this location. Cheatgrass has the highest frequency of occurrence within the 50 surveyed quadrats. **Photo 4-21** and **Photo 4-22** show the Daubenmire survey that completed at this location and the completed survey form is included in **Appendix B**.

Table 4-10. Daubenmire #1 Crested Wheatgrass Community

Coordinates: 117.411E, 43.656N 100 yards west of Twin Springs Road		**Investigator:** Waldher **Date:** May 7, 2013	
Plant Species	**Percent Canopy Cover**	**Species Composition**	**Frequency**
AGCR – Agrpyron spicatum	17	71	6
BRTE – Bromus tectorum	1	4	25
POSE – Posa secunda	6	28	56

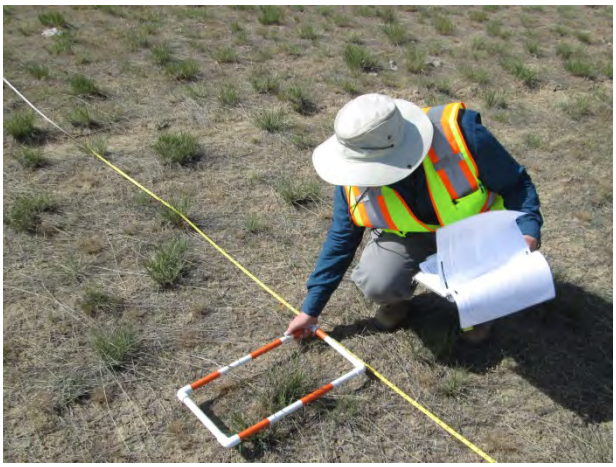


Photo 4-21. Clumps of crested wheatgrass are visible within sampling area.

Photo 4-22. Daubenmire #2 was located approximately 100 yards from Twin Springs Road within the crested wheatgrass plant community.

4.4.3 Daubenmire #3 – Annual Grass Community

HDR performed a Daubenmire vegetation survey at 117.407E, 43.664N, located in Section 14, Township 22 South, Range 43 East (**Figure 4-1**). The sampling plot is located approximately 200 feet west of Twin Springs Road, within the annual grass vegetation community. Information for Daubenmire #3 is presented in **Table 4-11**. Daubenmire survey results at this location show that cheatgrass has the highest percentage of canopy cover, highest composition, and the highest frequency of occurrence within the 50 surveyed quadrats. **Photo 4-23** and **Photo 4-24** show the Daubenmire survey completed at this location and the completed survey form is included in **Appendix B**.

Table 4-11. Daubenmire #3 Annual Grass Community

Coordinates: 117.407E, 43.664N 200 feet west of Twin Springs Road		**Investigator:** Waldher **Date:** May 7, 2013	
Plant Species	**Percent Canopy Cover**	**Species Composition**	**Frequency**
BRTE – Bromus tectorum	53	90	96
POSE – Posa secunda	3	5	38
AGCR – Agrpyron spicatum	-	-	8
LASE – Lactuca serriola	2	3	26
ELCA – Elymus caput-medusae	1	2	50

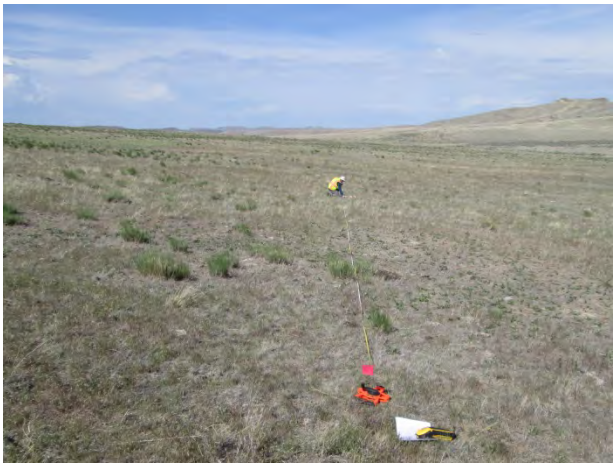


Photo 4-23. Sampling in the annual grass plant community.

Photo 4-24. Daubenmire #3 was located approximately 200 feet west of Twin Springs Road within the annual grass plant community.

4.5 Additional Vegetation Survey Results

4.5.1 Threatened and Endangered Species (federal)

HDR obtained the federally-listed plant species for Malheur County, Oregon, from USFWS. Howell's spectacular thelypody (*Thelypodium howellii ssp. spectabilis*) is listed as a threatened species for Malheur County. Howell's spectacular thelypody is a herbaceous biennial that occurs in mesic, alkaline habitats in the Baker-Powder River Valley region in northeast Oregon. It formerly also occurred in the Willow Creek Valley in Malheur County. Suitable habitat for this species may exist near the study area. However, HDR did not observe the species during the vegetation surveys.

4.5.2 Sensitive Species (state)

Much of the study area is located adjacent to BLM land. HDR obtained a list of sensitive plant species for the State of Oregon (**Appendix C**). HDR did not observe any of the plant species listed in **Appendix C** within the study area.

4.5.3 Noxious weed species

HDR obtained a list of noxious weeds for Malheur County Oregon (**Appendix C**) from the Malheur County Weed Advisory Board. Malheur County has prioritized control and/or eradication of noxious weeds by A" B, and C classes, with Class A having the highest priority. HDR observed the following noxious weeds during field investigations:

- One small, isolated population of Class A weed species, Austrian peaweed (*Sphaerophysa salusula*), adjacent to the proposed access road. This species is subject to mandatory control/eradication where found.
- One Class B species, Canada thistle (*Cirsium arvense*), just ouside of the study area near the northern boundary of the mine permit area. All Class B weeds are required to be controlled within 50 feet of all property lines, easements, and rights of way.
- Three Class C species within the study area: cheatgrass, medusahead and field bindweed (*Convoculus arvensis*). These species can be treated at the landowner's discretion. Cheatgrass and medusahead are the most dominant grass species throughout all of the study area.

Section 5: Description of Competing Land Uses

The primary adjacent land use to the proposed project has been and continues to be cattle grazing. Evidence of heavy grazing was present throughout much of the study area during the 2012 and 2013 vegetation field surveys. As the mine site and processing facilities are developed, these areas would be fenced off from grazing. It is likely that grazing would continue to occur on land adjacent to the permitted area.

Section 6: Revegetation and Reclamation Considerations and Opportunities

Calico will revegetate and reclaim disturbed sites during and after mining activities. Qualified personnel will analyze the pre-disturbance soil characteristics and determine the amount of soil that should be stockpiled for revegetation and reclamation. Disturbed areas will be seeded with a native seed mixture that is approved by BLM and other state agencies. A preliminary reclamation seed mixture is presented in **Table 6-1**. The reclamation goal will be to establish a self-sustaining ecosystem, comparable to undamaged ecosystems in the area of the mine. Vegetation test plots and chemical/physical soil and subsoil analysis may be required to ensure establishment feasibility.

Table 6-1. Preliminary Reclamation Seed Mixture

Botanical Name	Common Name	PLS Per Acre	# of Seeds Per LB	# of Seeds in Mix	% of Mix
Shrubs					
Artemisia tridentata vaserana	Mountain big sagebrush	0.25	2,500,000	625,000	0.69
Chrysothamnus nauseosus	Rubber rabbitbrush	0.50	400,000	200,000	1.4
Grasses					
Bouteloua curtipendula	Vaughn sideoats gramma	6.0	191,000	1,146,000	16.4
Elymus lanceolatus 'Sodar'	Sodar streambank wheatgrass	10	156,000	1,560,000	27.4
Elymus trachycaulus 'Revenue'	Revenue slender wheatgrass	2.5	159,000	390,000	6.8
Festuca ovina 'Covar'	Covar sheep fescue	3.0	680,000	2,040,000	8.2
Koeleria macrantha	Prairie junegrass	0.25	2,315,400	578,850	0.69
Panicum virgatum 'Pathfinder'	Pathfinder switchgrass	3.0	389,900	1,169,700	8.2
Pascopyrum smithii	Western wheatgrass	4.0	110,000	440,000	11.0
Poa sandbergii	Sandberg bluegrass	1.0	925,000	925,000	2.7
Pseudorecneura spicata	Bluebunch wheatgrass	4.0	389,000	1,556,000	11.0
Schizachyrium scoparium 'Pastura'	Pastura little bluestem	2.0	260,000	520,000	5.5
Total Application Rate (LBS/Acre)		**36.5**			

Section 7: Bibliography

Adrian Brown Consultants, Inc. (ABC). 1992. *Draft Grassy Mountain Environmental Impact Statement.*

Bureau of Land Management (BLM), Vale District Office.

1983. *Draft Report, Southern Malheur Grazing Management Program. Environmental Impact Statement*.

2001. *Proposed Southeastern Oregon, Resource Management Plan and Final Environmental Statement*. April. http://www.blm.gov/or/districts/vale/plans/files/seormp/SEORMP-FEIS-Vol1Txt.pdf

Bureau of Land Management (BLM)

1999. Overview of BLM's NEPA Process.

2001. *Environmental Impact Statement and Related Appendices (Vegetation and Grazing)*.

2008. *NEPA Handbook*, H-1790-1.

2012. *BLM Manual Section 6840*. http://www.blm.gov/pgdata/etc/medialib/blm/ca/pdf/pdfs/pa_pdfs/biology_pdfs.Par.9d22a8ee.File.dat/6840_ManualFinal.pdf

Cedar Creek Associates, Inc. 1991. *Vegetation Technical Memorandum.*

Conquist, Arthur, Arthur H. Holmgren, Noel H. Holmgren, James L. Reveal, Patricia K. Holmgren. 1977. *Intermountain Flora, Vascular Plants of the Intermountain West, U.S.A*. Volume Six. Published by Columbia University Press, New York. 584pp.

Consolidated State Agency Response. 1993.*Consolidated State Agency Response to Newmont Grassy Mountain Corporations Environmental Baseline Proposed Work Plan.*

Daubenmire, Rexford. 1959*. A Canopy Coverage Method of Vegetational Analysis. Northwest Science.*

Grassy Mountain DOGAMI TRT. 2012. *Suggested Baseline Data Methodologies Submittal – Oregon Chemical Processing Mining*.

HDR Engineering, Inc. (HDR). 2012. *Draft Terrestrial Vegetation Report, Grassy Mountain Project*.

IMS, Inc. (IMS). 1989. *Final Report: Soils, Vegetation and Wildlife Resources of the Grassy Mountain Project Area.*

Newmont Grassy Mountain Corporation (NMC). 1993. *Vegetation Baseline Study for Newmont Grassy Mountain Mine Project.*

U.S. Forest Service (USFS) and Bureau of Land Management (BLM) Pacific Northwest Interagency. 2012. *Federally Threatened, Endangered & Proposed, and Sensitive & Strategic Species List*. Website: http://www.fs.fed.us/r6/sfpnw/issssp/agency-policy/.

U.S. Fish and Wildlife Service (USFWS). *Threatened and Endangered Species List for Malheur County, Oregon*.

Whitson, Tom D., Larry C. Burrill, Steven A. Dewey, David W. Cudney, B.E. Nelson, Richard D. Lee, Robert Parker. *Weeds of the West*. January 1991. University of Wyoming. 630 pp.

Wright, Caroline E.

1989. *Preliminary Grassy Mountain Botanical Report*.

1991. *Grassy Mountain Botanical Survey*.Malheur County Weed Control Board. *Noxious Weed Species List*. June 15. Available online at the following address: http://www.malheurco.org/sites/malheurco.org/files/File/weeds/MalheurWeedList.pdf

Section 8: Contacts

Christine Whittaker, RLA
HDR Engineering, Inc.
412 East Parkcenter Blvd, Suite 100
Boise, ID 83706-6659
208-387-7067
christine.whittaker@hdrinc.com

Robert Waldher, RLA
HDR Engineering, Inc.
412 East Parkcenter Blvd, Suite 100
Boise, ID 83706-6659
208-387-7085
robert.waldher@hdrinc.com

A

Appendix A.

Vegetation Species Observed

Appendix A Grassy Mountain Exploration Project Terrestrial Vegetation Report – Vegetation Species Observed			
Scientific Name	**Common Name**	**Family Name**	**Plant Description**
Shrubs (Shrub Stratum)			
Artemisia tridentata	big sagebrush	Asteraceae	Perennial shrub
Chrysothamnus nauseosus	rubber rabbitbrush	Asteraceae	Perennial shrub
Chrysothamnus viscidiflorus	green rabbitbrush	Asteraceae	Perennial shrub
Opuntia polyacantha	plains prickly pear	Cactaceae	Perennial shrub
Rosa woodsii	Wood's rose	Rosaceae	Perennial shrub
Sarcobatus vermiculatus	greasewood	Chenopodiaceae	Perennial shrub
Forbs (Herbaceous Stratum)			
Achillea millefolium	common yarrow	Asteraceae	Perennial forb
Arnica sp.	arnica	Asteraceae	Perennial forb
Balsamorhiza sagittata	arrowleaf balsamroot	Asteraceae	Perennial forb
Chorispora tenella	blue mustard	Brassicaceae	Annual forb
Cirsium arvense	Canada thistle	Asteraceae	Noxious weed
Cirsium undulatum	wavyleaf thistle	Asteraceae	Perennial forb
Convolvulus arvensis	field bindweed	Convolvulaceae	Perennial forb
Eriogonum spergulinum	buckwheat	Polygonaceae	Annual forb
Haplopappus carthamoides	large-flowered goldenweed	Asteraceae	Perennial forb
Kochia scoparia	kochia	Chenopodiaceae	Annual forb
Lepidium perfoliatum	pepperweed	Brassicaceae	Annual/biennial forb
Melilotus alba	white sweet clover	Leguminaceae	Perennial forb
Melilotus officinalis	yellow sweet clover	Leguminaceae	Perennial forb
Phlox sp.	phlox	Polemoniaceae	Perennial forb
Rumex crispus	curly dock	Polygonaceae	Perennial forb
Sisymbrium altissimum	tumble mustard	Brassicaceae	Annual/biennial forb
Sphaeralcea munroana	Munro's gobemallow	Malvaceae	Perennial forb
Sphaerophysa salusula	Austrian peaweed	Fabaceae	Noxious weed
Taraxacum officinale	common dandelion	Compositaceae	Perennial forb
Tragopogon dubius	salsify	Asteraceae	Annual/biennial forb
Verbascum blattaria	moth mullein	Scrophulariaceae	Biennial forb
Grass and Grasslikes (Herbaceous Stratum)			
Agropyron cristatum	crested wheatgrass	Poaceae	Perennial grass
Agropyron spicatum	bluebunch wheatgrass	Poaceae	Perennial grass
Bromus tectorum	cheat grass	Poaceae	Annual grass
Eleocharis sp.	spikerush	Cyperaceae	Native grasslike
Elymus caput-medusae	medusahead	Poaceae	Annual grass
Elymus elymoides	squirreltail	Poaceae	Perennial grass
Hordeum jubatum	foxtail barley	Poaceae	Perennial grass
Juncus sp.	rush species	Juncaceae	Native grasslike
Leymus cinereus	Great Basin wildrye	Poaceae	Perennial grass
Poa secunda	Sandberg's bluegrass	Poaceae	Perennial grass
Polypogon monspeliensis	rabbit's foot grass	Poaceae	Annual grass
Vulpia microstachys	small fescue	Poaceae	Annual grass

B

Appendix B.

Vegetation Field Sampling Forms

Calico Resources Grassy Mountain Project
Vegetation Survey *Reporting Form*

Project: Calico Resources – Grassy Mountain Exploration Project	**Transect Name/#: 1**
Field Surveyor(s): 1. Bob Waldher 2. Matt Modlin	Date: 06-18-12 Time: 10:00 AM Weather: Partly Cloudy
Location Description: East side of mine permit area.	GPS Coordinates N: 43.669 E: -117.355
Vegetation Class: (i.e., sagebrush/grassland: grassland) Sagebrush / Bunchgrass	
Plot Size: 10' x 10'	
Section, Township, Range: 8, 22S, 44E	Datum: NAD 83
Land Ownership (BLM, private): Patented Claim	Accuracy: +/- 1 Meter
Est. % bare ground: 25%	Aspect: East Facing
Slope: 5% - 8%	Vegetation Height: 6" – 30"
Disturbance (grazing, roads, etc.): Grazed, access roads located nearby.	

Common Name	Botanical Name	Quantity
rubber rabbitbrush	*Chrysothamnus nauseosus*	9
large-flowered goldenweed	*Happlopappus carthamoides*	2
bluebunch wheatgrass	*Agropyron spicatum*	7
cheatgrass	*Bromus tectorum*	Dom.
Sandberg's bluegrass	*Poa secunda*	2
medusahead	*Taeniatherum caput-medusae*	Dom.

Calico Resources Grassy Mountain Project
Vegetation Survey *Reporting Form*

TES Species Observed (circle one)**:** **YES** **(NO)**

☐ USFWS
☐ BLM
☐ State of Oregon

Common Name	Botanical Name	Quantity

Population Notes: No special status species observed.

Noxious Weeds/Invasive Species Observed (circle one)**:** **(YES)** **NO**

☐ Class A
☐ Class B
☒ Class C

Common Name	Botanical Name	Quantity
cheatgrass	*Bromus tectorum*	Dom.
medusahead	*Taeniatherum caput-medusae*	Dom.

Population Notes: Cheatgrass and medusahead are co-dominant weed species present within the transect.

Additional Vegetation Survey Notes: Cheatgrass and medusahead form a mat of cover. Not able to count individual plants.

Site Photographs (include photo #, brief description and direction)**:**

Photos 9-19, Camera D, overview of plant community and transect sampling location.

Calico Resources Grassy Mountain Project
Vegetation Survey *Reporting Form*

Project: Calico Resources – Grassy Mountain Exploration Project	**Transect Name/#: 2**

Field Surveyor(s): 3. Bob Waldher 4. Matt Modlin	Date: 06-18-12 Time: 11:05 AM Weather: Partly Cloudy
Location Description: North side of mine permit area.	GPS Coordinates N: 43.671 E: -117.359
Vegetation Class: (i.e., sagebrush/grassland: grassland) Sagebrush / Bunchgrass	
Plot Size: 10' x 10'	
Section, Township, Range: 8, 22S, 44E	Datum: NAD 83
Land Ownership (BLM, private): Patented Claim	Accuracy: +/- 1 Meter

Est. % bare ground: 50% - 55%	Aspect: North Facing
Slope: 3% - 5%	Vegetation Height: 6" – 42"
Disturbance (grazing, roads, etc.): Grazed, roads located nearby.	

Common Name	Botanical Name	Quantity
big sagebrush	*Artemisia tridentata*	5
green rabbitbrush	*Chrysothamnus viscidiflorus*	1
greasewood	*Sarcobatus vermiculatus*	1
bluebunch wheatgrass	*Agropyron spicatum*	8
cheatgrass	*Bromus tectorum*	Dom.
Sandberg's bluegrass	*Poa secunda*	2
medusahead	*Taeniatherum caput-medusae*	Dom.

Calico Resources Grassy Mountain Project
Vegetation Survey *Reporting Form*

TES Species Observed (circle one)**:** **YES** **(NO)**

☐ USFWS
☐ BLM
☐ State of Oregon

Common Name	Botanical Name	Quantity

Population Notes: No special status species observed.

Noxious Weeds/Invasive Species Observed (circle one)**:** **(YES)** **NO**

☐ Class A
☒ Class B
☒ Class C

Common Name	Botanical Name	Quantity
cheatgrass	*Bromus tectorum*	Dom.
medusahead	*Taeniatherum caput-medusae*	Dom.
Canada thistle	*Cirsium arvense*	N/A

Population Notes: Cheatgrass and medusahead are co-dominant weed species present within the transect. Canada thistle observed near northern boundary of mine area but outside of project study area.

Additional Vegetation Survey Notes: Cheatgrass and medusahead form a mat of cover. Not able to count individual plants.

Site Photographs (include photo #, brief description and direction)**:**

Photos 20-26, Camera D, overview of plant community and transect sampling location.

Calico Resources Grassy Mountain Project
Vegetation Survey *Reporting Form*

Project: Calico Resources – Grassy Mountain Exploration Project	**Transect Name/#: 3**

Field Surveyor(s): 5. Bob Waldher 6. Matt Modlin	Date: 06-18-12 Time: 1:35 PM Weather: Partly Cloudy
Location Description: Located in reclaimed area west of Twin Springs Road	GPS Coordinates N: 43.659 E: -117.409
Vegetation Class: (i.e., sagebrush/grassland: grassland) Crested Wheatgrass / Annual Grass	
Plot Size: 10' x 10'	
Section, Township, Range: 13, 22S, 43E	Datum: NAD 83
Land Ownership (BLM, private): Private (Bishop property)	Accuracy: +/- 1 Meter

Est. % bare ground: 40% - 45%	Aspect: N/A, Valley Bottom
Slope: 1% - 2%	Vegetation Height: 3" – 24"
Disturbance (grazing, roads, etc.): Heavily grazed.	

Common Name	Botanical Name	Quantity
buckwheat	*Erigonum sp.*	1
mustard	*Sisymbrium sp.*	3
crested wheatgrass	*Agropyron cristatum*	29
cheatgrass	*Bromus tectorum*	Dom.
Sandberg's bluegrass	*Poa secunda*	17
medusahead	*Taeniatherum caput-medusae*	Dom.

Calico Resources Grassy Mountain Project
Vegetation Survey *Reporting Form*

TES Species Observed (circle one)**:** **YES** **(NO)**

☐ USFWS
☐ BLM
☐ State of Oregon

Common Name	Botanical Name	Quantity

Population Notes: No special status species observed.

Noxious Weeds/Invasive Species Observed (circle one)**:** **(YES)** **NO**

☐ Class A
☐ Class B
☒ Class C

Common Name	Botanical Name	Quantity
cheatgrass	*Bromus tectorum*	Dom.
medusahead	*Taeniatherum caput-medusae*	Dom.

Population Notes: Cheatgrass and medusahead are co-dominant weed species present within the transect.

Additional Vegetation Survey Notes: Cheatgrass and medusahead form a mat of cover. Not able to count individual plants. Area appears to be reclaimed with crested wheatgrass seed mixture.

Site Photographs (include photo #, brief description and direction)**:**

Photos 42-47, Camera D, overview of plant community and transect sampling location.

Calico Resources Grassy Mountain Project
Vegetation Survey *Reporting Form*

Project: Calico Resources – Grassy Mountain Exploration Project	**Transect Name/#: 4**
Field Surveyor(s): 7. Bob Waldher 8. Matt Modlin	Date: 06-18-12 Time: 3:05 PM Weather: Partly Cloudy
Location Description: Adjacent to south side of proposed access road.	GPS Coordinates N: 43.671 E: -117.995
Vegetation Class: (i.e., sagebrush/grassland: grassland) Annual Grass	
Plot Size: 10' x 10'	
Section, Township, Range: 12, 22S, 43E	Datum: NAD 83
Land Ownership (BLM, private): BLM	Accuracy: +/- 1 Meter

Est. % bare ground: 10% - 15%	Aspect: West Facing
Slope: 3% - 5%	Vegetation Height: 4" – 30"
Disturbance (grazing, roads, etc.): Grazed, adjacent to existing access road.	

Common Name	**Botanical Name**	**Quantity**
pepperweed	*Lepidium perfoliatum*	2
tumble mustard	*Sisymbrium altissimum*	2
Austrian peaweed	*Sphaerophysa salusula*	3
moth mullein	*Verbascum blattaria*	6
crested wheatgrass	*Agropyron cristatum*	6
cheatgrass	*Bromus tectorum*	Dom.
Idaho fescue	*Festuca idahoensis*	86
medusahead	*Taeniatherum caput-medusae*	Dom.

Calico Resources Grassy Mountain Project
Vegetation Survey *Reporting Form*

TES Species Observed (circle one)**:** **YES** **(NO)**

☐ USFWS
☐ BLM
☐ State of Oregon

Common Name	Botanical Name	Quantity

Population Notes: No special status species observed.

Noxious Weeds/Invasive Species Observed (circle one)**:** **(YES)** **NO**

☒ Class A
☐ Class B
☒ Class C

Common Name	Botanical Name	Quantity
cheatgrass	*Bromus tectorum*	Dom.
medusahead	*Taeniatherum caput-medusae*	Dom.
Austrian peaweed	*Sphaerophysa salusula*	3

Population Notes: Cheatgrass and medusahead are co-dominant weed species present within the transect. Small population of Austrian peaweed observed in area.

Additional Vegetation Survey Notes: Cheatgrass and medusahead form a mat of cover. Not able to count individual plants.

Site Photographs (include photo #, brief description and direction)**:**

Photos 52-62, Camera D, overview of plant community and transect sampling location.

Calico Resources Grassy Mountain Project
Vegetation Survey *Reporting Form*

Project: Calico Resources – Grassy Mountain Exploration Project	**Transect Name/#: 5**
Field Surveyor(s): 9. Bob Waldher 10. Matt Modlin	Date: 06-18-12 Time: 3:50 PM Weather: Partly Cloudy
Location Description: East side of mine permit area.	GPS Coordinates N: 43.669 E: -117.355
Vegetation Class: (i.e., sagebrush/grassland: grassland) Sagebrush / Bunchgrass	
Plot Size: 10’ x 10’	
Section, Township, Range: 8, 22S, 44E	Datum: NAD 83
Land Ownership (BLM, private): BLM	Accuracy: +/- 1 Meter
Est. % bare ground: 30% - 35%	Aspect: South Facing
Slope: 0% - 2%	Vegetation Height: 4” – 42”
Disturbance (grazing, roads, etc.): Grazed, adjacent to existing access road.	

Common Name	**Botanical Name**	**Quantity**
big sagebrush	*Artemisia tridentata*	13
bluebunch wheatgrass	*Agropyron spicatum*	1
cheatgrass	*Bromus tectorum*	Dom.
Idaho fescue	*Festuca idahoensis*	66
Sandberg’s bluegrass	*Poa secunda*	3

Calico Resources Grassy Mountain Project
Vegetation Survey *Reporting Form*

TES Species Observed (circle one)**:** **YES** **(NO)**

☐ USFWS
☐ BLM
☐ State of Oregon

Common Name	Botanical Name	Quantity

Population Notes: No special status species observed.

Noxious Weeds/Invasive Species Observed (circle one)**:** **(YES)** **NO**

☐ Class A
☐ Class B
☒ Class C

Common Name	Botanical Name	Quantity
cheatgrass	*Bromus tectorum*	Dom.

Population Notes: Cheatgrass dominant weed species present within the transect.

Additional Vegetation Survey Notes: Cheatgrass forms a mat of cover. Not able to count individual plants.

Site Photographs (include photo #, brief description and direction)**:**

Photos 63-69, Camera D, overview of plant community and transect sampling location.

Calico Resources Grassy Mountain Project
Vegetation Survey *Reporting Form*

Project: Calico Resources – Grassy Mountain Exploration Project	**Transect Name/#: 6**
Field Surveyor(s): 11. Bob Waldher 12. Matt Modlin	Date: 06-19-12 Time: 9:00 AM Weather: Partly Cloudy
Location Description: Located on slope above Freezout Lake Road	GPS Coordinates N: 43.649 E: -117.435
Vegetation Class: (i.e., sagebrush/grassland: grassland) Sagebrush / Bunchgrass	
Plot Size: 10' x 10'	
Section, Township, Range: 22, 22S, 43E	Datum: NAD 83
Land Ownership (BLM, private): Private (Bishop Property)	Accuracy: +/- 1 Meter

Est. % bare ground: 60%	Aspect: South Facing
Slope: 2% - 5%	Vegetation Height: 4" – 42"
Disturbance (grazing, roads, etc.): Heavily grazed, adjacent to existing access road.	

Common Name	**Botanical Name**	**Quantity**
big sagebrush	*Artemisia tridentata*	5
green rabbitbrush	*Chrysothamnus viscidiflorus*	1
cheatgrass	*Bromus tectorum*	Dom.
Misc. Grass Species		See Notes

Calico Resources Grassy Mountain Project
Vegetation Survey *Reporting Form*

TES Species Observed (circle one)**:** **YES** **(NO)**

☐ USFWS
☐ BLM
☐ State of Oregon

Common Name	Botanical Name	Quantity

Population Notes: No special status species observed.

Noxious Weeds/Invasive Species Observed (circle one)**:** **(YES)** **NO**

☐ Class A
☐ Class B
☒ Class C

Common Name	Botanical Name	Quantity
cheatgrass	*Bromus tectorum*	Dom.

Population Notes: Cheatgrass dominant weed species present within the transect.

Additional Vegetation Survey Notes: Cheatgrass forms a mat of cover. Not able to count individual plants. Some bunchgrass species could not be identified due to heavy grazing.

Site Photographs (include photo #, brief description and direction)**:**

Photos 12-17, Camera D, overview of plant community and transect sampling location.

Calico Resources Grassy Mountain Project
Vegetation Survey *Reporting Form*

Project: Calico Resources – Grassy Mountain Exploration Project	**Transect Name/#: 7**
Field Surveyor(s): 13. Bob Waldher 14. Matt Modlin	Date: 06-19-12 Time: 10:00 AM Weather: Partly Cloudy
Location Description: Located at proposed processing facility location.	GPS Coordinates N: 43.663 E: -117.407
Vegetation Class: (i.e., sagebrush/grassland: grassland) Annual Grass	
Plot Size: 10' x 10'	
Section, Township, Range: 13, 22S, 43E	Datum: NAD 83
Land Ownership (BLM, private): Private (Bishop Property)	Accuracy: +/- 1 Meter
Est. % bare ground: 2% - 3%	Aspect: East Facing
Slope: 3% - 5%	Vegetation Height: 4" – 12"
Disturbance (grazing, roads, etc.): Grazed, adjacent to existing access road.	

Common Name	Botanical Name	Quantity
blue mustard	*Chorispora tenalla*	1
prickly lettuce	*Lactuca serriola*	1
tumble mustard	*Sisymbrium altissimum*	9
cheatgrass	*Bromus tectorum*	Dom.

Calico Resources Grassy Mountain Project
Vegetation Survey *Reporting Form*

TES Species Observed (circle one)**:** **YES** **(NO)**

☐ USFWS
☐ BLM
☐ State of Oregon

Common Name	Botanical Name	Quantity

Population Notes: No special status species observed.

Noxious Weeds/Invasive Species Observed (circle one)**:** **(YES)** **NO**

☐ Class A
☐ Class B
☒ Class C

Common Name	Botanical Name	Quantity
cheatgrass	*Bromus tectorum*	Dom.

Population Notes: Cheatgrass dominant weed species present within the transect.

Additional Vegetation Survey Notes: Cheatgrass forms a mat of cover. Not able to count individual plants.

Site Photographs (include photo #, brief description and direction)**:**

Photos 18-24, Camera D, overview of plant community and transect sampling location.

Calico Resources Grassy Mountain Project
Vegetation Survey *Reporting Form*

Project: Calico Resources – Grassy Mountain Exploration Project	**Transect Name/#: 8**

Field Surveyor(s): 15. Bob Waldher 16. Matt Modlin	Date: 06-19-12 Time: 10:50 AM Weather: Partly Cloudy
Location Description: Adjacent to existing access road (outside project area)	GPS Coordinates N: 43.684 E: -117.363
Vegetation Class: (i.e., sagebrush/grassland: grassland) Sagebrush / Bunchgrass	
Plot Size: 10’ x 10’	
Section, Township, Range: 5, 22S, 44E	Datum: NAD 83
Land Ownership (BLM, private): BLM	Accuracy: +/- 1 Meter

Est. % bare ground: 65% - 70%	Aspect: Valley Bottom
Slope: 0% - 2%	Vegetation Height: 4” – 42”
Disturbance (grazing, roads, etc.): Heavily grazed, adjacent to existing access road.	

Common Name	Botanical Name	Quantity
big sagebrush	*Artemisia tridentata*	3
green rabbitbrush	*Chrysothamnus viscidiflorus*	2
crested wheatgrass	*Agropyron cristatum*	4
cheatgrass	*Bromus tectorum*	Dom.
Sandberg’s bluegrass	*Poa secunda*	112

Calico Resources Grassy Mountain Project
Vegetation Survey *Reporting Form*

TES Species Observed (circle one)**:** **YES** **(NO)**

☐ USFWS
☐ BLM
☐ State of Oregon

Common Name	Botanical Name	Quantity

Population Notes: No special status species observed.

Noxious Weeds/Invasive Species Observed (circle one)**:** **(YES)** **NO**

☐ Class A
☐ Class B
☒ Class C

Common Name	Botanical Name	Quantity
cheatgrass	*Bromus tectorum*	Dom.

Population Notes: Cheatgrass dominant weed species present within the transect.

Additional Vegetation Survey Notes: Cheatgrass forms a mat of cover. Not able to count individual plants.

Site Photographs (include photo #, brief description and direction)**:**

Photos 25-29, Camera D, overview of plant community and transect sampling location.

Daubenmire

Study Number	Date	Examiner	Allotment Name & Number	Pasture
BASELINE VEG.	5/7/13	R. WALDHER	Sagebrush/ Bunchgrass Community	

Transect Number and Location: DAUBENMIRE - 1, 30 FT SOUTH OF PROPOSED ACCESS ROAD

Number of Quadrats: 50

Plant Species	Quadrat																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
ARTR															4	3			1				2		
CHVI																							1		
POSE	1			1		3		1	2		1		1		1			3							2
AGSP	4	2	2		2	1					5			4			2								2
ERSP		1	1			1	1			1			3			2				1					
PHLOX				1	1		1			1		1				1				1		1	1	1	
BRTE			1		1	1			1	2		1	1	1	1	1	1	1	3	2	3	2	1	2	

Plant Species	Quadrat																								
	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
ARTR	1	3	2	2	1		3		2	1	1		3	2						5	1				
CHVI													1												
POSE	1				3	1			1	1	2	1		1	2	3		2			2			1	1
AGSP			2	1				1	2						1	2	4	2	5		1	1			1
ERSP	2	2			1					3			1												
PHLOX	1	1	1	1								1	1	2					1	1					
BRTE			1		1	3	2	1			2	2	1	1	3	1			1	2	1		1	1	1

Daubenmire Summary

Study Number	Date	Examiner	Allotment Name & Number	Pasture
BASELINE VEG.	5/7/13	R. WALDHER	Sagebrush / Bunchgrass Community	

Study Location: DAUBENMIRE - 1, 30 FT SOUTH OF PROPOSED ACCESS ROAD

Number of Quadrats: 50

Cover Class	Mid-Point	Species ARTR Number	ARTR Product	Species CHVI Number	CHVI Product	Species POSE Number	POSE Product	Species AGSP Number	AGSP Product	Species ERSP Number	ERSP Product	Species PHLOX Number	PHLOX Product	Species BRTE Number	BRTE Product	Species Number	Species Product	Species Number	Species Product	Species Number	Species Product	Species Number	Species Product
1 1-5%	2.5	6	15	2	5	14	35	7	17.5	8	20	18	45	23	57.5								
2 5-25%	15	5	75	-	-	6	90	9	135	3	45	1	15	8	120								
3 26-50%	37.5	4	150	-	-	4	150	-	-	2	75	-	-	4	150								
4 51-75%	62.5	1	62.5	-	-	-	-	3	187.5	-	-	-	-	-	-								
5 76-95%	85	1	85	-	-	-	-	2	170	-	-	-	-	-	-								
6 96-100%	97.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-								
Total canopy			387.5		5		275		510		140		60		327.5								
Number of Samples			50		50		50		50		50		50		50								
% canopy cover			8		-		6		10		3		1		7								
Species composition			23		-		17		29		9		3		20								
Frequency			34		4		48		42		26		38		70								

Daubenmire

Study Number	Date	Examiner	Allotment Name & Number	Pasture
BASELINE VEG.	5/7/13	R. WALDHER	Crested Wheatgrass Community	

Transect Number and Location: DAUBENMIRE - 2, 100 YDS EAST OF TWIN SPRINGS ROAD

Number of Quadrats: 50

Plant Species	Quadrat																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
AGCR	2	3	1	2	3			3	1	3		2	2		4	4	3	1				2	3	1	2
BRTE	2								1	1			1	2	1	2	1								
POSE	1	2	2	1	1	4	3	2	4	1	1	1	2	1				1			1	1	1	1	

Plant Species	Quadrat																								
	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
AGCR	1	3	2	3	2		1	4	2	2	2	3			1	1	1	2	3	2	1	3	3		2
BRTE	1	1					1		1			1					1								
POSE	1	1				1			1		1	1						1			2	1			

Daubenmire Summary

Study Number	Date	Examiner	Allotment Name & Number	Pasture
BASELINE VEG.	5/7/13	R. WALDHER	Crested Wheatgrass Community	

Study Location: DAUBENMIRE - 2, 100 YDS WEST OF TWIN SPRINGS ROAD

Number of Quadrats: 50

Cover Class	Mid-Point	Species AGCR Number	AGCR Product	Species BRTE Number	BRTE Product	Species POSE Number	POSE Product	Species Number	Species Product	Species Number	Species Product	Species Number	Species Product	Species Number	Species Product	Species Number	Species Product	Species Number	Species Product	Species Number	Species Product	Species Number	Species Product
1 1-5%	2.5	10	25	11	27.5	20	50																
2 5-25%	15	14	210	3	45	5	75																
3 26-50%	37.5	12	450	-	-	1	37.5																
4 51-75%	62.5	3	187.5	-	-	2	125																
5 76-95%	85	-	-	-	-	-	-																
6 96-100%	97.5	-	-	-	-	-	-																
Total canopy			872.5		72.5		287.5																
Number of Samples			50		50		50																
% canopy cover			17		1		6																
Species composition			71		4		25																
Frequency			78		28		56																

Daubenmire

Page 1 of 1

Study Number	Date	Examiner	Allotment Name & Number	Pasture
BASELINE VEG.	5/7/13	R. WALDHER	Annual Grass Community	

Transect Number and Location: DAUBENMIRE-3, 200 FT WEST OF TWIN SPRINGS ROAD

Number of Quadrats: 50

Plant Species	Quadrat																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
BRTE	5	4	2	1	2	3	2	1	3	3	2	3	1			1	1	4	5	5	5	5	4	2	3
POSE			2	1		1	2							1	2	2							1	2	
AGSP				1				1																	
LASE		1			2		1			1	1	2	2	1	1		2	1							
ELCA			1	1		1			1	1	1					1	2				1	1		1	1

Plant Species	Quadrat																								
	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
BRTE	3	2	4	4	5	4	4	2	4	5	5	4	5	5	6	5	4	4	3	5	6	5	5	5	6
POSE	1	1										1	1	1			2	1	2			1	1		
AGSP			1	1																					
LASE			1	1																					
ELCA	1	1	1	1		1		2	2	1					1	1	1	1	2						

Daubenmire Summary

Page 1 of 1

Study Number	Date	Examiner	Allotment Name & Number	Pasture
BASELINE VEG.	5/7/13	R. WALDHER	Annual Grass Community	

Study Location	Number of Quadrats
DAUBENMIRE - 3 200 FT WEST OF TWIN SPRINGS ROAD	50

Cover Class	Mid-Point	Species		Species		Species		Species		Species		Species		Species		Species		Species		Species		Species	
		BRTE		POSE		AGSP		LASE		ELCA														
		Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product
1 1-5%	2.5	5	12.5	12	30	4	10	9	22.5	21	52.5														
2 5-25%	15	7	105	7	105	-	-	4	60	4	10														
3 26-50%	37.5	7	262.5	-	-	-	-	-	-	-	-														
4 51-75%	62.5	11	687.5	-	-	-	-	-	-	-	-														
5 76-95%	85	15	1275	-	-	-	-	-	-	-	-														
6 96-100%	97.5	3	292.5	-	-	-	-	-	-	-	-														
Total canopy			2635		135		10		82.5		62.5														
Number of Samples			50		50		50		50		50														
% canopy cover			53		3		-		2		1														
Species composition			90		5		-		3		2														
Frequency			96		38		8		26		50														

C

Appendix C.

State of Oregon Sensitive Plant Species List

Appendix C Grassy Mountain Exploration Project Terrestrial Vegetation Report – State Sensitive Species List (Vale District)		
Scientific Name	**Common Name**	**BLM Occurrence Status (Vale District)**
ANTHELIA JULACEA	LIVERWORT	Suspected
BARBILOPHOZIA LYCOPODIOIDES	LIVERWORT	Suspected
JUNGERMANNIA POLARIS	LIVERWORT	Suspected
LOPHOZIA GILLMANII	LIVERWORT	Suspected
PELTOLEPIS QUADRATA	LIVERWORT	Suspected
PREISSIA QUADRATA	LIVERWORT	Suspected
PTILIDIUM PULCHERRIMUM	LIVERWORT	Suspected
SCHISTIDIUM CINCLIDODONTEUM	MOSS	Suspected
TEXOSPORIUM SANCTI-JACOBI	LICHEN	Suspected
ABRONIA TURBINATA	TRANS MONTANE ABRONIA	Documented
ACHNATHERUM SPECIOSUM	DESERT NEEDLEGRASS	Suspected
ACHNATHERUM WALLOWAENSIS	WALLOWA RICEGRASS	Suspected
AGASTACHE CUSICKII	CUSICK'S GIANT-HYSSOP	Documented
ALLENROLFEA OCCIDENTALIS	IODINE BUSH	Documented
ALLIUM GEYERI VAR. GEYERI	GEYER'S ONION	Suspected
AMSINCKIA CARINATA	MALHEUR VALLEY FIDDLENECK	Documented
ARGEMONE MUNITA	PRICKLY-POPPY	Documented
ARTEMISIA ARBUSCULA SSP. LONGICAULIS	LAHONTAN SAGEBRUSH	Documented
ARTEMISIA PAPPOSA	OWYHEE SAGEBRUSH	Documented
ASPLENIUM TRICHOMANES-RAMOSUM	GREEN SPLEENWORT	Suspected
ASTRAGALUS CALYCOSUS	KING'S RATTLEWEED	Documented
ASTRAGALUS CUSICKII VAR. STERILIS	STERILE MILK-VETCH	Documented
ASTRAGALUS GEYERI VAR. GEYERI	GEYER'S MILK-VETCH	Documented
ASTRAGALUS MULFORDIAE	MULFORD'S MILK-VETCH	Documented
ASTRAGALUS PLATYTROPIS	BROAD-KEELED MILK-VETCH	Documented
BOTRYCHIUM ASCENDENS	UPWARD-LOBED MOONWORT	Suspected
BOTRYCHIUM CAMPESTRE	PRAIRIE MOONWORT	Suspected
BOTRYCHIUM CRENULATUM	CRENULATE MOONWORT	Suspected
BOTRYCHIUM HESPERIUM	WESTERN MOONWORT	Suspected
BOTRYCHIUM LINEARE	SLENDER MOONWORT	Suspected
BOTRYCHIUM LUNARIA	MOONWORT	Suspected
BOTRYCHIUM MONTANUM	MOUNTAIN GRAPE-FERN	Suspected
BOTRYCHIUM PARADOXUM	TWIN-SPIKED MOONWART	Suspected
BOTRYCHIUM PEDUNCULOSUM	STALKED MOONWORT	Suspected
BUPLEURUM AMERICANUM	BUPLEURUM	Documented
CALOCHORTUS MACROCARPUS VAR. MACULOSUS	GREEN-BAND MARIPOSA-LILY	Documented
CALOCHORTUS NITIDUS	BROAD-FRUIT MARIPOSA-LILY	Suspected
CAMISSONIA PYGMAEA	DWARF EVENING-PRIMROSE	Suspected
CAREX ATROSQUAMA	BLACKENED SEDGE	Suspected
CAREX CAPILLARIS	HAIRLIKE SEDGE	Suspected
CAREX CORDILLERANA	CORDILLERAN SEDGE	Documented
CAREX GYNOCRATES	YELLOW BOG SEDGE	Suspected
CAREX IDAHOA	IDAHO SEDGE	Suspected
CAREX LASIOCARPA VAR. AMERICANA	SLENDER SEDGE	Suspected
CAREX MEDIA	INTERMEDIATE SEDGE	Suspected
CAREX MICROPODA	PYRENAEAN SEDGE	Suspected
CAREX NARDINA	SPIKENARD SEDGE	Suspected
CAREX PELOCARPA	NEW SEDGE	Suspected
CAREX RETRORSA	RETRORSE SEDGE	Suspected
CAREX SUBNIGRICANS	DARK ALPINE SEDGE	Suspected
CAREX VERNACULA	NATIVE SEDGE	Suspected
CASTILLEJA FLAVA VAR. RUSTICA	RURAL PAINTBRUSH	Documented
CASTILLEJA FRATERNA	FRATERNAL PAINTBRUSH	Suspected
CASTILLEJA RUBIDA	PURPLE ALPINE PAINTBRUSH	Suspected
CAULANTHUS CRASSICAULIS VAR. GLABER	SMOOTH WILD CABBAGE	Documented
CAULANTHUS MAJOR VAR. NEVADENSIS	SLENDER WILD CABBAGE	Documented
CHAENACTIS XANTIANA	DESERT CHAENACTIS	Documented
CHAETADELPHA WHEELERI	WHEELER'S SKELETON-WEED	Documented
CHEILANTHES FEEI	FEE'S LIP-FERN	Suspected

COLLOMIA RENACTA	BARREN VALLEY COLLOMIA	Documented
CRYPTOGRAMMA STELLERI	STELLER'S ROCKBRAKE	Suspected
CYMOPTERUS ACAULIS VAR. GREELEYORUM	GREELEY'S CYMOPTERUS	Documented
CYMOPTERUS IBAPENSIS	IBAPAH WAVEWING	Documented
CYPERUS LUPULINUS SSP. LUPULINUS	A CYPERUS	Suspected
CYPRIPEDIUM FASCICULATUM	CLUSTERED LADY'S-SLIPPER	Suspected
DELPHINIUM BICOLOR	FLATHEAD LARKSPUR	Documented
DODECATHEON PULCHELLUM VAR. SHOSHONENSE	DARKTHROAT SHOOTINGSTAR	Documented
ELATINE BRACHYSPERMA	SHORT SEEDED WATERWORT	Documented
ELEOCHARIS BOLANDERI	BOLANDER'S SPIKERUSH	Documented
ERIGERON DISPARIPILUS	WHITE CUSHION ERIGERON	Suspected
ERIGERON ENGELMANNII VAR. DAVISII	ENGELMANN'S DAISY	Suspected
ERIGERON LATUS	BROAD FLEABANE	Documented
ERIOGONUM CHRYSOPS	GOLDEN BUCKWHEAT	Documented
ERIOGONUM HOOKERI	HOOKER'S WILD BUCKWHEAT	Documented
ERIOGONUM PROCIDUUM	PROSTRATE BUCKWHEAT	Documented
ERIOGONUM SALICORNIOIDES	PLAYA BUCKWHEAT	Documented
GEUM ROSSII VAR. TURBINATUM	SLENDER-STEMMED AVENS	Suspected
HACKELIA CRONQUISTII	CRONQUIST'S STICKSEED	Documented
HACKELIA OPHIOBIA	THREE FORKS STICKSEED	Documented
HELIOTROPIUM CURASSAVICUM	SALT HELIOTROPE	Documented
HYMENOXYS LEMMONII	COOPER'S GOLDFLOWER	Documented
IVESIA RHYPARA VAR. RHYPARA	GRIMY IVESIA	Documented
IVESIA SHOCKLEYI	SHOCKLEY'S IVESIA	Documented
JUNCUS TRIGLUMIS VAR. ALBESCENS	THREE-FLOWERED RUSH	Suspected
KOBRESIA MYOSUROIDES	BELLARD'S KOBRESIA	Suspected
KOBRESIA SIMPLICIUSCULA	SIMPLE KOBRESIA	Suspected
LEPIDIUM DAVISII	DAVIS' PEPPERGRASS	Documented
LIPOCARPHA ARISTULATA	ARISTULATE LIPOCARPHA	Suspected
LISTERA BOREALIS	NORTHERN TWAYBLADE	Suspected
LOMATIUM ERYTHROCARPUM	RED-FRUITED LOMATIUM	Suspected
LOMATIUM FOENICULACEUM SSP. FIMBRIATUM	FRINGED DESERT-PARSLEY	Documented
LOMATIUM ROSEANUM	ROSE'S LOMATIUM	Documented
LUPINUS CUSICKII VAR. CUSICKII	CUSICK'S LUPINE	Documented
LUPINUS NEVADENSIS	NEVADA LUPINE	Documented
LYCOPODIUM COMPLANATUM	GROUND CEDAR	Suspected
MALACOTHRIX SONCHOIDES	LYRATE MALACOTHRIX	Documented
MENTZELIA CONGESTA	UNITED BLAZINGSTAR	Documented
MENTZELIA MOLLIS	SMOOTH MENTZELIA	Documented
MIMULUS EVANESCENS	DISAPPEARING MONKEYFLOWER	Documented
MIMULUS HYMENOPHYLLUS	MEMBRANE-LEAVED MONKEYFLOWER	Suspected
MIRABILIS MACFARLANEI	MACFARLANE'S FOUR O'CLOCK	Suspected
MUHLENBERGIA MINUTISSIMA	ANNUAL DROPSEED	Documented
OPHIOGLOSSUM PUSILLUM	ADDER'S-TONGUE	Suspected
OXYTROPIS SERICEA VAR. SERICEA	WHITE LOCOWEED	Documented
PELLAEA BRIDGESII	BRIDGES' CLIFF-BRAKE	Suspected
PHACELIA INUNDATA	PLAYA PHACELIA	Documented
PHACELIA LUTEA VAR. MACKENZIEORUM	MACKENZIE'S PHACELIA	Documented
PHACELIA MINUTISSIMA	DWARF PHACELIA	Suspected
PHLOX HENDERSONII	HENDERSON'S PHLOX	Suspected
PHLOX MULTIFLORA	MANY-FLOWERED PHLOX	Suspected
PHYSARIA CHAMBERSII	CHAMBERS' TWINPOD	Documented
PINUS ALBICAULIS	WHITEBARK PINE	Documented
PLATANTHERA OBTUSATA	SMALL NORTHERN BOG-ORCHID	Suspected
PLEUROPOGON OREGONUS	OREGON SEMAPHOREGRASS	Suspected
POGOGYNE FLORIBUNDA	PROFUSE-FLOWEREED MESA MINT	Documented
POTAMOGETON DIVERSIFOLIUS	RAFINESQUE'S PONDWEED	Documented
PRENANTHELLA EXIGUA	DESERT PRENANTHELLA	Documented
PYRROCOMA RADIATA	SNAKE RIVER GOLDENWEED	Documented
PYRROCOMA SCABERULA	ROUGH PYRROCOMA	Documented
RAFINESQUIA CALIFORNICA	CALIFORNIA CHICORY	Documented
RORIPPA COLUMBIAE	COLUMBIA CRESS	Suspected
RUBUS BARTONIANUS	BARTONBERRY	Documented

SALIX FARRIAE	FARR'S WILLOW	Suspected
SALIX WOLFII	WOLF'S WILLOW	Suspected
SAXIFRAGA ADSCENDENS SSP. OREGONENSIS	WEDGE-LEAF SAXIFRAGE	Suspected
SENECIO ERTTERAE	ERTTER'S SENECIO	Documented
SILENE SPALDINGII	SPALDING'S CATCHFLY	Documented
STANLEYA CONFERTIFLORA	BIENNIAL STANLEYA	Documented
SUKSDORFIA VIOLACEA	VIOLET SUKSDORFIA	Suspected
SYMPHORICARPOS LONGIFLORUS	LONG-FLOWERED SNOWBERRY	Documented
THALICTRUM ALPINUM	ALPINE MEADOWRUE	Suspected
THELYPODIUM EUCOSMUM	ARROW-LEAF THELYPODY	Suspected
THELYPODIUM HOWELLII SSP. SPECTABILIS	HOWELL'S SPECTACULAR THELYPODY	Suspected
TOWNSENDIA MONTANA	MOUNTAIN TOWNSENDIA	Suspected
TOWNSENDIA PARRYI	PARRY'S TOWNSENDIA	Suspected
TRIFOLIUM DOUGLASII	DOUGLAS' CLOVER	Suspected
TRIFOLIUM LEIBERGII	LEIBERG'S CLOVER	Documented
TRIFOLIUM OWYHEENSE	OWYHEE CLOVER	Documented
TROLLIUS LAXUS SSP. ALBIFLORUS	AMERICAN GLOBEFLOWER	Suspected
UTRICULARIA MINOR	LESSER BLADDERWORT	Suspected

D

Appendix D.

Malheur County Noxious Weed Species List

Public Notice
Malheur County Noxious Weed Control

WEED DISTRICT: The entire Malheur County is a weed control district known as the Malheur County Weed District. The weed district is governed by the Malheur County Court upon recommendations from the Malheur County Weed Advisory Board.

DESIGNATION OF NOXIOUS WEEDS: Pursuant to ORS 570.575 the following named plants are designated by the Malheur County Court to be injurious to public health, crops, livestock, land, or other property and are noxious.

It is the responsibility of private landowners the County, State and Federal governments to eradicate and control these weeds on their respective jurisdictions. Malheur County has prioritized control and/or eradication of these noxious weeds by "A" "B" & "C" classes, with Class A having the highest priority. Priorities may be adjusted by geographic areas at the recommendation of the Weed Advisory Board.

CLASS "A" WEED: A weed of known economic/environmental importance known to occur in the county in very small numbers to make eradication practicable, or not known to occur but its status in surrounding counties makes future occurrence seem imminent.

ACTION – infestations are subject to mandatory control/eradication where found with possible county assistance when funds are available.

COMMON NAME	*SCIENTIFIC NAME*
Austrian Peaweed	*Sphaerophysa salusula*
Common Crupina	*Crupina Vulgaris*
Big-Headed knapweed	*Centaurea macrocephala*
Buffalobur	*Solanum rostratum*
Camelthorn	*Alhagi pseudalhagi*
Dalmation toadflax	*Centaurea diffusa*
Dyers woad	*Isatis tinctoria*
Featherheaded knapweed	*Centaurea trichocephala*
Hydrilla	*Hydrilla venticillata*
Iberian starthistle	*Centaurea iberica*
Italian thistle	*Carduus pycnocephalus*
Jimsonweed	*Datera stramonium*
Johnsongrass	*Sorgum halepense*
Jointed goatgrass	*Aegilops cylindrical*

COMMON NAME	*SCIENTIFIC NAME*
Leafy spurge	*Euphorbia esula*
Meadow knapweed	*Centaurea pratensis*
Mediterranean sage	*Salvia aethiopis*
Milk thistle	*Silybum marianum*
Perennial pepperweed	*Lepidium latifolium*
Purple nutsedge	*Cyperus rotundus*
Purple starthistle	*Centaurea calcitrapa*
Rush skeletonweed	*Chondrilla juncea*
Short-fringe knapweed	*Centaurea nigrescens*
Silverleaf knightshade	*Solanum elaegnifolium*
Skeletonleaf bursage	*Ambrosia tomentosa*
Slender-flowered thistle	*Carduus tenuiflorus*
Smooth distaff thistle	*Carthamus baericus*
Spiny cocklebur	*Xanthium spinosum*
Spotted knapweed	*Centaurea maculosa*
Squarrose knapweed	*Centaurea virgata*
St. Johnswort (Klamath weed)	*Hypericum perforatum*
Sulfur cinquefoil	*Potentilla recta*
Wild proso millet	*Panicum miliaceum*
Tansy ragwort	*Senecio jacobaea*
Wooly distaff thistle	*Carthamus lanatus*
Yellow toadflax	*Linaria vulgaris*
Yellow starthistle	*Centaurea solstitialis*

* *Class "A" Weed only in that part of Malheur County south of the road leading from the junction of Malheur County line and McBride Creek Road, west to Leslie Gulch Road, to Lake Owyhee and the area south of the road leading from the Rinehart Ranch to the Crowley Road west to Highway 78, north to the Malheur County line.*

CLASS "B" WEED – A weed of known economic/environmental importance and of moderate to wide distribution and highly invasive, subject to intensive control or eradication where feasible at the county level.

ACTION – Infestations are subject to control where found, with possible county assistance when funds are available. All CLASS"B" weeds are required to be controlled within 50 feet of all property lines, easements and rights of way, pursuant to ORS 570.525

COMMON NAME	*SCIENTIFIC NAME*
Canada thistle	*Cirsium arvense*
Houndstongue	*Cynoglossum officinale*
Musk thistle	*Carduus nutans*
Perennial pepperweed	*Lepidium latifolium*
Purple loosestrife	*Lythrum salicaria*
Scotch thistle	*Onopordum acanthium*
Hoary cress (White Top)	*Lepidium spp.*
Russian knapweed	*Acroptilon repens*

** Owners or occupants having Russian knapweed are required to control a minimum 20% of their annual infestation per discreet parcel of land per year. This includes the 50 foot buffer plus additional amounts to total 20% of the infestation.

<u>CLASS "C" WEED</u> – A weed of known economic/environmental importance and of general distribution, that is subject to control or eradication as local conditions warrant.

ACTION – Infestations treated at landowners discretion.

COMMON NAME	***SCIENTIFIC NAME***
Bull thistle	*Cirsium vulgare*
Cheatgrass	*Bromus tectorum*
Dodder	*Cuscutta spp.*
Field bindweed	*Convolvulus arvensis*
Halogeton	*Halogeton glomeratus*
Kochia	*Kochia scoparia*
Medusahead rye	*Taeniatherum caput-medusae*
Poison hemlock	*Conium maculatum*
Puncturevine	*Tribulus terrestris*
Quackgrass	*Agropyron repens*
Common ragweed	*Ambrosia artimisiifolia*
Salt cedar	*Tamarix parviflora*
Sweet clover	*Melilotus officinalis*
Western horsetail	*Equisetum arvense*
Yellow nutsedge	*Cyperus esculentus*

Grassy Mountain Project (April 2015)

Draft Terrestrial Vegetation Baseline Study Addendum #1

Grassy Mountain Exploration Project

Calico Resources USA Corporation

Malheur County, Oregon

July 2015

Table of Contents

Section 1: Introduction 1

1.1 Project Area Description 1
1.1.1 Resource Study Area 1
1.2 Baseline Study Overview 1

Section 2: Baseline Characterization 9

2.1 Plant Community Description 9
2.2 Daubenmire Sampling Results 10
2.2.1 Daubenmire #1-2015 – Sagebrush/Bunchgrass Community 10
2.2.2 Daubenmire #2-2015 – Sagebrush/Bunchgrass Community 13
2.2.3 Daubenmire #3-2015 – Sagebrush/Bunchgrass Community 14
2.2.4 Daubenmire #4-2015 – Sagebrush/Bunchgrass Community 15
2.2.5 Daubenmire #5-2015 – Crested Wheatgrass/Annual Grass Community 16
2.2.6 Daubenmire #6-2015 – Sagebrush/Bunchgrass Community 17
2.3 Summary 18

Section 3: Bibliography 19

Section 4: Contacts 19

List of Figures

Figure 1. Project Location Map 3
Figure 2. Property Map Detail 5
Figure 3. Terrestrial Vegetation Study Area 7
Figure 4. Vegetation Community Types 11

List of Photos

Photo 1. Spring 2015 Conditions 9
Photo 2. Using the Daubenmire frame placed along a 100-foot-long measuring tape, HDR measured 50 quadrats. 10
Photo 3. Daubenmire #1 was located on BLM land in the Grassy Mountain Project Area within the sagebrush/bunchgrass plant community. 10
Photo 4. Daubenmire results confirmed that bunchgrasses were common at this location. 13
Photo 5. Daubenmire #2 was located on BLM land in the Grassy Mountain Project Area within the sagebrush/bunchgrass plant community. 13
Photo 6. Using the Daubenmire frame placed along a 100-foot-long measuring tape, HDR measured 50 quadrats. 14
Photo 7. Daubenmire #3 was located on BLM land in the Grassy Mountain Project Area within the sagebrush/bunchgrass plant community. 14
Photo 8. Sagebrush cover shown within Daubenmire frame. 15
Photo 9. Daubenmire #4 was located approximately 20 feet from the proposed access road within the sagebrush/bunchgrass plant community. 15
Photo 10. Using the Daubenmire frame placed along a 100-foot-long measuring tape, HDR measured 50 quadrats. 16

Photo 11. Daubenmire #5 was located on BLM land approximately 20 feet from Twin Springs Road within the crested wheatgrass/annual grass plant community. 16
Photo 12. Lupine was observed within several quadrats at this location. 17
Photo 13. Daubenmire #6 was located on BLM land approximately 15 feet from Twin Springs Road within the crested wheatgrass/annual grass plant community. 17

List of Tables

Table 1. Daubenmire #1-2015 Sagebrush/Bunchgrass Community 10
Table 2. Daubenmire #2-2015 Sagebrush/Bunchgrass Community 13
Table 3. Daubenmire #3-2015 Sagebrush/Bunchgrass Community 14
Table 4. Daubenmire #4-2015 Sagebrush/Bunchgrass Community 15
Table 5. Daubenmire #5-2015 Crested Wheatgrass Annual Grass Community 16
Table 6. Daubenmire #6-2015 Sagebrush/Bunchgrass Community 17

Appendices

Appendix A: Vegetation Species Observed
Appendix B: Vegetation Field Sampling Forms

Acronyms

BLM	Bureau of Land Management
Calico	Calico Resources USA Corporation
HDR	HDR Engineering, Inc.
TES	threatened and endangered species

Section 1: Introduction

This terrestrial vegetation baseline study addendum has been prepared in support of the Grassy Mountain Project (Project) in Malheur County, Oregon, which is being developed by Calico Resources USA Corporation (Calico). This addendum updates the *Draft Terrestrial Vegetation Baseline Study* (HDR 2014).

As noted in the 2014 study, the purpose of the terrestrial vegetation baseline study is to characterize the pre-project terrestrial vegetation communities, including species diversity; presence or absence of federally-listed threatened, endangered and sensitive (TES) species; Oregon and Bureau of Land Management (BLM) sensitive species; and condition and presence of noxious weeds. The baseline study will be used to support future mine permitting.

1.1 Project Area Description

As shown in **Figure 1**, the Project is located in Malheur County, Oregon, about 25 miles south-southwest of the City of Vale. The Project area, shown in **Figure 2**, encompasses portions of Section 8, Township 22 South, Range 44 East and Section 7, Township 22 South, Range 44 East. The project is accessed via Highway 20, west from Vale, to Russell Road. The site is approximately 25 miles south up Russell Road and Twin Springs Road.

The project area acreage includes the following:

Mine area	62 acres
Processing, tailings management and administration	626 acres
Total project area	688 acres

1.1.1 Resource Study Area

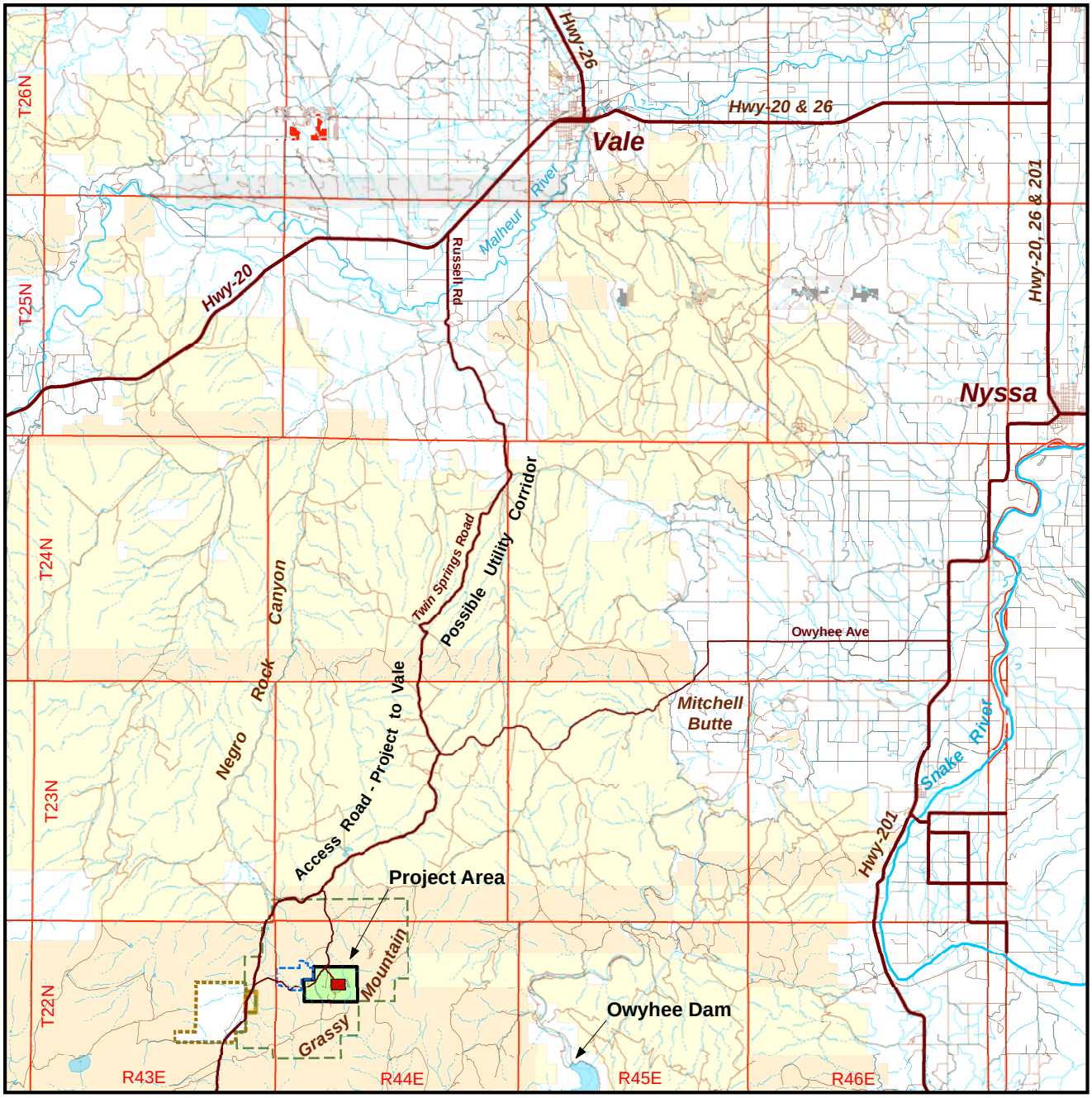
In early 2015, Calico identified approximately 310 acres of land managed by BLM that may be used to support future mining activities. The study area for this addendum includes this BLM land and the proposed Twin Springs Road access corridor, which could be upgraded to connect mine features and provide improved vehicle access between Vale, Oregon, and the Project. Much of the proposed access road corridor is currently maintained by BLM. The terrestrial vegetation study area is shown in **Figure 3**.

1.2 Baseline Study Overview

HDR's (HDR, Inc.) field survey team conducted field studies for this baseline study addendum on April 8 and 16, 2015, according to the regulatory framework and methodology set forth in the *Final Revised Environmental Baseline Study Work Plans* (HDR 2013).

The survey team used the Daubenmire vegetation sampling method for sampling vegetation attributes at six locations. This method consists of systematically placing a 20-centimeter by 50-centimeter quadrant frame along a 100-foot measuring tape and determining vegetation characteristics of canopy cover, frequency, and composition by canopy cover. HDR recorded the

information collected in the field on standardized Daubenmire field forms, which are included in **Appendix B**. Chapter 2 provides photos and descriptions of the six Daubenmire surveys.



Property Explanation

- Calico unpatented claims
- other unpatented claims
- Fee - surface & minerals
- Fee - minerals only
- Patented Claims
- Project Area
- BLM administered lands

N

0 1 2 3 4 5 km

0 1 2 3 miles

CALICO RESOURCES

Grassy Mountain Project
Malheur Co, Oregon

Location Map
July 2015

Figure 1. Project Location Map

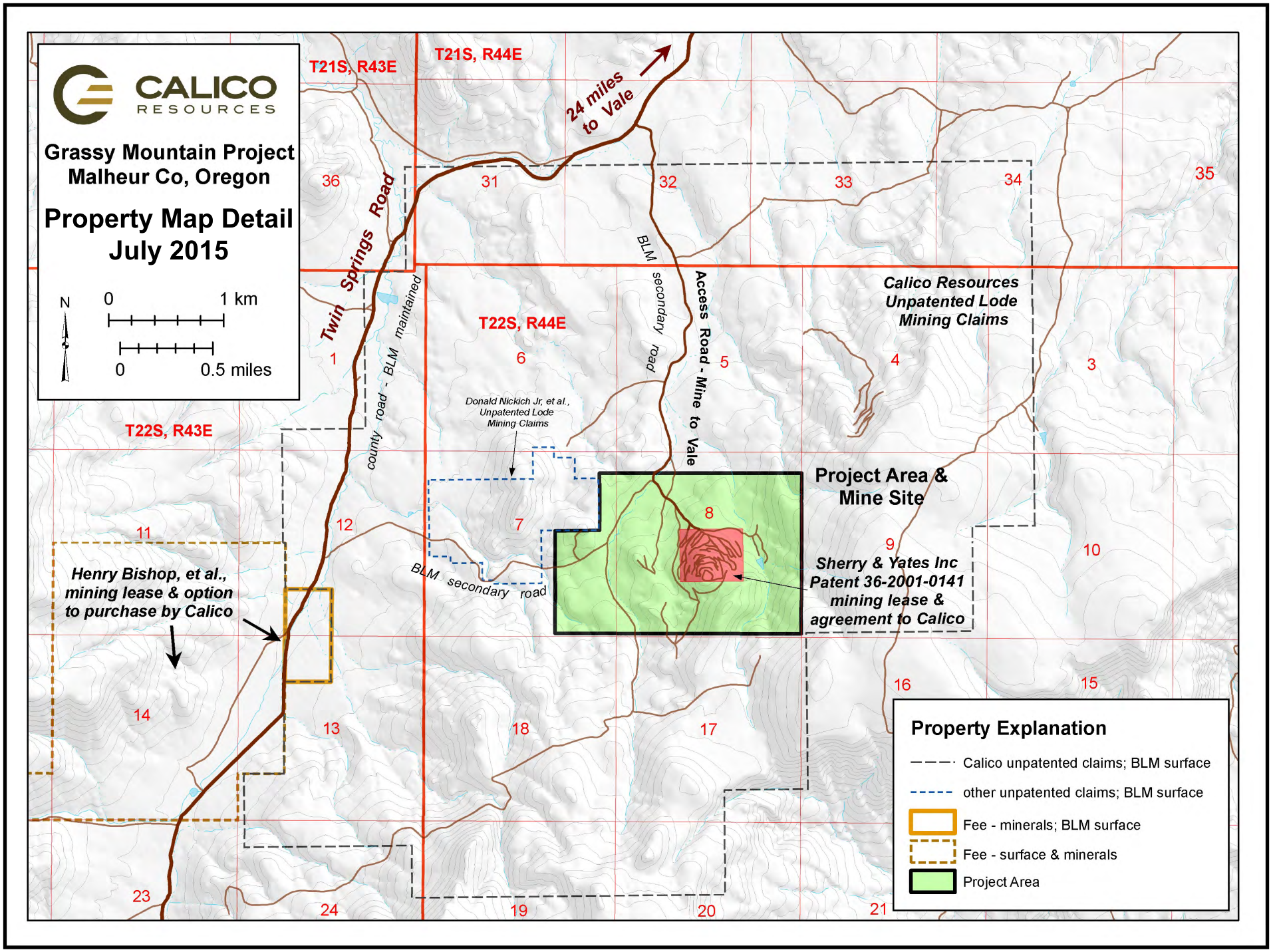


Figure 2. Property Map Detail

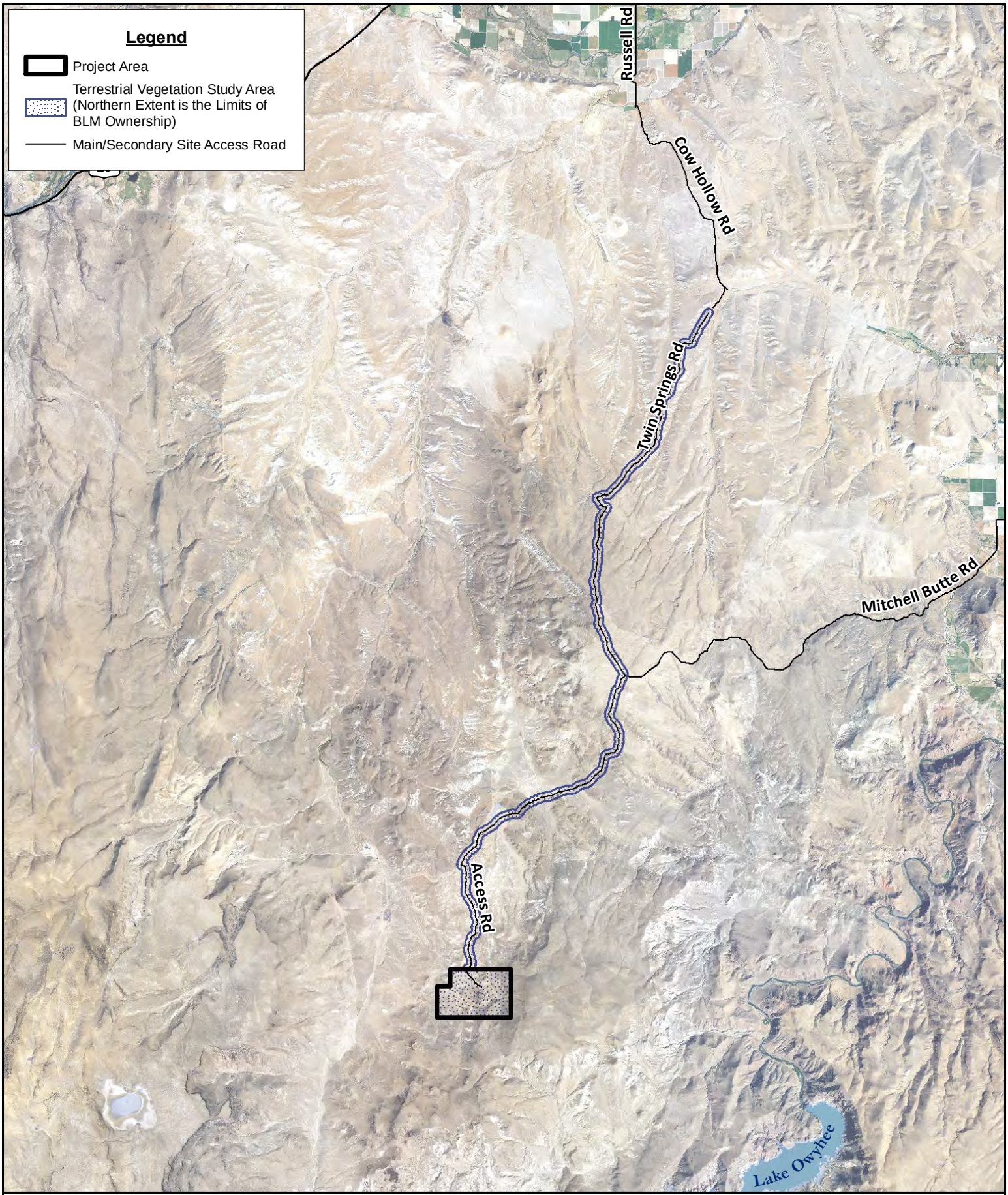


Figure 3. Vegetation Study Area
Calico Resources, Grassy Mountain Project
Malheur County, OR

Imagery: 2014 NAIP 1 meter resolution
Source: NRCS/USDA Digital Gateway
Other Data Sources: USGS; US Census Bureau

Map Production Date: 7/29/2015
Document: Q:\CalicoResources\GrassyMountain\map_docs\Vicinity_LetPort.mxd

Section 2: Baseline Characterization

2.1 Plant Community Description

Vegetation within the study area is a desert-rangeland type where sagebrush and grasses are the dominant species. The area has been extensively grazed for a number of years. Portions of the study area appear to have been re-seeded at one time with a crested wheatgrass (*Agropyron cristatum*) dominated seed mix.

Figure 4 shows the vegetation community types identified within the study area:

- sagebrush/bunchgrass
- crested wheatgrass/annual grass
- annual grass

Cheatgrass (Bromus tectorum), an invasive annual species, was common in nearly every plant community.

Photo 1. Spring 2015 Conditions

During the spring 2015 vegetation surveys, HDR's survey team did not observe any TES species, Oregon and BLM sensitive species, or noxious weeds within the six Daubenmire transects they surveyed. **Appendix A** contains a list of vegetation species observed at the Grassy Mountain Project. The survey team did observe cattle and sheep grazing at several locations within the study area. Most grass species were fully emerged and spring flowering forb species were in peak bloom. **Photo 1** shows the general growing conditions at the time of the 2015 spring survey.

2.2 Daubenmire Sampling Results

2.2.1 Daubenmire #1-2015 – Sagebrush/Bunchgrass Community

HDR's survey team performed a Daubenmire vegetation survey at 117.365E, 43.671N, located in Section 8, Township 22 South, Range 44 East (**Figure 4**). The sampling plot is located on BLM land in the Project area within the sagebrush/bunchgrass vegetation community. Information for Daubenmire #1-2015 is presented in **Table 1**. Daubenmire survey results at this location show that Sandberg's bluegrass (*Poa secunda*) had the highest percentage of canopy cover, species composition, and frequency at this location. Cheatgrass and bur buttercup (*Ceratocephala testiculata*) also occurred at a high frequency within the 50 surveyed quadrats. **Photo 2** and **Photo 3** show the Daubenmire survey completed at this location and the completed survey form is included in **Appendix B**.

Table 1. Daubenmire #1-2015 Sagebrush/Bunchgrass Community

Coordinates: 117.365E, 43.671N BLM land in Grassy Mountain Project Area		**Investigator:** R. Waldher **Date:** April 8, 2015	
Plant Species	**Percent Canopy Cover**	**Species Composition**	**Frequency**
ARTR – Artemisia tridentata	5	11	14
CHVI – Chrysothamnus nauseosus	-	-	2
POSE – Poa secunda	21	45	82
AGSP – Agropyron spicatum	5	11	20
CETE – Ceratocephala testiculata	6	13	54
BRTE – Bromus tectorum	10	21	60

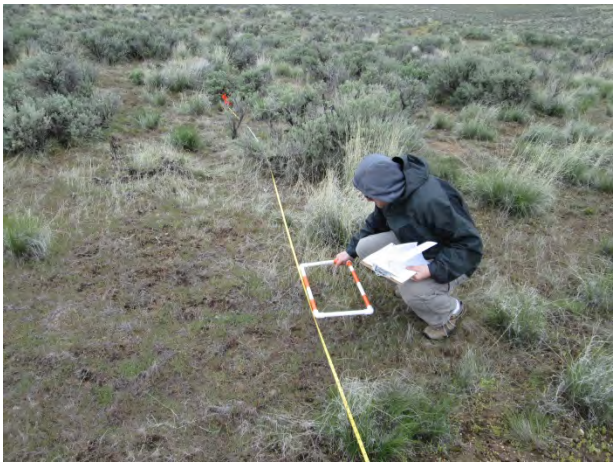
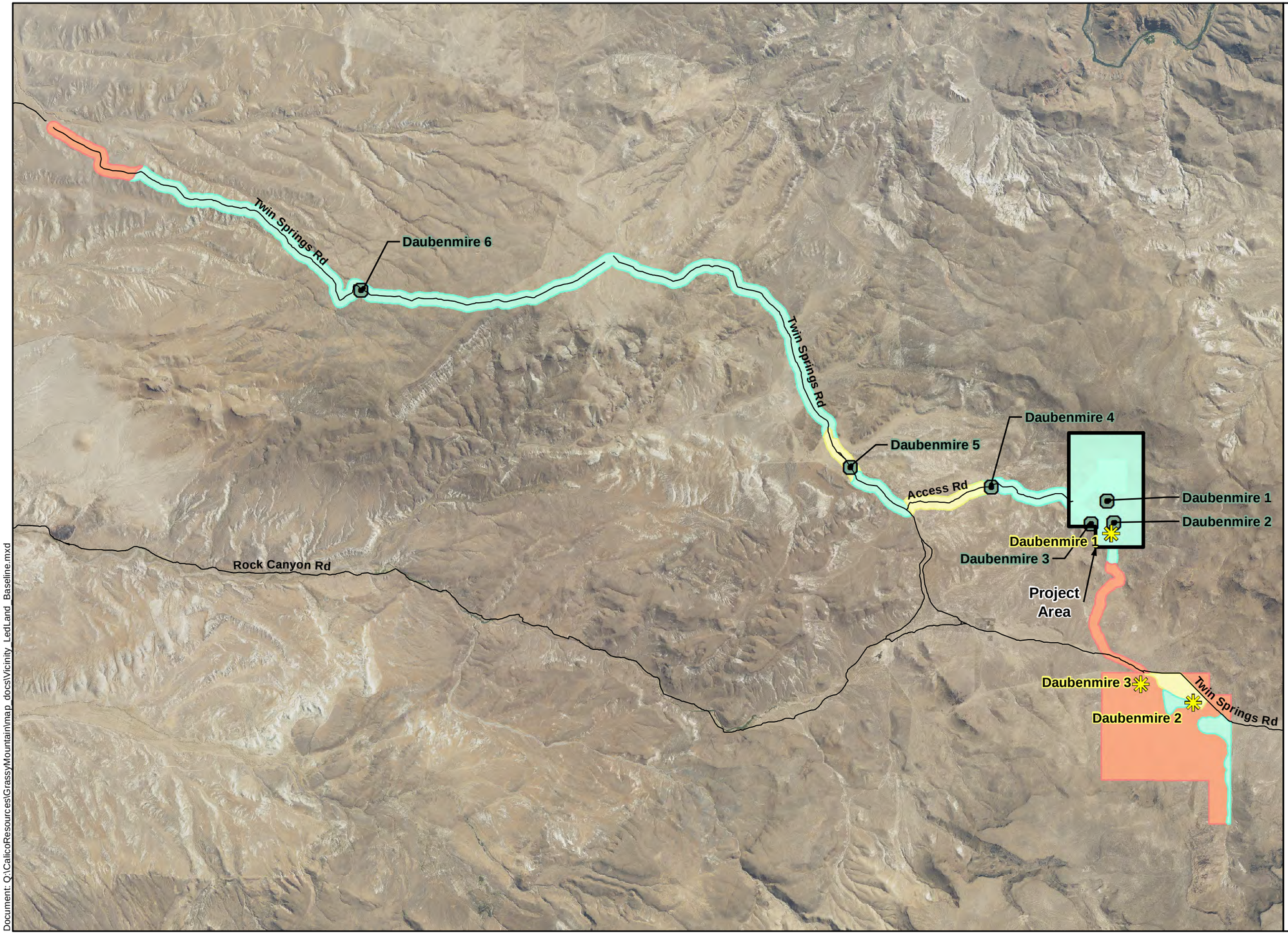


Photo 2. Using the Daubenmire frame placed along a 100-foot-long measuring tape, HDR measured 50 quadrats.

Photo 3. Daubenmire #1 was located on BLM land in the Grassy Mountain Project Area within the sagebrush/bunchgrass plant community.



Legend

- Project Area
- Public Roads
- Additional Daubenmire Transect Location
- Previously Reported Daubenmire Transect Location

Plant Community Type

- Annual Grass
- Crested Wheatgrass / Annual Grass
- Sagebrush / Bunchgrass

Note: Northern extent of plant community types is the limits of BLM ownership.

0 6,000 12,000
Feet

Imagery: 2014 NAIP 1 meter resolution
Source: NRCS/USDA Digital Gateway
Other Data Sources: BLM, USGS, Malheur County

Map Production Date: 7/29/2015

Document: Q:\CalicoResources\GrassyMountain\map_docs\Vicinity_LedLand_Baseline.mxd

Figure 4. Vegetation Community Types
Calico Resources, Grassy Mountain Project
Malheur County, OR

2.2.2 Daubenmire #2-2015 – Sagebrush/Bunchgrass Community

HDR's survey team performed a Daubenmire vegetation survey at 117.370E, 43.670N, located in Section 7, Township 22 South, Range 44 East (**Figure 4**). The sampling plot is located on BLM land in the Project area within the sagebrush/bunchgrass vegetation community. Information for Daubenmire #2-2015 is presented in **Table 2**. Daubenmire survey results at this location show that Sandberg's bluegrass had the highest percentage of canopy cover, species composition, and frequency at this location. Cheatgrass also occurred at a high frequency within the 50 surveyed quadrats. **Photo 4** and **Photo 5** show the Daubenmire survey completed at this location and the completed survey form is included in **Appendix B**.

Table 2. Daubenmire #2-2015 Sagebrush/Bunchgrass Community

Coordinates: 117.370E, 43.670N BLM land in Grassy Mountain Project Area		**Investigator:** R. Waldher **Date:** April 8, 2015	
Plant Species	**Percent Canopy Cover**	**Species Composition**	**Frequency**
ARTR – Artemisia tridentata	5	10	18
CHVI – Chrysothamnus nauseosus	1	2	6
POSE – Poa secunda	19	40	100
AGSP – Agropyron spicatum	12	25	46
BRTE – Bromus tectorum	11	23	94

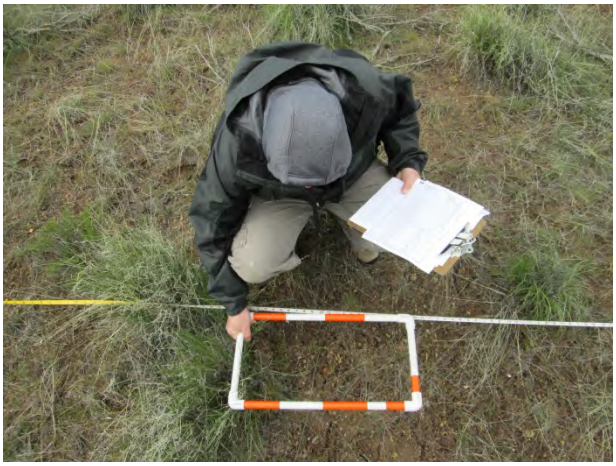


Photo 4. Daubenmire results confirmed that bunchgrasses were common at this location.

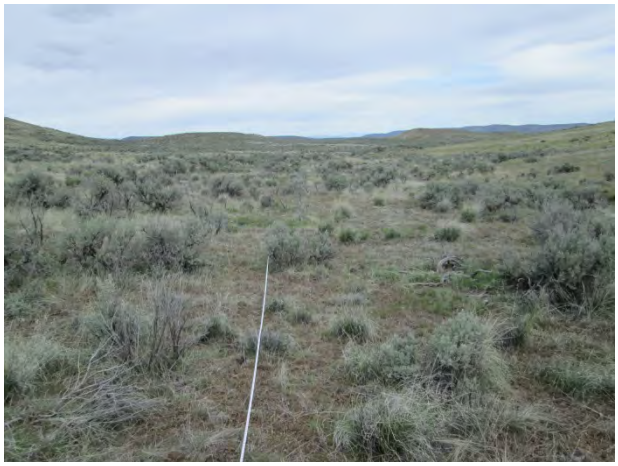


Photo 5. Daubenmire #2 was located on BLM land in the Grassy Mountain Project Area within the sagebrush/bunchgrass plant community.

2.2.3 Daubenmire #3-2015 – Sagebrush/Bunchgrass Community

HDR's survey team performed a Daubenmire vegetation survey at 117.370E, 43.673N, located in Section 7, Township 22 South, Range 44 East (**Figure 4**). The sampling plot is located on BLM land within the sagebrush/bunchgrass vegetation community. Information for Daubenmire #3-2015 is presented in **Table 3**. Daubenmire survey results at this location show that cheatgrass had the highest percentage of canopy cover, species composition, and frequency at this location. **Photo 6** and **Photo 7** show the Daubenmire survey completed at this location and the completed survey form is included in **Appendix B**.

Table 3. Daubenmire #3-2015 Sagebrush/Bunchgrass Community

Coordinates: 117.370E, 43.673N BLM land		**Investigator:** R. Waldher **Date:** April 8, 2015	
Plant Species	**Percent Canopy Cover**	**Species Composition**	**Frequency**
ARTR – Artemisia tridentata	14	26	38
AGSP – Agropyron spicatum	3	6	12
POSE – Poa secunda	5	9	54
BRTE – Bromus tectorum	31	58	88

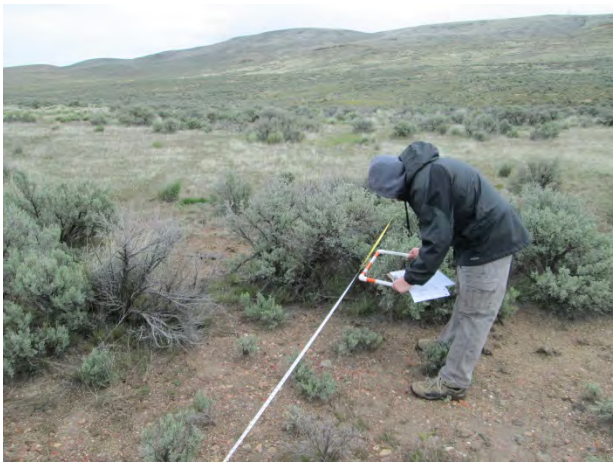


Photo 6. Using the Daubenmire frame placed along a 100-foot-long measuring tape, HDR measured 50 quadrats.

Photo 7. Daubenmire #3 was located on BLM land in the Grassy Mountain Project Area within the sagebrush/bunchgrass plant community.

2.2.4 Daubenmire #4-2015 – Sagebrush/Bunchgrass Community

HDR's survey team performed a Daubenmire vegetation survey at 117.362E, 43.690N, located in Section 5, Township 22 South, Range 44 East (**Figure 4**). The sampling plot is located on BLM land, adjacent to the access road, within the sagebrush/bunchgrass vegetation community. Information for Daubenmire #4-2015 is presented in **Table 4**. Daubenmire survey results at this location show that big sagebrush (*Artemisia tridentata*) had the highest percentage of canopy cover and species composition at this location. Bur buttercup occurred at the highest frequency as it was present within each of the 50 surveyed quadrats. **Photo 8** and **Photo 9** show the Daubenmire survey completed at this location and the completed survey form is included in **Appendix B**.

Table 4. Daubenmire #4-2015 Sagebrush/Bunchgrass Community

Coordinates: 117.362E, 43.690N BLM land adjacent to access road		**Investigator:** R. Waldher **Date:** April 16, 2015	
Plant Species	**Percent Canopy Cover**	**Species Composition**	**Frequency**
ARTR – Artemisia tridentata	18	47	46
POSE – Poa secunda	10	26	66
AGSP – Agropyron spicatum	2	5	16
CETE – Ceratocephala testiculata	8	21	100

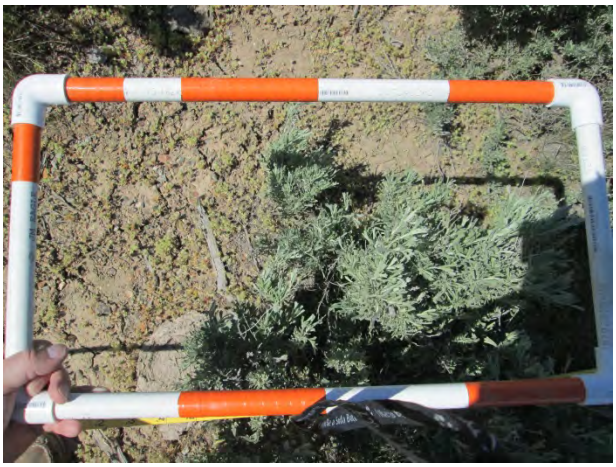


Photo 8. Sagebrush cover shown within Daubenmire frame.

Photo 9. Daubenmire #4 was located approximately 20 feet from the proposed access road within the sagebrush/bunchgrass plant community.

2.2.5 Daubenmire #5-2015 – Crested Wheatgrass/Annual Grass Community

HDR's survey team performed a Daubenmire vegetation survey at 117.357E, 43.714N, located in Section 29, Township 21 South, Range 44 East (**Figure 4**). The sampling plot is located on BLM land, approximately 20 feet from Twin Springs Road, within the crested wheatgrass/annual grass vegetation community. Information for Daubenmire #5-2015 is presented in **Table 5**. Daubenmire survey results at this location show that crested wheatgrass (*Agropyron cristatum*) had the highest percentage of canopy cover and species composition. Cheatgrass and crested wheatgrass both occurred at a high frequency within the 50 surveyed quadrats. **Photo 10** and **Photo 11** show the Daubenmire survey completed at this location and the completed survey form is included in **Appendix B**.

Table 5. Daubenmire #5-2015 Crested Wheatgrass Annual Grass Community

Coordinates: 117.357E, 43.714N BLM land, 20 feet from Twin Springs Road		**Investigator:** R. Waldher **Date:** April 16, 2015	
Plant Species	**Percent Canopy Cover**	**Species Composition**	**Frequency**
AGCR – Agropyron cristatum	23	66	78
CHVI – Chrysothamnus nauseosus	-	-	6
POSE – Poa secunda	2	5	26
BRTE – Bromus tectorum	11	22	88

Photo 10. Using the Daubenmire frame placed along a 100-foot-long measuring tape, HDR measured 50 quadrats.

Photo 11. Daubenmire #5 was located on BLM land approximately 20 feet from Twin Springs Road within the crested wheatgrass/annual grass plant community.

2.2.6 Daubenmire #6-2015 – Sagebrush/Bunchgrass Community

HDR's survey team performed a Daubenmire vegetation survey at 117.317E, 43.797N, located in Section 27, Township 20 South, Range 44 East (**Figure 4**). The sampling plot is located on BLM land, approximately 15 feet from Twin Springs Road, within the sagebrush/bunchgrass vegetation community. Information for Daubenmire #6-2015 is presented in **Table 6**. Daubenmire survey results at this location show that big sagebrush had the highest percentage of canopy cover and species composition at this location. Cheatgrass occurred at the highest frequency within the 50 surveyed quadrats. **Photo 12** and **Photo 13** show the Daubenmire survey completed at this location and the completed survey form is included in **Appendix B**.

Table 6. Daubenmire #6-2015 Sagebrush/Bunchgrass Community

Coordinates: 117.317E, 43.797N BLM land, 15 feet from Twin Springs Road		**Investigator:** R. Waldher **Date:** April 16, 2015	
Plant Species	**Percent Canopy Cover**	**Species Composition**	**Frequency**
ARTR – Artemisia tridentata	16	42	62
CHVI – Chrysothamnus nauseosus	-	-	4
POSE – Poa secunda	15	39	92
LUSP. – Lupinus sp.	1	2	8
BRTE – Bromus tectorum	6	16	74

Photo 12. Lupine was observed within several quadrats at this location.

Photo 13. Daubenmire #6 was located on BLM land approximately 15 feet from Twin Springs Road within the crested wheatgrass/annual grass plant community.

2.3 Summary

This addendum updates the *Draft Terrestrial Vegetation Baseline Study* (HDR 2014). Vegetation within the study area is a desert-rangeland type where sagebrush and grasses are the dominant species. The area has been extensively grazed for a number of years. Portions of the study area appear to have been re-seeded at one time with a crested wheatgrass (*Agropyron cristatum*) dominated seed mix.

The survey team used the Daubenmire vegetation sampling method for sampling vegetation attributes at six locations. HDR recorded the information collected in the field on standardized Daubenmire field forms, which are included in **Appendix B**. The survey results confirmed the presence of three main vegetation community types within the study area: sagebrush/bunchgrass, crested wheatgrass/annual grass, and annual grass. Cheatgrass (*Bromus tectorum*), an invasive annual species, was common in nearly every plant community.

During the spring 2015 vegetation surveys, HDR's survey team did not observe any TES species, Oregon and BLM sensitive species, or noxious weeds within the six Daubenmire transects they surveyed. They did observe cattle and sheep grazing at several locations within the study area. Most grass species were fully emerged and spring flowering forb species were in peak bloom.

Section 3: Bibliography

Daubenmire, Rexford. 1959*. A Canopy Coverage Method of Vegetational Analysis. Northwest Science.*

HDR, Inc. (HDR)

2013. *Final Revised Environmental Baseline Study Work Plans*. March.

2014. *Draft Terrestrial Vegetation Baseline Study*. November.

Section 4: Contacts

Christine Whittaker, RLA
HDR Engineering, Inc.
412 East Parkcenter Blvd, Suite 100
Boise, ID 83706-6659
208-387-7067
christine.whittaker@hdrinc.com

A

Vegetation Species Observed

Appendix A
Grassy Mountain Exploration Project
Terrestrial Vegetation Report – Vegetation Species Observed

Scientific Name	Common Name	Family Name	Plant Description
Shrubs (Shrub Stratum)			
Artemisia tridentata	big sagebrush	Asteraceae	Perennial shrub
Chrysothamnus nauseosus	rubber rabbitbrush	Asteraceae	Perennial shrub
Chrysothamnus viscidiflorus	green rabbitbrush	Asteraceae	Perennial shrub
Opuntia polyacantha	plains prickly pear	Cactaceae	Perennial shrub
Rosa woodsii	Wood's rose	Rosaceae	Perennial shrub
Sarcobatus vermiculatus	greasewood	Chenopodiaceae	Perennial shrub
Forbs (Herbaceous Stratum)			
Achillea millefolium	common yarrow	Asteraceae	Perennial forb
Arnica sp.	Arnica	Asteraceae	Perennial forb
Balsamorhiza sagittata	arrowleaf balsamroot	Asteraceae	Perennial forb
Ceratocephala testiculata	bur buttercup	Ranunculaceae	Annual forb
Chorispora tenella	blue mustard	Brassicaceae	Annual forb
Cirsium arvense	Canada thistle	Asteraceae	Noxious weed
Cirsium undulatum	wavyleaf thistle	Asteraceae	Perennial forb
Convolvulus arvensis	field bindweed	Convolvulaceae	Perennial forb
Eriogonum spergulinum	buckwheat	Polygonaceae	Annual forb
Haplopappus carthamoides	large-flowered goldenweed	Asteraceae	Perennial forb
Kochia scoparia	kochia	Chenopodiaceae	Annual forb
Lepidium perfoliatum	pepperweed	Brassicaceae	Annual/biennial forb
Lomatium simplex	desert parsley	Apiaceae	Perennial forb
Lupinus sp.	lupine	Leguminaceae	Perennial forb
Melilotus alba	white sweet clover	Leguminaceae	Perennial forb
Melilotus officinalis	yellow sweet clover	Leguminaceae	Perennial forb
Phlox sp.	Phlox	Polemoniaceae	Perennial forb
Rumex crispus	curly dock	Polygonaceae	Perennial forb
Sisymbrium altissimum	tumble mustard	Brassicaceae	Annual/biennial forb
Sphaeralcea munroana	Munro's gobemallow	Malvaceae	Perennial forb
Sphaerophysa salusula	Austrian peaweed	Fabaceae	Noxious weed
Taraxacum officinale	common dandelion	Compositaceae	Perennial forb
Tragopogon dubius	salsify	Asteraceae	Annual/biennial forb
Verbascum blattaria	moth mullein	Scrophulariaceae	Biennial forb
Grass and Grasslikes (Herbaceous Stratum)			
Agropyron cristatum	crested wheatgrass	Poaceae	Perennial grass
Agropyron spicatum	bluebunch wheatgrass	Poaceae	Perennial grass
Bromus tectorum	cheat grass	Poaceae	Annual grass
Eleocharis sp.	spikerush	Cyperaceae	Native grasslike
Elymus caput-medusae	medusahead	Poaceae	Annual grass
Elymus elymoides	squirreltail	Poaceae	Perennial grass
Hordeum jubatum	foxtail barley	Poaceae	Perennial grass
Juncus sp.	rush species	Juncaceae	Native grasslike
Leymus cinereus	Great Basin wildrye	Poaceae	Perennial grass
Poa secunda	Sandberg's bluegrass	Poaceae	Perennial grass
Polypogon monspeliensis	rabbit's foot grass	Poaceae	Annual grass
Vulpia microstachys	small fescue	Poaceae	Annual grass

B

Vegetation Field Sampling Forms

ADDENDUM #1

Daubenmire

Study Number BASELINE VEG.	Date 4/8/15	Examiner R. WALDHER	Allotment Name & Number	Pasture
Transect Number and Location Daubenmire #1 - 2015			Number of Quadrats 50	

Plant Species	Quadrat																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
ARTR																1								3	3
CHVI		2																							
POSE	2	2	2	4	4	4	3	5	3	2	3	1	1		2		5	2	4	3	2	2	1	1	3
AGSP													3					2					1		
CETE		1							1	1	1	1	1	1	1		1	1	1	1	1	2	1		1
BRTE									1	1			1	4	4	3	1	1						2	

Plant Species	Quadrat																								
	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
ARTR																				5	4	2			1
CHVI																									
POSE	3	2		3	3	2	3	2	2	1				1	1			2	1		1	3	1	2	2
AGSP												3	3		4		1	4						1	1
CETE			1	2	2	2					1	2	2	1		5	5								1
BRTE	3	3	2	1	1	1	1	2	2	3	2			1	1			2	1	2	2	3	3	1	1

Illustration 9

Daubenmire Summary

Study Number BASELINE VEG.	Date 4/8/15	Examiner R. WALDHER	Allotment Name & Number	Pasture
Study Location Daubenmire #1 - 2015			Number of Quadrats 50	

Cover Class	Mid-Point	Species ARTR Number	ARTR Product	Species CHVI Number	CHVI Product	Species POSE Number	POSE Product	Species AGSP Number	AGSP Product	Species CETE Number	CETE Product	Species BRTE Number	BRTE Product	Species Number	Species Product	Species Number	Species Product	Species Number	Species Product	Species Number	Species Product	Species Number	Species Product
1 1-5%	2.5	2	5	-	-	10	25	4	10	19	47.5	14	35										
2 5-25%	15	1	15	1	15	15	225	1	15	6	90	8	120										
3 26-50%	37.5	2	73	-	-	10	375	3	112.5	-	-	6	225										
4 51-75%	62.5	1	62.5	-	-	4	250	2	125	-	-	2	125										
5 76-95%	85	1	85	-	-	2	170	-	-	2	170	-	-										
6 96-100%	97.5	-	-	-	-	-	-	-	-	-	-	-	-										
Total canopy			240.5		15		1045		262.5		307.5		505										
Number of Samples			50		50		50		50		50		50										
% canopy cover			5		-		21		5		6		10										
Species composition			11		-		45		11		13		21										
Frequency			14		2		82		20		54		60										

ADDENDUM #1

Daubenmire

Study Number BASELINE VEG	Date 4/8/15	Examiner R. WALDHER	Allotment Name & Number	Pasture

Transect Number and Location Daubenmire #2 - 2015 | Number of Quadrats 50

Plant Species	Quadrat																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
ARTR	1	2	5	1	1	1																			
CHVI				2						3								2							
POSE	2	2	2	1	1	1	2	3	3	1	1	1	3	3	3	2	2	1	2	3	2	2	2	2	2
AGSP						3					2	2					3				3		4	2	1
BRTE	1		1	1			2	2	3	1	1	2	3	3	3	1	1	1	2	3	2	2	2	2	2

Plant Species	Quadrat																								
	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
ARTR																					2	5	3		
CHVI																									
POSE	2	1	2	2	3	2	3	3	2	3	1	2	2	3	1	2	3	2	4	3	1	1	3	1	2
AGSP	4		2	2	1	2		3	3		4					1	3	3	1		1	1		3	
BRTE	1	2	3	3	1	1	1	1	1	1	1	1	1	2	2	2	1	1	1	1	1	1	2	1	1

Illustration 9

Daubenmire Summary

Study Number	Date	Examiner	Allotment Name & Number	Pasture
BASELINE VEG.	4/8/15	R. WALDHER		

Study Location	Number of Quadrats
Daubenmire #2 - 2015	50

Cover Class	Mid-Point	Species ARTR Number	ARTR Product	Species CHVI Number	CHVI Product	Species POSE Number	POSE Product	Species AGSP Number	AGSP Product	Species BRTE Number	BRTE Product	Species Number	Species Product	Species Number	Species Product	Species Number	Species Product	Species Number	Species Product	Species Number	Species Product	Species Number	Species Product
1 1-5%	2.5	4	10	-	-	13	32.5	6	15	26	65												
2 5-25%	15	2	30	2	30	22	330	6	90	14	210												
3 26-50%	37.5	1	37.5	1	37.5	14	525	8	300	7	262.5												
4 51-75%	62.5	-	-	-	-	1	62.5	3	187.5	-	-												
5 76-95%	85	2	170	-	-	-	-	-	-	-	-												
6 96-100%	97.5	-	-	-	-	-	-	-	-	-	-												
Total canopy			247.5		67.5		950		592.5		537.5												
Number of Samples			50		50		50		50		50												
% canopy cover			5		1		19		12		11												
Species composition			10		2		40		25		23												
Frequency			18		6		100		46		94												

Illustration 10

ADDENDUM # 1

Daubenmire

Study Number BASELINE VEG.	Date 4/8/15	Examiner R. WALDHER	Allotment Name & Number	Pasture

Transect Number and Location Daubenmire # 3 - 2015 | Number of Quadrats 50

Plant Species	Quadrat																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
ARTR								2	1	3	3														3
AGSP																									
POSE	1	2				1	1		2	2		1			1	1				1				2	1
BRTR	4	3	4	4	4	4	4	3	3	2	1	1	3	4	4	4	4	4	3	2	4	4	4	3	2

Plant Species	Quadrat																								
	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
ARTR	3	2					3	3	4		2	2	2	5	5	3	3	1	4						
AGSP	1	3		3		3	1	3																	
POSE	1				1	1	3		1						1	3	2	1	2	3	2	1	1	2	
BRTR	1	2					1		2	1	1	1		2	1	2	2	1	1	2	3	4	4	4	4

Illustration 9

ADDENDUM #1

Daubenmire Summary

Study Number	Date	Examiner	Allotment Name & Number	Pasture
BASELINE VEG.	4/8/15	R. WALDHER		

Study Location: Daubenmire #3 - 2015 | Number of Quadrats: 50

Cover Class	Mid-Point	Species: ARTR Number	ARTR Product	Species: AGSP Number	AGSP Product	Species: POSE Number	POSE Product	Species: BRTE Number	BRTE Product	Species Number	Species Product	Species Number	Species Product	Species Number	Species Product	Species Number	Species Product	Species Number	Species Product	Species Number	Species Product	Species Number	Species Product
1 1-5%	2.5	2	5	2	5	16	40	10	25														
2 5-25%	15	5	75	-	-	8	120	9	135														
3 26-50%	37.5	8	300	4	150	3	112.5	7	262.5														
4 51-75%	62.5	2	125	-	-	-	-	18	1125														
5 76-95%	85	2	170	-	-	-	-	-	-														
6 96-100%	97.5	-	-	-	-	-	-	-	-														
Total canopy			675		155		272.5		1547.5														
Number of Samples			50		50		50		50														
% canopy cover			14		3		5		31														
Species composition			26		6		9		58														
Frequency			38		12		54		88														

Illustration 10

ADDENDUM #1

Daubenmire

Study Number BASELINE VEG.	Date 4/16/15	Examiner R. WALDHER	Allotment Name & Number	Pasture

Transect Number and Location Daubenmire #4 - 2015 | Number of Quadrats 50

Plant Species	Quadrat																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
ARTR					2				2		4	2	1	5	4					5	3	2			
POSE	2	1	1	4	1		2	3	2	1	3	1	2	2	3			2	3	2	2			1	2
AGSP						1	2				1				1										
CETE	1	1	1	1	1	3	2	1	1	1	1	2	1	1	1	1	1	2	1	1	1	1	1	1	2

Plant Species	Quadrat																								
	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
ARTR	3		3	5		3	3	3	4	3	3				3				4				2	1	
POSE	3					1	2	2	2	1	1	1		2	2			1				2		1	2
AGSP								1		3	2					1			1						
CETE	1	1	1	1	3	2	3	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	2	1	1

Illustration 9

ADDENDUM #1

Daubenmire Summary

Study Number	Date	Examiner	Allotment Name & Number	Pasture
BASELINE VEG.	4/16/15	R. WALDHER		

Study Location: Daubenmire #4 - 2015 | Number of Quadrats: 50

Cover Class	Mid-Point	Species: ARTR		Species: POSE		Species: AGSP		Species: CETE		Species		Species		Species		Species		Species		Species		Species	
		Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product
1 1-5%	2.5	2	5	12	30	5	12.5	38	95														
2 5-25%	15	5	75	15	225	2	30	6	90														
3 26-50%	37.5	9	337.5	5	187.5	1	37.5	6	225														
4 51-75%	62.5	4	250	1	62.5	-	-	-	-														
5 76-95%	85	3	255	-	-	-	-	-	-														
6 96-100%	97.5	-	-	-	-	-	-	-	-														
Total canopy			922.5		505		80		410														
Number of Samples			50		50		50		50														
% canopy cover			18		10		2		8														
Species composition			47		26		5		21														
Frequency			46		66		16		100														

Illustration 10

ADDENDUM #1

Daubenmire

Study Number BASELINE VEG.	Date 4/16/15	Examiner R. WALDHER	Allotment Name & Number	Pasture

Transect Number and Location Daubenmire #5 - 2015 | Number of Quadrats 50

Plant Species	Quadrat																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
AGCR	1	4	2	3	1	1	2		1	3	2	4					3	3		5	3	3	4		2
CHVI																									
POSE						1					1	1						1			1				
BRTE	2	1	2	2	3	2	2	1	1	2	2	3	1	2	2	2	1	2	1		1	2	2	1	2

Plant Species	Quadrat																								
	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
AGCR	2	2	2	3		2	2	4	4	1	1		1	1		1	3		4	3	3	4	2	3	3
CHVI													2	1		1									
POSE						1								3	1			1		1	1			2	2
BRTE	2	1		1	2	1	3	2	1		1	1	1	1	2	3	3	1			1	1	2	2	2

Illustration 9

ADDENDUM # 1

Daubenmire Summary

Study Number BASELINE VEG.	Date 4/16/15	Examiner R. WALDHER	Allotment Name & Number	Pasture
Study Location Daubenmire # 5-2015			Number of Quadrats 50	

Cover Class	Mid-Point	Species AGCR Number	AGCR Product	Species CHV1 Number	CHV1 Product	Species POSE Number	POSE Product	Species BRTE Number	BRTE Product	Species Number	Species Product	Species Number	Species Product	Species Number	Species Product	Species Number	Species Product	Species Number	Species Product	Species Number	Species Product	Species Number	Species Product
1 1-5%	2.5	9	22.5	2	5	10	25	19	47.5														
2 5-25%	15	10	150	1	15	2	30	20	300														
3 26-50%	37.5	12	450	-	-	1	37.5	5	187.5														
4 51-75%	62.5	7	437.5	-	-	-	-	-	-														
5 76-95%	85	1	85	-	-	-	-	-	-														
6 96-100%	97.5	-	-	-	-	-	-	-	-														
Total canopy			1145		20		92.5		535														
Number of Samples			50		50		50		50														
% canopy cover			23		-		2		11														
Species composition			66		0		5		22														
Frequency			78		6		26		88														

ADDENDUM #1

Daubenmire

Study Number BASELINE VEG	Date 4/16/15	Examiner R. WALDHER	Allotment Name & Number	Pasture

Transect Number and Location Daubenmire # 6 - 2015 | Number of Quadrats 50

Plant Species	Quadrat																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
ARTR	3			2	4	1			1	2	3	2							5	4	1	1	4	3	2
CHVI																									
POSE	2	1	3	2	3	3	2	2	1	2	3	2	2	2	2	4	3	2	2	1	2		1	2	2
LUSP.																								1	1
BRTE	2	1	1			1	2	2			2	2	1			1	2	1	1	1		3	1	1	1

Plant Species	Quadrat																								
	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
ARTR				1							2	3	1	2	4	2	1	1	1	1	2	3	4	3	3
CHVI																		1	1						
POSE	1	3	2	2	3	2	1	1	2		1		2	1	3	1	1		2	1	2	1	2	2	1
LUSP.	1															4									
BRTE	1			1	2		1	1		1	1	3	2	1	2	1		1		1	1	3	2	1	1

Illustration 9

ADDENDUM #1

Daubenmire Summary

Study Number	Date	Examiner	Allotment Name & Number	Pasture
BASELINE VEG	4/16/15	R. WALDHER		

Study Location: Daubemire #6 - 2015 | Number of Quadrats: 50

Cover Class	Mid-Point	Species: ARTR		Species: CHVI		Species: POSE		Species: LUSP.		Species: BRTE		Species		Species		Species		Species		Species		Species	
		Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product	Number	Product
1 1-5%	2.5	10	25	2	5	14	35	3	7.5	24	60												
2 5-25%	15	8	120	-	-	23	345	-	-	10	150												
3 26-50%	37.5	7	262.5	-	-	8	300	-	-	3	112.5												
4 51-75%	62.5	5	312.5	-	-	1	62.5	1	62.5	-	-												
5 76-95%	85	1	85	-	-	-	-	-	-	-	-												
6 96-100%	97.5	-	-	-	-	-	-	-	-	-	-												
Total canopy			805		5		742.5		70		322.5												
Number of Samples			50		50		50		50		50												
% canopy cover			16		-		15		1		6												
Species composition			42		-		39		2		16												
Frequency			62		4		92		8		74												

ATTACHMENT B

SAGEBRUSH IDENTIFICATION TEST FOR THE GRASSY MOUNTAIN MINE PROJECT; MALHEUR COUNTY, OREGON
MEMO FROM EM STRATEGIES TO DOGAMI, DATED SEPTEMBER 28, 2018.

EM STRATEGIES

MEMORANDUM

DATE: October 2, 2018

TO: Randy Jones, Oregon Department of Geology and Mineral Industries

FROM: Kris Kuyper, Biology Program Manager; Sarah Harrelson, Botanist

SUBJECT: Sagebrush Identification Test for the Grassy Mountain Mine Project; Malheur County, Oregon

INTRODUCTION

Calico Resources USA Corp. (Calico) received a letter dated August 10, 2018, with comments on the *Grassy Mountain Mine Project Terrestrial Vegetation Baseline Report* (EM Strategies, Inc. [EMS] 2018) from the Oregon Department of Geology and Mineral Industries (DOGAMI). The DOGAMI comment letter included reviews by DOGAMI, the Oregon Department of Agriculture, and the Oregon Department of Fish and Wildlife (ODFW). The ODFW stated "the identification of the dominant big sage subspecies as mountain [big sagebrush] ([*Artemisia tridentata* subsp.] *vaseyana*) instead of Wyoming [big sagebrush] ([*A. t.* subsp] *wyomingensis*) seems odd at that elevation. Because the baseline data could be used to inform reclamation seed mixes and to evaluate reclamation success, this identification should be verified." To accommodate this comment, Calico tasked SPF Water Engineering, LLC (SPF) with the field collection of sagebrush plant samples to be sent to EMS for testing. The methodology and results of the tests are provided below.

METHODOLOGY

SPF collected the samples on September 18, 2018. The samples were collected from two locations, identified as Daubenmire plots D4 and D7 in the baseline report. The samples were packaged in two separate plastic bags and were sent via overnight mail. The samples were received by EMS on September 19, 2018. The identification process followed the method outlined in the United States Forest Service's (USFS') 2015 *Sagebrush Identification with Ultraviolet Light* (Attachment 1). The use of distilled water rather than using both methanol and water was the only modification to this specific methodology. The USFS *Sagebrush Identification Table for Use with Black Light* (Attachment 2) listed identification factors for using water or methanol. Other references that state water is an acceptable method for testing include: *A Simple Field Technique for Identification of Some Sagebrush Taxa* (Stevens and McArthur 1974); Sagebrush Identification, Ecology, and Palatability Relative to Sage-Grouse (Rosentreter 2004); and *Pocket Guide to Sagebrush* (PRBO Conservation Science 2012).

Small amounts (at least two cubic centimeters) of plant material from each location were placed in two separate small jars, which were then filled with just enough distilled water to cover the plant

material. An effort was made to avoid cross-contamination of samples by washing the scissors used between maceration of each sample. The samples were then allowed to rest for approximately 15 minutes.

Once the samples were allowed to rest, they were taken into a dark room and lit with a 365-nanometer ultraviolet (UV) light.

RESULTS

Results were based on the USFS *Sagebrush Identification Table for Use with Black Light* (Attachment 2). The table states that samples identified as Wyoming big sagebrush must have at least three of the following characteristics to make a definitive identification:

1. UV fluorescence in water (colorless to very very pale blue);
2. Leaf shape and size (leaves ½ to ¾ inch long; leaf margins curved outward; crushed leaves have a turpentine smell);
3. Plant growth form (uneven topped; floral stems growing throughout the crown);
4. Branching pattern (spreading/upright);
5. Environment (mesic to frigid; xeric to ustic; 4,500 feet to 5,500 feet above mean sea level [amsl]); and
6. Mature plant height (up to four feet).

Samples identified as mountain big sagebrush must have at least three of the following characteristics to make a definitive identification:

1. UV fluorescence in water (intense blue to creamy-blue);
2. Leaf shape and size (leaves ¾ to one-inch long; leaf margins curved outward; crushed leaves have a mint-ish smell);
3. Plant growth form (even);
4. Branching pattern (spreading/somewhat upright);
5. Environment (frigid; xeric to ustic; 5,200 feet to 8,600 feet amsl; can rarely be mesic); and
6. Mature plant height (up to four feet).

The sample from the D4 location fluoresced colorless to very very pale blue under UV light, had leaves that were approximately 0.5-inch long with turpentine smell, and the specimen was collected at approximately 3,670 feet amsl. The specimen from the D7 location fluoresced colorless to very very pale blue under UV light, had leaves that were approximately 0.5 to 0.75-inch long with turpentine smell, and was collected at approximately 3,520 feet amsl.

CONCLUSION

Both samples demonstrated the characteristics of Wyoming big sagebrush; specifically, UV fluorescence, leaf shape, size, and smell. In addition, the elevation at which the samples were collected are closer to the elevation range reported for Wyoming big sagebrush than mountain big sagebrush. Therefore, the specimens at both the D4 and D7 sample sites are determined to be Wyoming big sagebrush.

ATTACHMENTS

Attachment 1: Sagebrush Identification with Ultraviolet Light
Attachment 2: Sagebrush Identification Table for Use with Black Light

REFERENCES

PRBO (Point Reyes Bird Observatory) Conservation Science. 2012. *Pocket Guide to Sagebrush*. http://www.sagestep.org/pubs/pubs/sagebrush_pock_guide.pdf. Accessed October 1, 2018.

Rosentreter, Roger. 2004. *Sagebrush Identification, Ecology, and Palatability Relative to Sage-Grouse*. USDA Forest Service Proceedings RMRS-P-000. https://www.ntc.blm.gov/krc/uploads/284/Sagebrush%20Identification%20Ecology%20and%20Palatability%20Relative%20to%20Sage%20Grouse..pdf. Accessed October 1, 2018.

Stevens, Richard and E. Durant McArthur. 1974. *A Simple Field Technique for Identification of Some Sagebrush Taxa*. Journal of Range Management 27(4). July 1974. https://journals.uair.arizona.edu/index.php/jrm/article/viewFile/6349/5959. Accessed October 1, 2018.

United States Forest Service (USFS). 2010. *Sagebrush Identification Table For Use With Black Light*. https://www.fs.fed.us/rm/boise/research/shrub/Links/SageID.pdf. Accessed September 20, 2018.

_____. 2015. *Sagebrush Identification with Ultraviolet Light*. https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprd3836539.pdf. Accessed September 20, 2018.

Sagebrush Identification with Ultraviolet Light

April 2015

Multiple vegetation keys exist to identify sagebrush taxa. A supplementary method to aid in accurate sagebrush identification is the ultraviolet (UV) light fluorescing technique. Using this method is optional for sagebrush identification, but may be used by Government inspectors for quality assurance purposes.

Materials needed:

- 100% methanol
- water
- small glass vials
- scissors
- 366 nm UV light

UV light fluorescing method:

1. Collect sagebrush specimen. If specimens are not tested immediately, store them in separate air-tight containers (e.g., zip-lock bags).
2. Within 3 days of specimen collection – cut up sagebrush leaves with scissors into two glass vials. Put at least 2 cubic centimeters of leaf material into each vial.
3. Add water to one vile and 100% methanol to the other, so that the leaves are submerged. Do not fill the entire vile with liquid.
4. Let the leaves sit in each solution for up to 15 minutes; in many cases fluorescence may be visible immediately.
5. In a darkened area, use a 366 nm UV light and shine through each vile.
6. Record color of the liquid fluorescing in each vile
7. Identify specimen by comparing fluorescing results and morphological characteristics to the 'Sagebrush Identification Table for Use with Black Light.'

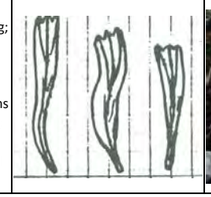
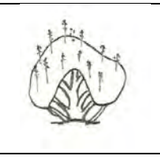
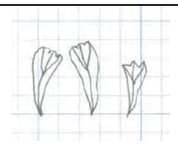
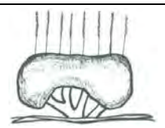
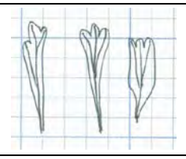
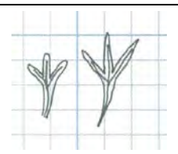
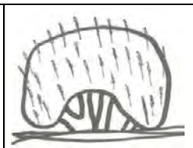
Sagebrush Identification with Ultraviolet Light Data Form

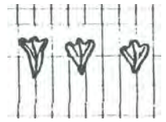
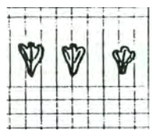
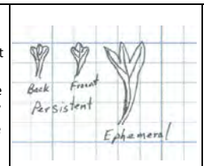
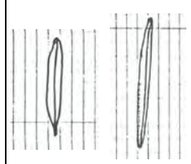
1- **Reference Site & Plot ID#:** _____ *2*- **Names**: _____ *3*- **M/D/YY:** _____-_____-_____

Specimen Number	Fluorescence Under UV Light		Morphological Characteristics	Identification
	Water	Methanol		

Sagebrush Identification Table For Use With Black Light

For Use in the Inter-Great Basin Area

Plant Nomenclature	Fluoresces Under Ultraviolet Light		Leaf shape and size			Plant Growth Form			Branching Pattern	Environment	Mature Plant Height	Comments
	Water	Alcohol										
Basin Big Sagebrush Artemisia tridentata subsp. tridentata (ARTRT)	Colorless to Very Very Pale blue Rarely pale Brownish-red	Brownish to Reddish-Brown to colorless	Leaves 3/4 -1 1/4 in. long; long narrow; Leaf will normally be 4 times longer than it is at its widest point; Leaf margins not extending outward; Crushed leaves have a strong turpentine smell			Uneven topped; Floral stems growing throughout the crown			"V"ed branching/ upright	Mesic to Frigid Xeric to Ustic 4000 to 8000 ft.	3.5 ft. to greater than 8 ft.	Uneven topped; Main stem is undivided and trunk-like at base;. Located normally in drainage bottoms; Small concave areas and valley floors, but always on deep Non-saline Non-calcareous soils. Vegetative leader is greater than 1/2 the length of the flower stalk from the same single branch. In Basin there are two growth forms: One the Typical tall form (Diploid); Two a shorter form that looks similar to Wyoming sagebrush if you do not look for the trunk (around 1 inch or so); the branching pattern; and the seedhead to vegetative leader characteristics (Tetraploid).
Wyoming Big Sagebrush Artemisia tridentata subsp. wyomingensis (ARTRW8)	Colorless to Very Very Pale blue	Colorless to pale brownish-red	Leaves 1/2 - 3/4 inches long; Leaf margins curved outward. Crushed leaves have a turpentine smell.			Uneven topped; Floral stems growing throughout the crown			Spreading/ upright	Mesic to Frigid Xeric to Ustic 4500 to 5500 ft.	Up to 4 ft.	Uneven topped; Main stem is usually divided at ground level. Plants will often keep the last years seed stalks into the following fall. Located normally in the lower half of the upland and through-out the semi-desert zones. Soils can be mildly alkaline.
Bonneville Big Sagebrush Artemisia tridentata subsp. "X bonnevillensis"	Blue to Intense Blue can be a creamy-blue	Colorless to weak brownish-red	Leaves 1/2 - 2/3 in. long; Leaf margins curved outward. Crushed leaves have a weak mint-ish smell.			Uneven but with even seed heads			Spreading/ upright	Mesic to Frigid Xeric 5000 to 7000 ft.	Up to 4 ft.	Uneven topped; Flower stalks extending noticeably above the top of the plant; Main stem is usually divided at ground level; . Located normally in the upper half of the upland zones (Normally 12 inches effective precipitation and up).
Mountain Big Sagebrush Artemisia tridentata subsp. vaseyana (pauciflora) (ARTRV)	Intense blue to Creamy-blue	Creamy-blue	Leaves 3/4 - 1 in. long; Leaf margins curved outward; Crushed leaves have a mint-ish smell.			Even			Spreading/ some-what upright	Frigid Xeric to Ustic 5200 to 8600 ft. Can rarely be Mesic	Up to 4 ft.	Even topped; Flower stalks extending noticeably above the top of the plant; Main stem divided at ground level. There are two types of mountain big sagebrush. **Mountain sagebrush** is located in the mountain zone. Very rarely in the High Mountain Zone. Subsp. pauciflora (M**ountain sagebrush**) will not layer nor sprout and has **6** or less flowers per floret.
High Mt. Big Sagebrush Artemisia tridentata subsp. vaseyana (ARTRV)	Intense blue to Creamy-blue	Creamy-blue	Leaves 3/4 - 1 in. long; Leaf margins curved outward; Crushed leaves have a mint-ish smell.			Even			Spreading/ some-what upright	Frigid to Cryic Mainly Udic sometimes Xeric to Ustic 6000 to 9000 ft.	Up to 4 ft.	Even topped; Flower stalks extending noticeably above the top of the plant; Main stem divided at ground level. **High Mountain sagebrush** is located in the High Mountain Zone. Very rarely found in the Mountain Zone. Subsp. vaseyana (**High Mountain sagebrush)** will layer limitedly but never sprout and has **7** or more flowers per floret.
Subalpine Big Sagebrush Artemisia tridentata spiciformis (ARTRS2)	Intense blue to Creamy-blue	Creamy-blue	Leaves 1 to 1 1/2 in. long. Leaf margins curved outward; Ephemeral leaves sometimes have entire margins. Crushed leaves have a fresh mint-ish smell.			Even			Spreading; Layering and Sprouting	Cryic to rarely frigid Mainly Udic, rarely Xeric to Ustic 7500 to 9400 ft.	Up to 4 ft. Normally around 3 ft.	Raggedly even topped; Flower stalks extending noticeably above the top of the plant; Branches layer producing roots wherever branches contact the ground for any extended period of time. Main stem divided at ground level. Located in the high mountain zone. Found on clayey to silty-clay loam soils. Can back-cross with Silver sage causing production of some entire leaves. Plant will sprout from damaged crowns and bases of branches.
Three Tip Sagebrush Artemisia tripartita (ARTR4)	Blue to Pale Blue	Brownish-Red to Colorless	Leaves 1/2 - 1 in. long; Leaf very deeply lobed and have a feathery look. Crushed leaves have a weak mint-ish smell.			Uneven but can appear Even			Spreading Layering Stump and root sprouting	Mesic to Frigid Xeric 4800 to 7000 ft.	2 to 3 ft.	Plants spread by seeds; layering stump and root sprouts. Plants tend to grow in patches with older plants in the middle. Grows in moderately deep to deep soils and in gravelly to loamy soils. This plant will replace Bonneville sagebrush if the site burns often enough. This plant will at times have a seed head apperanc simular to Subalpine Big Sagebrush.
Bigelow Sagebrush Artemisia bigelovii (ARBI3)	Pale Cremish Blue to Pale blue to rarely colorless	Brownish-Red to Colorless (The Brownish-red color may have an interesting Yellowish cast)	Leaves are 0.6 to 1 in. long. Leaves are not bucktoothed but can appear to be on casual observation.			Even			Spreading	Mesic Aridic to Xeric 4200 to 5000 ft.	0.75 to 2.0 ft.	Readily identified by morphological characteristics and/or geographic location. Grows on shallow soils derived from limestone and sometimes sandstone

Plant Nomenclature	Fluoresces Under Ultraviolet Light		Leaf shape and size			Plant Growth Form			Branching Pattern	Environment	Mature Plant Height	Comments
	Water	Alcohol										
Black Sagebrush (Gray Leaf) Artemisia nova (ARNO4)	Colorless (Greenish) to Pale Blue	Brownish-Red	Leaves 3/8 to 1/2 in. long rarely slightly longer; having glandular dots. Dots sometimes difficult to see due to pubescent on leaves. Leaves on flowering stalk entire & persistent. Mild Turpentine smell.			Even			Spreading	Mesic to Frigid Xeric to Ustic 4500 to 8000 ft.	0.75 to 1.25 ft.	Occurs on shallow (or soils that act shallow to root growth) **Calcareous** soils. Flowers usually in groups of three or more and normally on short slender peduncles. Flower stalks arising from the outside layer of the crown.
Black Sagebrush (Green Leaf) Artemisia nova (ARNO4)	Colorless to very pale blue	Brownish-Red	Leaves 3/8 to 1/2 in. long rarely longer; having glandular dots. Leaves sticky when crushed. Leaves on flowering stalk entire & persistent. Strong Turpentine smell.			Even			Spreading	Mesic to Frigid Xeric to Ustic 4500 to 8000 ft.	0.75 to 1.75 ft.	Occurs on shallow (or soils that act shallow to root growth) **Calcareous** soils. Flowers usually in groups of three or more and normally on short slender peduncles. Flower stalks arising from the outside layer of the crown.
Low Sagebrush Artemisia arbuscula subsp. arbuscula (ARARA)	Intense blue to Creamy-blue	Creamy-blue	Leaves 1/2 to 1 in. long. Leaves on flowering stalks early-deciduous & mostly lobed. Crushed leaves have a mint-ish smell.			Uneven			Spreading	Frigid to Rarely Mesic, to Rarely Cryic Xeric to Ustic 5500 to 8200 ft.	0.75 to 1.5 ft.	Occurs on shallow (or soils that act shallow to root growth) **non-calcareous** soils. Flowers usually single (rarely 2 - 4) and are usually sessile especially at the top of the flower stocks.
Little Sagebrush Artemisia arbuscula subsp. thermopola (ARART	Intense blue to Creamy-blue	Pale Blue to Creamy-blue	Leaves 1/2 to 6/8 in. long. Ephemeral leaves persistent into late summer. Leaves on flower stocks are early-deciduous & deeply cleafed. Crushed leaves have a mint-ish smell.			Uneven to slightly Even appearing			Spreading	Friged to Cryic Ustic 7000 to 8500 ft.	0.75 to 1.5 ft.	Occurs on shallow (or soils that act shallow to root growth) **non-calcareous** igneous soils (Quartzite parent material.) This form occurs only at high elevations. Flowers usually single (rarely 2 - 4) and are usually sessile especially at the top of the flower stocks.
Early Sagebrush Alkali Sagebrush Artemisia arbuscula subsp. longiloba (ARARL)	Creamy-blue	Creamy-blue	There are two types of leaves: Type 1: Persistent leaves (0.5 to 0.7 inch) long; buck toothed. Type 2: Ephemeral leaves (0.7 to 1 inch) long and more silverish in appearance; deeply lobed.			Uneven			Spreading	Frigid to Mesic Xeric 4500 to 8000 ft.	0.75 to 2.0 ft.	Frequently layers where branches come in contact with the ground; Flowers in May and/or June whereas the other sagebrushes flower in the fall; There are two types recognized: Type 1 is a short shrub (0.6 to 1.0 ft.) Type 2 is a medium shrub (1.5 to 2 ft.) . Type 1 occurs in poorly drained or tight alkaline soils. Type 2 occurs on moderately drained alkaline soils
Mountain Silver Sagebrush Artemisia cana subsp. viscidula	Very Pale blue to Colorless	Brownish-Red	Leaves 1/4 to 1.0 inches long. Leaves deciduous. Crushed leaves smell like turpentine and sticky feeling.			Uneven			Spreading	Frigid to Mesic Xeric 6000 to 9200 ft.	0.75 to 4.0 ft.	Root sprouts; Grows in deep loam soils along mountain streams and in heavy and/or very deep snow pack areas. . Note: If Bolanderi Silver Sagebrush is ever incounterd the newer stems and the leaves will be exteramly Pubescent.

Need three or more of the characteristics to match to be sure of the species Id.

Note: material placed in Water needs to set for 3 to 4 minuets & material placed in Alcohol needs to set for 15 to 20 minutes before being analyzed under the Black Light.

Intensity of Florescent color will vary according to season of year. Ephemeral leaves will make the colors more brilliant; Times of heavy rain and/or wet snow will reduce the intensity of the colors.

Note: Material placed in water and alcohol will often fade with time (if left in solution for over 4 days) and may be misleading in some species of sagebrush. Short wave length Black lights will not work. Need a 3660 angstrom light.

ATTACHMENT C

BOTANICAL SURVEY & VEGETATION COMMUNITY MAPPING REPORT,
GRASSY MOUNTAIN MINE PROJECT, MALHEUR COUNTY, OREGON; JUNE 2019

BOTANICAL SURVEY &
VEGETATION COMMUNITY MAPPING REPORT

GRASSY MOUNTAIN MINE PROJECT
MALHEUR COUNTY, OREGON
JUNE, 2019

Prepared for:

EM Strategies, Inc.
1650 Meadow Wood Lane
Reno, NV 89502
(775) 826-8822

Prepared by:

Siskiyou BioSurvey LLC
265 Ball Road
Eagle Point, OR 97520
(541) 821-1635

INTRODUCTION

This report presents the methods and results of botanical surveys and vegetation community mapping on the Grassy Mountain Mine Project located in Malheur County, in southeastern Oregon. The project area includes a total of 1,761.7 acres in two survey areas, the Grassy Mine and Process Area, and the Access Road Corridor, an approximate 18 mile length of the Twin Springs Road. The two surveys areas are located on the Vale District BLM. Field Surveys were conducted for special status plant species and noxious weeds, and vegetation was mapped by plant community type. Results are documented in this report, and as GIS shapefiles and digital maps, a project level species list, BLM Survey Forms, BLM Special Status Plant Forms, and a table of Weed Sites. Habitat and Plant photos of all Special Status Plant Sites are also included.

PROJECT PERSONNEL

All field surveys were conducted by botanists of Siskiyou BioSurvey, LLC: Richard Brock, Richard Callagan, Julie Spelletich, John Villella and Gretchen Vos. This report is authored by Gretchen Vos and Richard Brock. The shapefiles, maps, and digital products are created by Richard Brock. Richard Brock was Project Manager.

PROJECT AREA

The project area is located within the Vale District of BLM, approximately 15 miles south-southeast of Harper, Oregon, 22 miles southwest of Vale, Oregon and 5 miles north of Owyhee Lake. The project survey area is located in T4N, R44E, Sections 5, 7, 8; T5N, R44E, Sections 3, 10, 11, 14, 15, 21, 22, 23, 28, 29, 32; T6N, R44E, Section 1, 12, 13, 14, 23, 26, 27, 34; T6N, R45E, Section 6; and T7N, R44E, Section 14, 15, 22, 23, 26, 35, 36. The survey area includes two distinct units: a 875.8 acre area in the Grassy Mountain Mine and Process area, and a 885.9 acre access road corridor along the Twin Springs Road.

Grassy Mountain Mine and Process Area Survey Unit

The Grassy Mountain Mine and Process Survey Area is a contiguous 875.8 acre unit in T4N, R44E, in parts of Sections 5, 7 and 8. Elevation ranges from 3,520 to 4,560 feet, primarily on north and west aspects, and a small area of east-facing slopes. The unit is dominated by flat to gentle slopes with cobble and gravelly soils, flat rocky mesa tops, dry open drainages, one small reservoir, and lesser amounts of steep north- and east-facing upper slopes of an un-named small peak. The survey unit is approximately 1 mile north-northwest of Grassy Mountain. Survey area vegetation is dominated by shrub-steppe plant associations, typical of the region. Plant communities in the survey area are described below.

Access Road Corridor Survey Unit

The access road corridor survey unit includes 885.9 acres along a n 18 mile north-south length of the Twin Springs Road in T5N, R44E, Sections 3, 10, 11, 14, 15, 21, 22, 23, 28, 29, 32; T6N, R44E, Section 1,

12, 13, 14, 23, 26, 27, 34; T6N, R45E, Section 6; and T7N, R44E, Section 14, 15, 22, 23, 26, 35, 36. The road corridor includes an approximate 300 foot wide survey "project buffer" area, with additional larger proposed roadside work/process areas. Twin Springs Road follows a number of ridgelines; the elevation ranges from 2,300 feet in the north, to 3,600 in the south, with an upper elevation of 3,800 feet. Topography along the survey corridor includes ridgelines, upper slopes, flat lowland valleys and flat to steep incised dry drainages. Vegetation is dominated by shrub-steppe plant associations, typical of the region; plant communities are described below.

METHODS

Pre-Field Review

Project manager Richard Brock performed all pre-field review of targeted special status plant species, noxious weeds, and plant/vegetation communities of Southeast Oregon. A search of BLM special status plant species was conducted in a 10 mile radius of the project area in the ORBIC and BLM Geobob databases. Species Profiles of state listed species were reviewed on Oregon Department of Agriculture website (https://www.oregon.gov/ODA/programs/PlantConservation/Pages/AboutPlants.aspx). Mr. Brock also consulted with BLM Vale District Botanist Susan Fritts regarding phenology of targeted special status plant species. A list of six species was identified as having high potential to occur in the project area. Populations of two of the species are known to occur in the project survey area.

Special Status Plant Species With Potential To Occur in Grassy Mountain Mine Project, June, 2019

Sp. Code	Scientific Name	SSP Category	Habitat	Occurrence in Project Area
HACR4	*Hackelia cronquistii*	BLM SEN; Oregon Threatened	Sandy north-facing slopes	HACR4 #641, #605, #OR034_1342 (additional older ORBIC sites nearby)
ASMU	*Astragalus mulfordiae*	BLM SEN; Oregon Endangered	Sandy soils, shrub-steppe, desert-shrub	ASMU #356, #357
ERSA8	*Eriogonum salicornioides*	BLM SEN	Saline soils	
ASCUS	*Astragalus cusickii var. sterilis*	BLM SEN; Oregon Threatened	canyon rock	
MEMO2	*Mentzelia mollis*	BLM SEN: Oregon Endangered	clay soils	
STCO2	*Stanleya confertiflora*	BLM SEN; Federal SOC	clay soils	

A review of the 2019 Oregon State Noxious Weed List was used to identify target weeds in the project area (https://www.oregon.gov/ODA/programs/Weeds/OregonNoxiousWeeds/Pages/Law.aspx). All "A listed" and "B Listed" weed species were included as target weeds. Additional pre-field review of

potential target weeds in the project area included (i) phone consultation with Susan Fritts, BLM Botanist, Vale District, (ii) a review of noxious weeds previously reported in the project area (*Terrestrial Vegetation Baseline Report*, EM Strategies, Inc., 2018, and (iii) a review of the Oregon Atlas Project website.

Potential target plant/vegetation community types in the project area were identified by (i) a review of vegetation communities previously reported in the project area (*Terrestrial Vegetation Baseline Report*, EM Strategies, Inc., 2018), and (ii) a review of vegetation in *Natural Vegetation of Oregon and Washington* (Franklin and Dryness, 1973).

Field Survey Methodology

Field surveys were conducted on June 7, 8, 9, 10, 11, 12 and 13, 2019. Surveyors walked the entire survey area within the Grassy Mine and Process Area and along the Access Road Corridor. Surveyors carried GPS units with survey unit polygons and topographic and aerial photo maps. Aerial photos were used to identify unique soil and geographic features. Surveyors searched for and documented special status plants species and noxious weeds, and mapped plant community polygons.

Special Status Plant Species Surveys

Surveys were conducted for BLM Sensitive and Oregon State Threatened and Endangered Plant Species in the Grassy Mine and Process Area and along the Access Road Corridor Survey Area. Surveyors used an intuitive controlled meander process to identify potential habitat and focus survey efforts. All special status plant sites were documented by GPS points on handheld Garmin GPS Units. Habitat data, associated species, number of plants and total occupied area were noted in field notebooks. A photo of the plant and a habitat photo were taken. A simple yellow/black flag was hung at the site. Known sites were visited with complete surveys in all adjacent habitat within the survey area boundaries. BLM Special Status Plant Site Forms were completed and are included with this report. Negative site visits to known sites were also noted and negative site reports were completed.

Noxious Weed Site Surveys

Surveyors searched for noxious weed plant sites concurrent with special status plant surveys. Noxious weed sites were mapped with GPS points, polygons were marked on contour and/or aerial photo maps, and weed sites were documented on spreadsheets; surveyors recorded weed species, infestation or patch size (estimate of plant numbers), cover, location (along road or rangeland), frequency (spot or scattered) and cover area. Large infestations were mapped on aerial and/or contour maps and edges or boundaries were recorded on GPS units. A GIS shapefile of all weed sites is included with this report.

Plant Community Mapping

Terrestrial vegetation in the project area was mapped for current plant community types. Surveyors used ocular estimates to map areas great than one acre on aerial and/or contour maps as distinct plant community polygons. Changes in vegetation less than one acre were treated as inclusions and mapped with the dominant larger community type. Surveyors noted inclusions of sub-types or extensive weedy areas. Surveyors also mapped small inclusions of special plant habitats based on unique plant species and/or soil types. Plant communities were mapped in the Grassy Mine and Process Area and along the

Access Road Corridor Survey Area. Descriptions of the plant community types and representative photos are described below and a GIS shapefile of the plant community polygons is included with this report.

RESULTS

Plant Communities

EM Strategies, Inc. previously identified and mapped five plant community types in *Terrestrial Vegetation Baseline Report* (EM Strategies, Inc., 2018). Four additional plant community types were identified and mapped during this 2019 field survey. The nine plant communities can be divided into two broad plant community types: (i) vegetation dominated by intact native vegetation, and (ii) disturbed plant communities dominated by non-native weedy species.

1. Bluebunch Wheatgrass/Cheatgrass/Annual-Perennial Community

The Bluebunch Wheatgrass/Cheatgrass-Annual-Perennial Community occurs in both the Grassy Mountain Mine and Process Area, and the Access Road Corridor Survey Area. The community is co-dominated by bluebunch wheatgrass (*Pseudoroegneria spicata* var. inermis, and/or *P. spicata* var. *spicata*), and cheatgrass (*Bromus tectorum*). This plant community represents a relatively more native vegetation type, where native perennial forbs and grasses are common. Common native species include *Crepis acuminata, Penstemon speciosus*, *P. cusickii*, *Allium acuminatum*, *Zigadenus venenosus var. venenosus*, *Poa secunda, Elymus elymoides* subsp. *elymoides, E. elymoides* subsp. *brevifolius*, and *Hesperostipa comata* subsp. *comata.* This community also includes a more weedy disturbed sub-type where cheatgrass and medusahead (*Taeniatherum caput-medusae*) are co-dominant with the bluebunch wheatgrass, and/or non-native forbs are more common (*Lepidium perfoliatum, Descurainia pinnata, Ceratocephala testiculata*).

1. **Bluebunch Wheatgrass/Cheatgrass/Annual-Perennial Community**

2. Crested Wheatgrass Seeded Community

The Crested Wheatgrass Seeded Community occurs in both the Mine and Process Area, and the Access Road Corridor Survey Units, where non-native restoration seeding followed rangeland fires. This plant community type represents a non-native vegetation type. Crested wheatgrass (*Agropyron cristatum*) is dominant, with cheatgrass and *Poa secunda* very common and often with high total cover. Native grasses and forbs are uncommon and bare soil ranges from scattered to larger openings. This community also includes a less weedy sub-type with scattered native grass species recovering, including *Elymus elymoides, Achnatherum hymenoides*, and occasional bluebunch wheatgrass.

2. Crested Wheatgrass Seeded Community

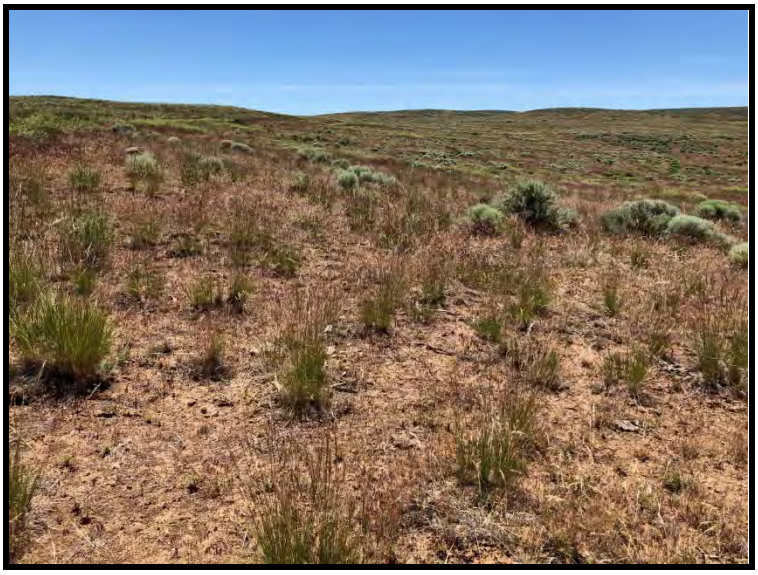
3. Big Sagebrush/Crested Wheatgrass Community

The Big Sagebrush/Crested Wheatgrass Community occurs in the northern region of the Mine and Process Area Survey Unit, and scattered throughout the Access Road Corridor Survey Unit. This community represents a mixed native/non-native plant community type where non-native crested wheatgrass was seeded into Wyoming big sagebrush (*Artemesia tridentata* var. *wyomingensis*). The community includes a low to high cover of Wyoming big sagebrush, ranging from scattered to moderate, with a prominent seeded cover of crested wheatgrass. Cheatgrass and/or *Poa secunda* may be present in low to high density, along with a mix of native and non-native annuals and perennial forbs. Included in this mapped community is a sub-type where Wyoming big sagebrush drops out and yellow rabbitbrush (*Chrysothamus viscidiflorus*) co-occurs or dominates, as a scattered to low shrub cover.

3. Big Sagebrush/Crested Wheatgrass Community

4. Yellow Rabbitbrush/Bluebunch Wheatgrass Community

The Yellow Rabbitbrush/Bluebunch Wheatgrass Community is dominated by a sparse to moderate cover of yellow rabbitbrush with bluebunch wheatgrass in the understory. Also included in this mapping unit are areas where other native bunch grass species co-dominate with the bluebunch wheatgrass, including *Poa secunda, Elymus elymoides, Hesperostipa comata* subsp. *comata,* and *Acnatherum hymenoides.*



4. Yellow Rabbitbrush/Bluebunch Wheatgrass Community

5. Big Sagebrush/Bluebunch Wheatgrass Community

The Big Sagebrush/Bluebunch Wheatgrass Community occurs throughout the two survey units. This native vegetation community type is dominated by a sparse to moderate cover of Wyoming big sagebrush, and a low to moderate cover of bluebunch wheatgrass. This plant community may include other native bunch grass and forb species, including *Crepis acuminata, Penstemon speciosus*, *P. cusickii*, *Toxicoscordion venenosum* var. *venenosum*, *Poa secunda, Elymus elymoides* subsp. *elymoides, E. elymoides* subsp. *brevifolius*, and *Achnatherum hymenoides,* and *Hesperostipa comata* subsp. *comata.* A less common sub-type included with this community type is scattered areas of big sagebrush with a high native forb cover and a lower bunchgrass cover. Additional forbs include *Crepis acuminata, C. modocensis, Astragalus lentiginosus var. salinus, A. beckwithii var. weiserensis, A. atratus var. owyheensis, Lomatium grayi,* and *Mentzelia albicaulis*.

5. Big Sagebrush/Bluebunch Wheatgrass Community

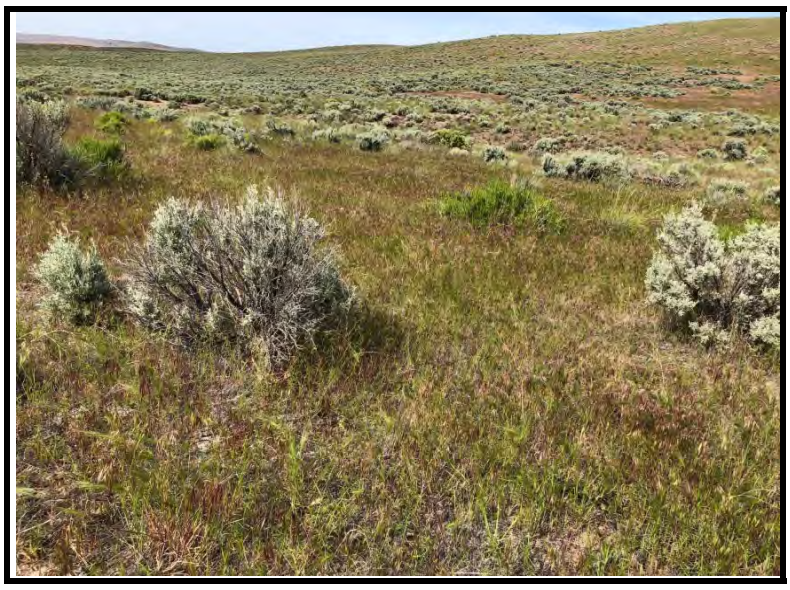
6. Annual Weedy Grass-Forb Community

The Annual Weedy Grass-Forb Community represents a highly disturbed, weedy, non-native dominated vegetation type. It occurs along the Access Road Corridor Survey Area, and as smaller areas in the Grassy Mountain Mine and Process Area. Extensive areas occur in the far north on private rangeland ownership. Common grasses include cheatgrass and *Poa secunda,* common forbs include *Chorispora tenella, Descurainia pinnata*, *Allysum desertorum*, *Sisymbrium altissimum* and scattered to extensive patches of the noxious weeds *Onopordom acanthium*, *Kochia scoparia,* and *Chondrilla juncea*. Areas with extensive *Taeniatherum caput-medusae* infestations do not occur as commonly as in the private rangeland ownership, and are more extensive in the Grassy Mountain Mine and Process Area Survey Unit.

6. Annual Weedy Grass-Forb Community

7. Big Sagebrush/Weedy Annual Grass-Forb Community

The Big Sagebrush/Weedy Annual Grass-Forb Community is a disturbed native plant community type and occurs in both survey unit areas. The Wyoming big sagebrush component however indicates deeper soils and is an ecologically important component of a native dominant plant community. The understory and openings however are dominated by non-native annuals, including a moderate to heavy cover of cheatgrass, and scattered weedy forbs (*Descurainia pinnata, Lepidium perfoliatum*); scattered to extensive areas of *Taeniatherum caput-medusae* are common. *Poa secunda* may also be present.



7. Big Sagebrush/Weedy Annual Grass-Forb Community (Road Corridor)

7. Big Sagebrush/Weedy Annual Grass-Forb Community (Mine Area)

8. Mixed Annual Weedy Grass-Forb/Native Bunch Grass Community

The Mixed Annual Weedy Grass-Forb/Native Bunch Grass Community is a disturbed weedy plant community type with the addition of a low but notable cover of native bunch grass species. It occurs along the Access Road Corridor Survey Area, and in two locations of notable size within the Grassy Mountain Mine and Process Area. This plant community is similar to #6 above, with the addition of native grasses, including *Poa secunda, Elymus elymoides* subsp. *elymoides, E. elymoides* subsp. *brevifolius*, *Achnatherum hymenoides, H. comata* subsp. *comata*, *Festuca idahoensis,* and occasional bluebunch wheatgrass.

8. Mixed Annual Weedy Grass-Forb/Native Bunch Grass Community

9. Irrigated Pasture/Agricultural Crop Plant Community

The Irrigated Pasture/Agricultural Crop Plant Community type occurs in the far northern Access Road Corridor Survey Area on irrigated private agricultural cropped areas. This is a completely non-native converted plant community. Annual crops dominate the survey area and weedy species occur along fence lines and irrigation ditches. Common weed y species include *Descurainia pinnata, Kochia scoparia, Sisymbrium altissimum* and *Convolvulus arvense*.

Summary of Plant Community Types, by Acres and Survey Unit Area, June, 2019

Code	Plant Community Type	Access Road Area (Acres)	Mine and Process Area (Acres)
0	Road Surface	56.7	1.5
1	Bluebunch wheatgrass/ annuals	69.0	49.5
2	Crested Wheatgrass plantings	191.6	0.0
3	Sagebrush/Crested Wheatgrass	37.6	54.1
4	Rabbitbrush / Bunchgrass	49.9	21.9
5	Sagebrush / Bunchgrass	145.4	398.1
6	Annual Grass/Forb	268.6	156.3
7	Rabbitbrush / Annuals	9.3	129.1
8	Bunchgrass/Annual mix (no PSSP)	42.0	47.2
9	Irrigated Cropland	12.0	0.0
5/1	Sagebrush / Bunchgrass x Annual Grass/Forb	0.0	28.0
W	Wetland	0.1	0.0

Special Plant/Soil Habitat

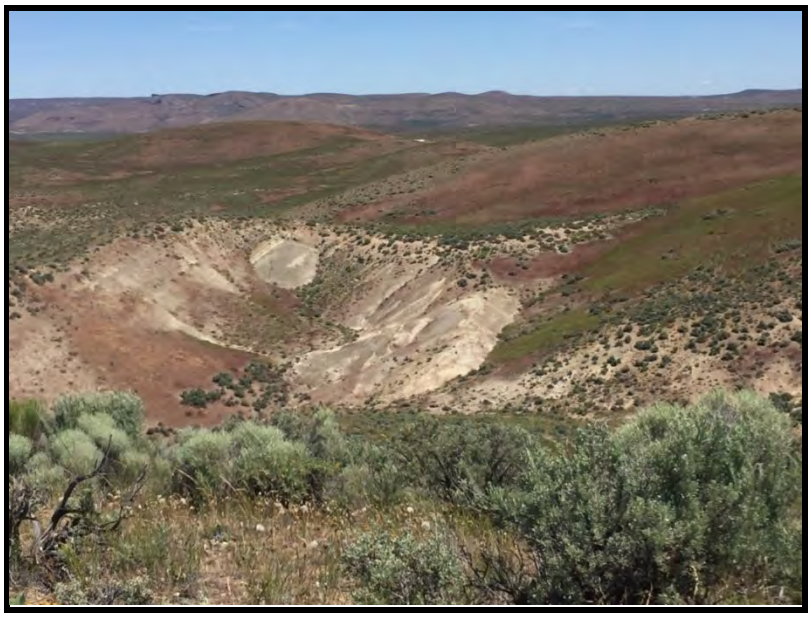
Special Plant/Soil Habitats were located in both the Grassy Mountain Mine and Process Area, and scattered throughout the Access Road Corridor Survey Area. Habitats included a matrix of scattered small areas and/or a larger continuous special habitat. Typical special habitats included:

- **Sandy Soils/Forb Rich**: occurs on flat slopes within Big Sagebrush/Bluebunch Wheatgrass Community in the Grassy Mountain Mine and Process area; the habitat occurred as multiple small patches of open soil over a larger 1-2 acre area, with notable covers of native forbs including *Crepis acuminata, Crepis modocensis, Chaenactis douglasii, Allium acuminatum*, and multiple species of *Astragalus*.

Special Habitat: Sandy Soils/Forb Rich in sagebrush; Mine Survey Area

- **Sandy (white) Ash Soils/Forb Rich**: also occur on open small steep hillside micro-habitats, within areas of the Mixed Annual Weedy Grass-Forb/Native Bunch Grass Community along the Access Road Corridor Survey Area. Vegetation included a unique diverse mix of scattered native forbs (*Crepis acuminata,* multiple species of *Astragalus* and *Lomatium*, *Eriogonum ovalifolium, E. novonudum, Cryptantha spiculifera, Chaenactis douglasii*) and scattered native bunchgrasses (*Hesperostipa comata* subsp. *comata, Elymus elymoides* subsp. *elymoides, E. elymoides* subsp. *brevifolius*, and *Achnatherum hymenoides*). This special habitat occurred adjacent to the known special status plant site *Astragalus mulfordiae.*

Special Habitat: Sandy-Ashy Soils/Forb Rich; Roadside Corridor Survey Area



Special Habitat: Sandy-Ashy Soils/Forb Rich; Roadside Corridor Survey Area

Special Status Plant Sites

Three sites of Mulford's milkvetch (*Astragalus mulfordiae*) were located during the 2019 surveys. A summary of sites is included below.

Summary of Special Status Plant Sites, Grassy Mountain Mine Project, June, 2019

Species	Site #	# of Plants	Total Area (acres)	2019 Plant Occurrences in Project Area
Astragalus mulfordiae	RB96	17	0.25	Access Road Corridor: West & East of Road
Astragalus mulfordiae	357	71	1.47	Access Road Corridor: West of Road
Astragalus mulfordiae	356	34	1.08	Access Road Corridor: West of Road

Mulford's milkvetch (Astragalus mulfordiae)

Astragalus mulfordia (ASMU) is a BLM Sensitive and Oregon State Endangered plant species in the Fabaceae (legume/pea) family. ASMU is also a Federal Species of Concern. It is limited to a region approximately 160 kilometers by 160 kilometers (100 miles by 100 miles) in shrub-steppe and desert shrub communities west of the Snake River Plain in Eastern Oregon and adjacent Southwest Idaho. It occurs from the Owyhee Uplands of Malheur County, Oregon, east to the Owyhee Front, and Boise Foothills of Idaho. Two historic *Astragalus mulfordiae* sites (ASMU 356 and ASMU 357) occur within the project area along the Access Road Corridor Survey Area. Both sites were visited during this 2019 survey. An additional new ASMU site was located north of ASMU 357. BLM Special Status Plant Site Forms were completed and are included with this report.

ASMU #356

ASMU #356 is a historic site located in T20S, R44E, in the NW ¼ of Section 13. The site was visited on June 7, 11 and 13, 2019. A total of 71 ASMU plants were located west of the Twin Springs Road. Plants were located within the historic/mapped population polygon and outside of the polygon, to the immediate north and south. ASMU plants were located between 3 and 40 meters from the road edge. The habitat of this site included a notable cover of cheatgrass and scattered rush skeleton weed as well as scattered native bunchgrass species and forbs. This site includes four plants that are located within 3 meters of the road cut bank and are likely to be negatively impacted by any road widening.

ASMU #357

ASMU #357 is a historic site located in T20S, R44E, in the SW ¼ of Section 12 and the NW ¼ of Section 13. The site was visited on June 7, 12, and 13, 2019. A total of 34 ASMU plants were located west of the Twin Springs Road. No plants were located within the mapped BLM population boundary polygon; 28 plants were found outside/north of the population polygon, and 6 plants were located south/outside of the population polygon. The new 34 plants extend the population area approximately 350 meters north to south, all on the west side of the Twin Springs road. The new ASMU plants occur approximately 10 to 60 meters west of the roadbed. The habitat of this site included notable weedy annuals including cheatgrass and rush skeleton weed, as well as scattered native bunchgrass species and forbs. The ASMU

plants located within 10 meters of the road cut bank may be negatively impacted by any proposed road widening.

ASMU #RB19-56

ASMU #RB19-56 is a new site that was located approximately 200 meters north of the ASMU #357 site, in T20S, R44E, in the SW ¼ of Section 12. The site includes 17 ASMU plants; 14 plants were located east of the Twin Springs Road and 3 plants were located west of the road. The new ASMU plants are located between 8 and 26 meters of the road edge. The plants on the east side of the road are in a very weedy annual grass-forb community, where cheat grass, and tumbleweed mustard are common. The plants in the west-side sub-population occur in a more native-dominant habitat of bunchgrasses and forbs; though rush skeleton weed is common, and cheatgrass cover reaches 60 percent. ASMU plants located east of the road are close enough to be negatively impacted by any proposed road widening.

Cronquist's stickseed (Hackelia cronquistii)

Hackelia cronquistii (HACR4) is a BLM Sensitive and Oregon State Threatened plant species in the Boraginaceae ("borage") family. It is also a Federal Species of Concern. HACR4 inhabits shrub-steppe communities typically dominated by big sagebrush. It occurs on sandy north-facing hillsides with slight to extreme slope, and less often on moist slopes in ravines, at elevations ranging from 2,000 to 3,640 feet. It is restricted to central eastern Oregon (primarily in northern Malheur County) along with Baker County, Oregon as well as Payette and Washington counties in Idaho. Three sites of *Hackelia cronquistii* (HACR4 #641, #605, and #OR034_1342) were previously documented within the project area along the Access Road Corridor Survey Area. The three sites were visited during this 2019 survey on July 7, 9, and 10, 2019. No HACR4 plants were located. Negative BLM Special Status Plant Site Forms were completed and are included with this report. Three additional sites of *Hackelia cronquistii* occur near but outside of the road corridor survey area (HACR #651, #OR034_1346, #660). Habitat at all HACR4 sites in and near the survey area appeared notably weedy; a habitat photo of HACR4 # OR034_1346 is included below.

Habitat of *Hackelia cronquistii* site #OR034_1346 (no plants located)

Noxious Weed Plant Sites

Ten noxious weeds species were located in the project mine and road survey areas: *Cardaria draba, Chondrilla juncea, Cirsium arvense, Cirsium arvense, Cirsium vulgare, Convolvulus arvensis, Kochia scoparia, Onopordum acanthium, Phalaris arundinacea, Phragmites australis, Taeniatherum caput-medusae*. A GIS shape file of weed locations is included with this report. An Excel table (*Noxious Weeds Table_Grassy Mtn Mine*) is also included; it is the attribute table from the shapefile and includes all of the fields required on the Vale District BLM Noxious Weed Forms, so suffices in place of those forms.

Several of the weed sites occurred as scattered plants and concentrations within a large, multi-acre total area (including several sites of *Onopordum acanthium, Chondrilla juncea* and *Taeniatherum caput-medusae*). One species, *Convolvulus arvensis* occurred most often as linear populations immediately along the primary access road on both BLM and private ownership. The *Kochia scoparia* sites were located along the access road in the privately owned region in the far north. In general a 50 ft. rule was used to delineate sites; if plants are further than 50 feet from each other, a new site was created. This rule was relaxed a bit when mapping *Onopordum acanthium* because it tends to be very diffuse and irregularly distributed, varying from year to year; so large diffuse collections of plants were mapped as larger polys. A summary of noxious weeds, number of sites, total area, and location distribution are summarized in the table below.

Summary of Noxious Weed Plant Sites, Grassy Mountain Mine Project, June, 2019

Species	Common Name	Total # of Sites	Total Area Occupied (acres)	Distribution
Cardaria draba	whitetop	24	2.11	along access roads, PVT and BLM
Chondrilla juncea	rush skeletonweed	45	26.11	along access roads, restricted to BLM
Cirsium arvense	Canada thistle	5	0.13	along access roads on BLM
Cirsium vulgare	bull thistle	1	0.01	at mine site, PVT
Convolvulus arvensis	field bindweed	55	2.09	along access roads, PVT and BLM
Kochia scoparia	kochia	4	0.67	along access roads, PVT
Onopordum acanthium	Scotch thistle	167	174.2	common throughout, PVT and BLM
Phalaris arundinacea	reed canarygrass	1	0.01	one spot at irrigation canal
Phragmites australis	common reed	1	0.01	one spot at small spring
Taeniatherum caput-medusae	medusahead grass	43	327.4	common throughout BLM portion

GIS Data Files

Files accompanying this report are all in Nad83 Zone 11N; this projection was used in order to be consistent with BLM data requirements.

GrassyMtn_PlantCommunities: This is a Polygon file with plant communities mapped within the survey area. The attribute table includes a numeric code, plant community (VegType) name and acres. Veg Type includes the 9 described above in this document plus a "Wetland" for one spot of perennial wetland and a class "road surfaces" for the access road.

NoxiousWeeds_GrassyMtn_All: This is a Polygon file with attribute table that includes all required BLM data per site. This attribute table is also included here as an excel file.

SSP_Sites_Poly: This is a Polygon file with the three Astragalus mulfordiae sites found occupied during the survey. Included are both (i) the specific occurrence locations (waypoints) where plants were found, and (ii) the general current population outlines that connect those waypoints.

SurveyTracks_SBS_All: This compressed file documents all of the survey route tracks (survey intensity) for the survey effort.

Grassy Mountain Mine and Access Road Botany Survey
Vascular Species List
Siskiyou BioSurvey, LLC
June 7 - 13, 2019

Code	Species	Common Name	Family	Habitat
ACMI	Achillea millefolium	yarrow	Asteraceae	
ACHY	Achnatherum hymenoides	Indian ricegrass	Poaceae	
ACNED	Achnatherum nelsonii subsp. dorei	Dore's needlegrass	Poaceae	
ACOC3	Achnatherum occidentale	western needlegrass	Poaceae	
AGCR	Agropyron cristatum	crested wheatgrass	Poaceae	
AGGL	Agoseris glauca	pale agoseris	Asteraceae	
ALAC4	Allium acuminatum	Hooker's onion	Liliaceae	
ALTO	Allium tolmiei	Tolmie's onion	Liliaceae	shallow soil
ALDE	Allysum desertorum	desert madwort	Brassicaceae	
ALLE7	Aliciella leptomeria	sand gillia	Polemoniaceae	
AMAL	Amaranthus albus	prostrate pigweed	Amaranthaceae	pasture, road
AMME	Amsinkia menziesii	Menzie's fiddleneck	Boraginaceae	
AMTE3	Amsinkia tesselata	bristly fiddleneck	Boraginaceae	
ANDI2	Antennaria dimorpha	low pussytoes	Asteraceae	Lithosols
ARDO3	Artemesia douglasiana	Douglas's sagewort	Asteraceae	
ARFR	Arenaria franklinii	Franklin's sandwort	Caryophyllaceae	shallow soil
ARHO2	Arabis holboellii	Holboell's rock cress	Brassicaceae	
ARLU	Artemisia ludoviciana	white sagebrush	Asteraceae	riparian
ARTRW8	Artemesia tridentata var. wyomingensis	wyoming big sagebrush	Asteraceae	
ASATO	Astragalus atratus var. owyheensis	Owyhee milkvetch	Fabaceae	
ASBEW	Astragalus beckwithii var. weiserensis	Weiser's milkvetch	Fabaceae	
ASCUS	Astragalus curvicarpus var. subglaber	sickle milk-vetch	Fabaceae	
ASFI	Astragalus filipes	basalt milkvetch	Fabaceae	
ASIOD	Astragalus iodanthus var. diaphanoides	snake milkvetch	Fabaceae	
ASLE	Astragalus lentiginosus var. salinus	speckled milkvetch	Fabaceae	
ASMA6	Astragalus malacus	shaggy milkvetch	Fabaceae	
ASMU	**Astragalus mulfordiae**	**Mulford's milkvetch**	**Fabaceae**	
ASPU	Astragalus purshii	wooly-pod milk-vetch	Fabaceae	
ASSP	Asclepius speciosus	showy milkweed	Asclepiadaceae	
BASA3	Balsamorhiza saggitata	arrowleaf balsam root	Asteraceae	
BLSC	Blepharipappus scaber	blepharipappus	Asteraceae	
BRTE	Bromus tectorum	cheat grass	Poaceae	
CAAN7	Castilleja angustifolia	Northwest Indian paintbrush	Scrophulariaceae	
CABR	Calochortus bruneanuis	Bruneau mariposa lily	Liliaceae	
CADR	Cardaria draba	whitetop	Brassicaceae	
CAMI2	Camelina microcarpa	littlepod false flax	Brassicaceae	
CAMI23	Camissonia minor	small evening primrose	Onagraceae	
CANU4	Carduus nutans	nidding plumeless thistle	Asteraceae	irrigation canal
CAPI3	Castilleja pilosa	parrothead Indain	Scrophulariaceae	Riparian
CATA2	Camissonia tanacetifolia	tansyleaf evening primrose	Onagraceae	Riparian
CETE5	Ceratocephala testiculata	curveseed butterwort	Ranunculaceae	
CHDO	Chaenactis douglasii	dustymaiden	Asteraceae	
CHJU	Chondrilla juncea	rush skeleton weed	Asteraceae	
CHNA2	Chrysothamus naseosus	gray rabbitbrush	Asteraceae	
CHTE2	Chorispora tenella	blue mustard	Brassicaceae	
CHVI8	Chrysothamus viscidiflorus	green rabbit-brush	Asteraceae	
CIAR4	Cirsium arvense	Canadian thistle	Asteraceae	
CIUT	Cirsium utahense	utah thistle	Asteraceae	
CIVU	Cirsium vulgare	bull thistle	Asteraceae	Riparian
COAR4	Convolvulus arvensis	field bindweed	Convolvulaceae	
COUM	Comandra umbellata	bastard toadflax	Santalaceae	
COVI5	Coriospermum villosum	hairy bugseed	Chenopodiaceae	roads

Grassy Mountain Mine and Access Road Botany Survey
Vascular Species List
Siskiyou BioSurvey, LLC
June 7 - 13, 2019

CRAC2	Crepis acuminata	tapertip crepis	Asteraceae	
CRIN4	Crepis intermedia	limestone hawksbeard	Asteraceae	
CRMO4	Crepis modocensis	Modoc hawksbeard	Asteraceae	
CRFE3	Cryptantha fendleri	sand cryptantha	Boraginaceae	
CRPR	Cryptantha propria	Idaho cryptantha	Boraginaceae	
CRSP4	Cryptantha spiculifera	snake river cryptantha	Boraginaceae	
DELPH	Delpineum sp.	delphinium	Ranunculaceae	
DEPI	Descurainia pinnata	western tansymustard	Brassicaceae	
DESO2	Descurainia sophia	herb sophia	Brassicaceae	
DRVE2	Draba verna	vernal draba	Brassicaceae	
ELELE	Elymus elymoides ssp. elymoides	squirreltail	Poaceae	
ELGL	Elymus glaucus	blue wildrye	Poaceae	Riparian
EPBR3	Epilobium brachycarpum	parched fireweed	Onagraceae	
ERAP	Erigeron aphanactis	rayless shaggy fleabane	Asteraceae	
ERAU6	Erigeron austinae	sagebrush fleabane	Asteraceae	
ERBABA	Erigeron baileyi var. baileyi	Bailey's buckwheat	Polygonaceae	
ERCI6	Erodium cicutarium	filaree	Geraniaceae	
ERFIF	Erigeron filifolius var. filifolius	threadleaf fleabane	Asteraceae	
ERLI	Erigeron linearis	desert yellow fleabane	Asteraceae	
ERPUI	Erigeron pumilus var. intermedius	shaggy fleabane	Asteraceae	
ERMA2	Eriogonum maculatum	spotted buckwheat	Polygonaceae	
ERNA10	Ericameria nauseosa	rubber rabbitbrush	Asteraceae	
ERNO	Eriogonum novonudum	false naked buckwheat	Polygonaceae	
EROVO	Eriogonum ovalifolium var. ovalifolium	oval leaved Eriogonum	Polygonaceae	
ERSP6	Eriogonum spergulinum	spurry buckwheat	Polygonaceae	
ERWA3	Eriogonum watsonii	Watson's buckwheat	Polygonaceae	
ERLAL	Eriophyllum lanatum var. lanatum	common Oregon sunshine	Asteraceae	
ERTR13	Eremopyrum triticeum	annual wheatgrass	Poaceae	
FEID	Festuca idahoensis	Idaho fescue	Poaceae	
FRPU2	Fritillaria pudica	yellow fritillaria	Liliaceae	
GNPA	Gnaphalium palustre	lowland cudweed	Asteraceae	Riparian
GRSP	Grayia spinosa	spiny hopsage	Chenopodiaceae	
GRSQ	Grindelia squarrosa	resinweed	Asteraceae	
HECOC8	Hesperostipa comata ssp. comata	needle and thread grass	Poaceae	
HECU	Helianthus cusikii	Cusick's sunflower	Asteraceae	
IDSC	Idahoa scapigera	oldstem idahoa	Brassicaceae	
KOSC	Kochia scoparia	burningbush	Chenopodiaceae	roads
LAOC3	Lapula occidentalis	flatspine stickweed	Boraginaceae	
LASE	Lactuca serriola	prickly lettuce	Asteraceae	
LECA5	Lepidium campestre	field pepperweed	Brassicaceae	
LECI4	Leymus cinereus	basin wildrye	Poaceae	
LEPE2	Lepidium perfoliatum	clasping pepperweed	Brassicaceae	
LERE7	Lewisia redeviva	bitter root	Portulaceceae	
LODI	Lomatium dissectum	lace-leaved lomatium	Apiaceae	
LOFOM	Lomatium foeniculaceum var. macdougalii	Macdougal's biscuitroot	Apiaceae	
LOGR	Lomatium grayi	Gray's buscuitroot	Apiaceae	
LOTR2	Lomatium triternatum	nine-leaf biscuit-root	Apiaceae	
LUARN	Lupinus arbustus ssp. neolaxiflorus	longspur lupine	Fabaceae	
LUBI4	Lupinus biddlei	Oregon lupine	Fabaceae	
LUBR	Lupinus brevicaulis	short stemmed lupine	Fabaceae	
MAVU	Marrubium vulgare	horehound	Lamiaceae	
MEAL6	Mentzelia albicaulis	whitestem blazingstar	Loasaceae	
MEDIC	Medicago	alfalfa	Fabaceae	

Grassy Mountain Mine and Access Road Botany Survey
Vascular Species List
Siskiyou BioSurvey, LLC
June 7 - 13, 2019

MICU2	Mimulus cusikii	Cusick's monkeyflower	Scrophulariaceae	
OECA10	Oenothera caespitosa	tufted evening primrose	Onagraceae	
OECL2	Oenothera claviformis	browneyes	Onagraceae	
OEPA	Oenothera pallida ssp. pallida	pale evening primrose	Onagraceae	
ONAC	Onopordom acanthium	Scotch cotton thistle	Asteraceae	
OPCO13	Opuntia × columbiana	grizzly bear pricklypear	Cactaceae	
ORFA	Orobanche fasciculata	clustered broomrape	Orobanchaceae	
PECU	Penstemon cusickii	Cusick's beardtongue	Scrophulariaceae	
PEOR7	Petalostemom ornatus	Blue mountain prairie clover	Fabaceae	
PESP	Penstemon speciosus	showy penstemon	Scrophulariaceae	
PHAD	Phacelia adenophora	glandular yellow phacelia	Hydrophyllaceae	
PHAR3	Phalaris arundinacea	Canary reedgrass	Poaceae	irrigation canal
PHAU7	Phragmites australis	common reed	Poaceae	riparian
PHGR16	Phlox gracilis	pink annual phlox	Polemoniaceae	
PHHAL	Phacelia hastata var. leucophylla	silverleaf phacelia	Hydrophyllaceae	JUOC/Rock
PHHOC	Phlox hoodii ssp. canescens	carpet phlox	Polemoniaceae	
PHLI	Phacelia linearis	narrow-leaved phacelia	Hydrophyllaceae	
PHLO2	Phlox longifolia	longleaf phlox	Polemoniaceae	
PLLE	Plagiobothrys leptocladus	finebranched popcornflower	Boraginaceae	
POAV	Polygonum aviculare	prostrate knotweed	Polygonaceae	Roads
POBU	Poa bulbosa	bulbous bluegrass	Poaceae	
PONE	Poa nevadensis	Nevada bluegrass	Poaceae	
POSE	Poa secunda	one-sided bluegrass	Poaceae	
PSSPI	Pseudoegneria spicata ssp. inermis	bluebunch wheatgrass	Poaceae	
PSSPS	Pseudoegneria spicata ssp. spicata	bluebunch wheatgrass	Poaceae	
PUTR2	Purshia tridentata	antelpoe bitterbrush	Rosaceae	
PYCAC2	Pyrrocoma carthamoides	largeflower goldenweed	Asteraceae	
RIAU	Ribes areum	golden current	Grossulariaceae	
RUCR	Rumex crispus	curly dock	Polygonaceae	Riparian
RUSA	Rumex salicifolia	willowleaf dock	Polygonaceae	Riparian
SADO4	Salvia dorrii	purple sage	Salviaceae	
SATR12	Salsola tragus	tumbleweed	Chenopodiaceae	road edge
SAVE4	Sarcobatus vermiculatus	greasewood	Chenopodiaceae	
SCAN4	Scutelleria antirrhinoides	nose scullcap	Lamiaceae	JUOC/Rock
SIAL	Sisymbrium altissimum	tumbling mustard	Brassicaceae	
SOTR	Solanum triflorum	cutleaf nightshade	Solanaceae	riparian
SPMU2	Sphaeralcea munroana	Munroe's globemallow	Malvaceae	
TACA8	Taeniatherum caput-medusae	medusahead	Poaceae	
TECA2	Tetradymia canescens	spineless horsebrush	Asteraceae	
TRDU	Tragopogon dubius	yellow salsify	Asteraceae	
URDIH	Urtica dioica ssp. holosericea	stinging nettle	Urticaceae	Riparian
VEAM2	Veronica americana	American brooklime	Scrophulariaceae	Riparian
VEBL	Verbascum blattaria	moth mullien	Scrophulariaceae	
VETH	Verbascum thapsus	common mullein	Scrophulariaceae	
ZIPA2	Zigadenus paniculatus	foothill death camas	Liliaceae	
ZIVEV	Zigadenus venenosus v. venenosus	meadow death camas	Liliaceae	

FID	Date	Code	Species	Count	Acres	Area Sq. Ft.	Relative Freq.	UTM_X	UTM_Y	T	R	S	Road Name	Gen__Location	Growth Form	Growth Stage	Owner
39	6/10/2019	CADR	Cardaria draba	60	0.001	46	Patch	474368	4846383	21S	44E	3	Twin Spring	Roadside	Upright growth	Flowering	BLM
40	6/10/2019	CADR	Cardaria draba	70	0.004	180	Patch	474390	4846151	21S	44E	3	Twin Spring	Roadside	Upright growth	Flowering	BLM
82	6/11/2019	CADR	Cardaria draba	30	0.003	148	Patch	474453	4849177	20S	44E	27	Twin Spring	Roadside	Upright growth	Flowering	BLM
83	6/8/2019	CADR	Cardaria draba	300	0.193	8388	Scattered	470910	4835071	22S	44E	8	NA	Rangeland	Upright growth	Flowering	BLM
131	6/9/2019	CADR	Cardaria draba	300	0.048	2082	Patch	471497	4835272	22S	44E	8	NA	Rangeland	Upright growth	Seed Set	BLM
148	6/10/2019	CADR	Cardaria draba	30	0.006	274	Patch	475163	4844606	21S	44E	11	Twin Spring	Roadside	Upright growth	Seed Set	BLM
174	6/11/2019	CADR	Cardaria draba	1200	0.084	3677	Patch	474365	4847678	20S	44E	34	Twin Spring	Rangeland	Upright growth	Seed Set	BLM
256	6/11/2019	CADR	Cardaria draba	200	0.032	1405	Patch	475988	4851278	20S	44E	23	Twin Spring	Roadside	Upright growth	Seed set	BLM
292	6/10/2019	CADR	Cardaria draba	1000	0.312	13582	Patch	471877	4840556	21S	44E	28	Twin Spring	Rangeland	Upright growth	Seed set	BLM
305	6/11/2019	CADR	Cardaria draba	20000	0.213	9266	Patch	474708	4849484	20S	44E	26	Twin Spring	Rangeland	Upright growth	Seed set	BLM
46	6/12/2019	CADR	Cardaria draba	10000	0.013	557	Scattered	476991	4858834	19S	44E	26	Twin Spring	Rangeland	Upright growth	Seed set	PVT
85	6/9/2019	CADR	Cardaria draba	500	0.016	709	Patch	470983	4835589	22S	44E	8	NA	Rangeland	Upright growth	Flowering	PVT
113	6/12/2019	CADR	Cardaria draba	600	0.074	3220	Patch	477741	4857291	19S	44E	36	Twin Spring	Rangeland	Upright growth	Flowering	PVT
117	6/13/2019	CADR	Cardaria draba	50	0.040	1726	Patch	475480	4861300	19S	44E	23	Twin Spring	Roadside	Upright growth	Flowering	PVT
118	6/13/2019	CADR	Cardaria draba	1000	0.051	2226	Patch	475462	4861740	19S	44E	23	Twin Spring	Roadside	Upright growth	Flowering	PVT
119	6/13/2019	CADR	Cardaria draba	2000	0.129	5600	Patch	475470	4861942	19S	44E	14	Russell Road	Rangeland	Upright growth	Flowering	PVT
196	6/13/2019	CADR	Cardaria draba	10,000	0.223	9695	Patch	475528	4860984	19S	44E	23	Twin Spring	Rangeland	Upright growth	Seed Set	PVT
198	6/13/2019	CADR	Cardaria draba	1000	0.022	969	Patch	475557	4860782	19S	44E	23	Twin Spring	Rangeland	Upright growth	Seed Set	PVT
203	6/13/2019	CADR	Cardaria draba	20,000	0.223	9733	Patch	475614	4860866	19S	44E	23	Twin Spring	Rangeland	Upright growth	Seed Set	PVT
204	6/13/2019	CADR	Cardaria draba	50	0.013	547	Patch	475531	4861070	19S	44E	23	Twin Spring	Rangeland	Upright growth	Seed Set	PVT
205	6/13/2019	CADR	Cardaria draba	30,000	0.325	14145	Patch	475504	4861130	19S	44E	23	Twin Spring	Rangeland	Upright growth	Seed Set	PVT
269	6/12/2019	CADR	Cardaria draba	500	0.055	2378	Patch	477816	4856162	20S	44E	1	Twin Spring	Roadside	Upright growth	Seed set	PVT
273	6/13/2019	CADR	Cardaria draba	4	0.002	91	Spot	475397	4861871	19S	44E	22	Twin Spring	Rangeland	Upright growth	Seed set	PVT
276	6/13/2019	CADR	Cardaria draba	1000	0.032	1414	Patch	475490	4862063	19S	44E	14	Russell Road	Roadside	Upright growth	Seed set	PVT
					2.113												
47	6/11/2019	CHJU	Chondrilla juncea	50	0.023	1016	Scattered	474366	4848656	20S	44E	34	Twin Spring	Rangeland	Upright growth	Preflower	BLM
48	6/11/2019	CHJU	Chondrilla juncea	5	0.001	34	Spot	474294	4848349	20S	44E	34	Twin Spring	Rangeland	Upright growth	Preflower	BLM
49	6/11/2019	CHJU	Chondrilla juncea	20	0.001	27	Patch	474330	4848131	20S	44E	34	Twin Spring	Rangeland	Upright growth	Preflower	BLM
50	6/12/2019	CHJU	Chondrilla juncea	100	19.480	848551	Scattered	476759	4853859	20S	44E	13	Twin Spring	Rangeland	Upright growth	Preflower	BLM
99	6/11/2019	CHJU	Chondrilla juncea	1	0.001	45	Spot	475822	4851106	20S	44E	23	Twin Spring	Rangeland	Upright growth	Preflower	BLM
102	6/12/2019	CHJU	Chondrilla juncea	20	0.002	94	Patch	476208	4852453	20S	44E	14	Twin Spring	Rangeland	Upright growth	Preflower	BLM
104	6/12/2019	CHJU	Chondrilla juncea	25	0.004	184	Patch	476191	4852547	20S	44E	14	Twin Spring	Rangeland	Upright growth	Preflower	BLM
105	6/12/2019	CHJU	Chondrilla juncea	30	0.038	1644	Patch	476190	4852579	20S	44E	14	Twin Spring	Rangeland	Upright growth	Preflower	BLM
109	6/12/2019	CHJU	Chondrilla juncea	3	0.001	56	Spot	476440	4852941	20S	44E	13	Twin Spring	Rangeland	Upright growth	Preflower	BLM
139	6/10/2019	CHJU	Chondrilla juncea	1	0.006	270	Spot	474975	4844784	21S	44E	11	Twin Spring	Rangeland	Upright growth	Preflower	BLM
146	6/10/2019	CHJU	Chondrilla juncea	2	0.007	287	Spot	475042	4844449	21S	44E	11	Twin Spring	Rangeland	Upright growth	Preflower	BLM
169	6/11/2019	CHJU	Chondrilla juncea	20	1.925	83832	Scattered	474296	4847727	20S	44E	34	Twin Spring	Rangeland	Upright growth	Preflower	BLM
173	6/11/2019	CHJU	Chondrilla juncea	4	0.006	267	Spot	474406	4847976	20S	44E	34	Twin Spring	Rangeland	Upright growth	Preflower	BLM
178	6/11/2019	CHJU	Chondrilla juncea	5	0.006	265	Spot	474413	4848994	20S	44E	34	Twin Spring	Roadside	Upright growth	Preflower	BLM
179	6/11/2019	CHJU	Chondrilla juncea	1	0.003	141	Spot	474439	4849049	20S	44E	34	Twin Spring	Rangeland	Upright growth	Preflower	BLM
186	6/12/2019	CHJU	Chondrilla juncea	16	0.010	443	Patch	476540	4853213	20S	44E	13	Twin Spring	Rangeland	Upright growth	Preflower	BLM
187	6/12/2019	CHJU	Chondrilla juncea	50	0.221	9617	Scattered	476464	4853032	20S	44E	13	Twin Spring	Rangeland	Upright growth	Preflower	BLM
191	6/12/2019	CHJU	Chondrilla juncea	100	0.418	18219	Scattered	476656	4853287	20S	44E	13	Twin Spring	Rangeland	Upright growth	Preflower	BLM
193	6/12/2019	CHJU	Chondrilla juncea	20	0.410	17838	Scattered	477044	4854176	20S	44E	12	Twin Spring	Rangeland	Upright growth	Preflower	BLM
194	6/12/2019	CHJU	Chondrilla juncea	20	0.029	1250	Patch	477151	4854330	20S	44E	12	Twin Spring	Rangeland	Upright growth	Preflower	BLM
210	6/12/2019	CHJU	Chondrilla juncea	100	0.150	6529	Scattered	476578	4853256	20S	44E	13	Twin Spring	Rangeland	Upright growth	Preflower	BLM

FID	Date	Code	Species	Count	Acres	Area Sq. Ft.	Relative Freq.	UTM_X	UTM_Y	T	R	S	Road Name	Gen__Location	Growth Form	Growth Stage	Owner
244	6/11/2019	CHJU	Chondrilla juncea	1	0.002	105	Spot	476044	4851266	20S	44E	23	Twin Spring	Rangeland	Upright growth	Preflower	BLM
245	6/11/2019	CHJU	Chondrilla juncea	2	0.002	75	Spot	476026	4851305	20S	44E	23	Twin Spring	Rangeland	Upright growth	Preflower	BLM
247	6/11/2019	CHJU	Chondrilla juncea	1	0.002	67	Spot	476036	4851354	20S	44E	23	Twin Spring	Rangeland	Upright growth	Preflower	BLM
249	6/11/2019	CHJU	Chondrilla juncea	4	0.002	93	Spot	476071	4851437	20S	44E	23	Twin Spring	Rangeland	Upright growth	Preflower	BLM
251	6/11/2019	CHJU	Chondrilla juncea	15	0.002	98	Patch	476090	4851861	20S	44E	23	Twin Spring	Rangeland	Upright growth	Preflower	BLM
252	6/11/2019	CHJU	Chondrilla juncea	5	0.003	116	Spot	476065	4851868	20S	44E	23	Twin Spring	Rangeland	Upright growth	Preflower	BLM
254	6/11/2019	CHJU	Chondrilla juncea	100	2.095	91259	Scattered	476040	4851622	20S	44E	23	Twin Spring	Rangeland	Upright growth	Preflower	BLM
258	6/12/2019	CHJU	Chondrilla juncea	2	0.002	92	Spot	475203	4850369	20S	44E	26	Twin Spring	Rangeland	Upright growth	Preflower	BLM
261	6/12/2019	CHJU	Chondrilla juncea	1	0.002	85	Spot	476176	4852372	20S	44E	14	Twin Spring	Rangeland	Upright growth	Preflower	BLM
262	6/12/2019	CHJU	Chondrilla juncea	1	0.001	49	Spot	476169	4852251	20S	44E	23	Twin Spring	Rangeland	Upright growth	Preflower	BLM
263	6/12/2019	CHJU	Chondrilla juncea	1	0.002	84	Spot	476196	4852152	20S	44E	23	Twin Spring	Rangeland	Upright growth	Preflower	BLM
264	6/12/2019	CHJU	Chondrilla juncea	150	1.087	47339	Scattered	476166	4852060	20S	44E	23	Twin Spring	Rangeland	Upright growth	Preflower	BLM
265	6/12/2019	CHJU	Chondrilla juncea	1	0.002	91	Spot	476128	4851931	20S	44E	23	Twin Spring	Roadside	Upright growth	Preflower	BLM
266	6/12/2019	CHJU	Chondrilla juncea	7	0.003	116	Spot	476168	4851936	20S	44E	23	Twin Spring	Rangeland	Upright growth	Preflower	BLM
267	6/12/2019	CHJU	Chondrilla juncea	6	0.002	95	Spot	476233	4852279	20S	44E	23	Twin Spring	Rangeland	Upright growth	Preflower	BLM
316	6/12/2019	CHJU	Chondrilla juncea	20	0.019	841	Patch	477302	4854648	20S	44E	12	Twin Spring	Rangeland	Upright growth	Preflower	BLM
317	6/12/2019	CHJU	Chondrilla juncea	30	0.019	841	Patch	477343	4854660	20S	44E	12	Twin Spring	Rangeland	Upright growth	Preflower	BLM
321	6/13/2019	CHJU	Chondrilla juncea	40	0.019	841	Patch	477409	4854763	20S	44E	12	Twin Spring	Rangeland	Upright growth	Preflower	BLM
322	2/17/1900	CHJU	Chondrilla juncea	20	0.019	841	Patch	477420	4854820	20S	44E	12	Twin Spring	Rangeland	Upright growth	Preflower	BLM
325	6/12/2019	CHJU	Chondrilla juncea	40	0.019	841	Patch	477571	4855034	20S	44E	12	Twin Spring	Rangeland	Upright growth	Preflower	BLM
268	6/12/2019	CHJU	Chondrilla juncea	5	0.003	149	Spot	477786	4856205	20S	44E	1	Twin Spring	Rangeland	Upright growth	Preflower	PVT
279	6/12/2019	CHJU	Chondrilla juncea	50	0.023	990	Scattered	477793	4856126	20S	44E	1	Twin Spring	Rangeland	Upright growth	Preflower	PVT
333	6/12/2019	CHJU	Chondrilla juncea	20	0.019	841	Patch	477852	4855771	20S	44E	1	Twin Spring	Rangeland	Upright growth	Preflower	PVT
335	6/12/2019	CHJU	Chondrilla juncea	30	0.019	841	Patch	477881	4855716	20S	44E	1	Twin Spring	Rangeland	Upright growth	Preflower	PVT
				45	26.111												
2	6/9/2019	CIAR4	Cirsium arvense	60	0.086	3759	Scattered	471248	4836098	22S	44E	8	NA	Rangeland	Upright growth	Flowering	BLM
183	6/11/2019	CIAR4	Cirsium arvense	600	0.048	2071	Patch	474514	4849448	20S	44E	27	Twin Spring	Riparian	Upright growth	Preflower	BLM
					0.134												
127	6/8/2019	CIVU	Cirsium vulgare	1	0.009	393	Spot	471059	4835394	22S	44E	8	NA	Rangeland	Upright growth	Preflower	PVT
6	6/9/2019	COAR4	Convolvulus arvensis	300	0.079	3436	Scattered	471343	4835558	22S	44E	8	NA	Roadside	Upright growth	Flowering	BLM
41	6/10/2019	COAR4	Convolvulus arvensis	30	0.072	3155	Patch	474382	4846076	21S	44E	3	Twin Spring	Roadside	Upright growth	Flowering	BLM
43	6/11/2019	COAR4	Convolvulus arvensis	5	0.004	174	Spot	474306	4846943	21S	44E	3	Twin Spring	Roadside	Upright growth	Flowering	BLM
44	6/11/2019	COAR4	Convolvulus arvensis	100	0.003	140	Patch	474300	4847017	21S	44E	3	Twin Spring	Roadside	Upright growth	Flowering	BLM
45	6/11/2019	COAR4	Convolvulus arvensis	20	0.005	224	Patch	474296	4847055	21S	44E	3	Twin Spring	Roadside	Upright growth	Flowering	BLM
51	6/11/2019	COAR4	Convolvulus arvensis	20	0.002	70	Patch	474418	4848237	20S	44E	34	Twin Spring	Rangeland	Upright growth	Flowering	BLM
52	6/11/2019	COAR4	Convolvulus arvensis	30	0.017	762	Patch	474369	4848150	20S	44E	34	Twin Spring	Roadside	Upright growth	Flowering	BLM
122	6/11/2019	COAR4	Convolvulus arvensis	25	0.003	150	Patch	475975	4851243	20S	44E	23	Twin Spring	Roadside	Upright growth	Flowering	BLM
129	6/9/2019	COAR4	Convolvulus arvensis	350	0.018	764	Patch	471485	4835333	22S	44E	8	NA	Rangeland	Upright growth	Flowering	BLM
130	6/9/2019	COAR4	Convolvulus arvensis	150	0.006	280	Patch	471459	4835310	22S	44E	8	NA	Rangeland	Upright growth	Flowering	BLM
136	6/10/2019	COAR4	Convolvulus arvensis	200	0.005	237	Patch	474972	4844483	21S	44E	11	Twin Spring	Rangeland	Upright growth	Flowering	BLM
138	6/10/2019	COAR4	Convolvulus arvensis	10	0.008	331	Spot	474969	4844819	21S	44E	11	Twin Spring	Rangeland	Upright growth	Flowering	BLM
156	6/10/2019	COAR4	Convolvulus arvensis	500	0.031	1357	Patch	474815	4845159	21S	44E	11	Twin Spring	Roadside	Upright growth	Flowering	BLM
162	6/10/2019	COAR4	Convolvulus arvensis	100	0.870	37903	Scattered	475009	4844821	21S	44E	11	Twin Spring	Roadside	Upright growth	Flowering	BLM
163	6/10/2019	COAR4	Convolvulus arvensis	5	0.003	115	Spot	474635	4845447	21S	44E	10	Twin Spring	Roadside	Upright growth	Flowering	BLM
166	6/10/2019	COAR4	Convolvulus arvensis	200	0.156	6816	Scattered	474793	4843252	21S	44E	14	Twin Spring	Roadside	Upright growth	Flowering	BLM

FID	Date	Code	Species	Count	Acres	Area Sq. Ft.	Relative Freq.	UTM_X	UTM_Y	T	R	S	Road Name	Gen__Location	Growth Form	Growth Stage	Owner
175	6/11/2019	COAR4	Convolvulus arvensis	100	0.016	695	Patch	474290	4847489	20S	44E	34	Twin Spring	Roadside	Upright growth	Flowering	BLM
184	6/11/2019	COAR4	Convolvulus arvensis	50	0.018	794	Patch	474783	4849917	20S	44E	26	Twin Spring	Roadside	Upright growth	Flowering	BLM
185	6/12/2019	COAR4	Convolvulus arvensis	8	0.008	354	Spot	476596	4853273	20S	44E	13	Twin Spring	Rangeland	Upright growth	Flowering	BLM
192	6/12/2019	COAR4	Convolvulus arvensis	30	0.006	243	Patch	476656	4853319	20S	44E	13	Twin Spring	Rangeland	Upright growth	Flowering	BLM
211	6/10/2019	COAR4	Convolvulus arvensis	50	0.009	402	Patch	475149	4844615	21S	44E	11	Twin Spring	Roadside	Upright growth	Flowering	BLM
212	6/10/2019	COAR4	Convolvulus arvensis	30	0.017	724	Patch	474848	4843991	21S	44E	14	Twin Spring	Roadside	Upright growth	Flowering	BLM
213	6/10/2019	COAR4	Convolvulus arvensis	300	0.040	1753	Patch	474896	4845025	21S	44E	11	Twin Spring	Roadside	Upright growth	Flowering	BLM
214	6/10/2019	COAR4	Convolvulus arvensis	4	0.003	133	Spot	475015	4844390	21S	44E	11	Twin Spring	Roadside	Upright growth	Flowering	BLM
226	6/10/2019	COAR4	Convolvulus arvensis	NA	0.013	545	Patch	473111	4841162	21S	44E	22	Twin Spring	Roadside	Upright growth	Flowering	BLM
231	6/11/2019	COAR4	Convolvulus arvensis	30	0.004	173	Scattered	473036	4841113	21S	44E	22	Twin Spring	Roadside	Upright growth	Flowering	BLM
232	6/11/2019	COAR4	Convolvulus arvensis	100	0.010	453	Scattered	473085	4841139	21S	44E	22	Twin Spring	Roadside	Upright growth	Flowering	BLM
236	6/11/2019	COAR4	Convolvulus arvensis	5	0.004	168	Spot	474863	4842367	21S	44E	23	Twin Spring	Roadside	Upright growth	Flowering	BLM
280	6/12/2019	COAR4	Convolvulus arvensis	40	0.003	135	Patch	475282	4850557	20S	44E	26	Twin Spring	Roadside	Upright growth	Flowering	BLM
299	6/10/2019	COAR4	Convolvulus arvensis	100	0.030	1326	Patch	471477	4840375	21S	44E	28	Twin Spring	Roadside	Upright growth	Flowering	BLM
300	6/10/2019	COAR4	Convolvulus arvensis	500	0.025	1099	Patch	471342	4840248	21S	44E	29	Twin Spring	Roadside	Upright growth	Flowering	BLM
309	6/11/2019	COAR4	Convolvulus arvensis	100	0.016	683	Patch	474959	4850112	20S	44E	26	Twin Spring	Roadside	Upright growth	Flowering	BLM
310	6/11/2019	COAR4	Convolvulus arvensis	300	0.019	841	Patch	477482	4855043	20S	44E	12	Twin Spring	Rangeland	Upright growth	Flowering	BLM
53	6/12/2019	COAR4	Convolvulus arvensis	2	0.001	60	Spot	477106	4858566	19S	44E	36	Twin Spring	Rangeland	Upright growth	Flowering	PVT
54	6/12/2019	COAR4	Convolvulus arvensis	10	0.003	123	Patch	477290	4858143	19S	44E	36	Twin Spring	Roadside	Upright growth	Flowering	PVT
55	6/12/2019	COAR4	Convolvulus arvensis	20	0.007	313	Patch	477249	4858244	19S	44E	36	Twin Spring	Roadside	Upright growth	Flowering	PVT
56	6/12/2019	COAR4	Convolvulus arvensis	100	0.011	495	Scattered	477186	4858368	19S	44E	36	Twin Spring	Roadside	Upright growth	Flowering	PVT
57	6/12/2019	COAR4	Convolvulus arvensis	20	0.004	178	Patch	476924	4859020	19S	44E	26	Twin Spring	Roadside	Upright growth	Flowering	PVT
58	6/12/2019	COAR4	Convolvulus arvensis	100	0.013	571	Scattered	476874	4859187	19S	44E	26	Twin Spring	Roadside	Upright growth	Flowering	PVT
59	6/13/2019	COAR4	Convolvulus arvensis	30	0.011	459	Patch	475766	4860254	19S	44E	26	Twin Spring	Roadside	Upright growth	Flowering	PVT
60	6/13/2019	COAR4	Convolvulus arvensis	20	0.007	313	Scattered	476940	4859085	19S	44E	26	Twin Spring	Rangeland	Upright growth	Flowering	PVT
61	6/13/2019	COAR4	Convolvulus arvensis	20	0.035	1521	Scattered	476959	4858920	19S	44E	26	Twin Spring	Rangeland	Upright growth	Flowering	PVT
62	6/13/2019	COAR4	Convolvulus arvensis	30	0.011	487	Patch	476371	4860034	19S	44E	26	Twin Spring	Roadside	Upright growth	Flowering	PVT
63	6/13/2019	COAR4	Convolvulus arvensis	100	0.014	597	Patch	476147	4860014	19S	44E	26	Twin Spring	Roadside	Upright growth	Flowering	PVT
64	6/13/2019	COAR4	Convolvulus arvensis	25	0.010	419	Patch	475820	4860015	19S	44E	26	Twin Spring	Rangeland	Upright growth	Flowering	PVT
112	6/12/2019	COAR4	Convolvulus arvensis	40	0.012	516	Patch	477727	4856882	20S	44E	1	Twin Spring	Rangeland	Upright growth	Flowering	PVT
116	6/13/2019	COAR4	Convolvulus arvensis	1000	0.286	12437	Scattered	475481	4861385	19S	44E	23	Twin Spring	Roadside	Upright growth	Flowering	PVT
200	6/13/2019	COAR4	Convolvulus arvensis	100	0.011	479	Patch	475707	4860429	19S	44E	23	Twin Spring	Rangeland	Upright growth	Flowering	PVT
201	6/13/2019	COAR4	Convolvulus arvensis	50	0.010	453	Patch	475644	4860694	19S	44E	23	Twin Spring	Rangeland	Upright growth	Flowering	PVT
202	6/13/2019	COAR4	Convolvulus arvensis	100	0.006	263	Patch	475621	4860712	19S	44E	23	Twin Spring	Roadside	Upright growth	Flowering	PVT
209	6/12/2019	COAR4	Convolvulus arvensis	50	0.007	321	Patch	477353	4857969	19S	44E	36	Twin Spring	Roadside	Upright growth	Flowering	PVT
270	6/12/2019	COAR4	Convolvulus arvensis	40	0.003	134	Patch	477708	4857400	19S	44E	36	Twin Spring	Rangeland	Upright growth	Flowering	PVT
282	12:00:00 AM	COAR4	Convolvulus arvensis	200	0.018	800	Patch	475464	4861165	19S	44E	22	Twin Spring	Roadside	Upright growth	Flowering	PVT
327	6/12/2019	COAR4	Convolvulus arvensis	200	0.033	1443	Patch	477611	4855140	20S	44E	12	Twin Spring	Roadside	Upright growth	Flowering	PVT
328	6/12/2019	COAR4	Convolvulus arvensis	200	0.022	967	Patch	477712	4855264	20S	44E	12	Twin Spring	Roadside	Upright growth	Flowering	PVT
338	6/13/2019	COAR4	Convolvulus arvensis	200	0.027	1170	Patch	475912	4859987	19S	44E	26	Twin Spring	Roadside	Upright growth	Flowering	PVT
				55	2.088												
114	6/13/2019	KOSC	Kochia scoparia	500	0.264	11484	Patch	475476	4861653	19S	44E	23	Twin Spring	Roadside	Upright growth	Preflower	PVT
271	6/13/2019	KOSC	Kochia scoparia	2000	0.164	7129	Patch	475460	4861739	19S	44E	22	Twin Spring	Roadside	Upright growth	Preflower	PVT
274	6/13/2019	KOSC	Kochia scoparia	3	0.002	86	Spot	475408	4861839	19S	44E	22	Twin Spring	Rangeland	Upright growth	Preflower	PVT
281	12:00:00 AM	KOSC	Kochia scoparia	500	0.239	10422	Scattered	475453	4861106	19S	44E	22	Twin Spring	Roadside	Upright growth	Preflower	PVT
					0.669												

FID	Date	Code	Species	Count	Acres	Area Sq. Ft.	Relative Freq.	UTM_X	UTM_Y	T	R	S	Road Name	Gen__Location	Growth Form	Growth Stage	Owner
1	6/8/2019	ONAC	Onopordum acanthium	1	0.007	313	Spot	471201	4835752	22S	44E	8	NA	Rangeland	Upright growth	Preflower	BLM
7	6/10/2019	ONAC	Onopordum acanthium	1	0.001	62	Spot	474904	4844247	21S	44E	14	Twin Spring	Rangeland	Upright growth	Preflower	BLM
8	6/10/2019	ONAC	Onopordum acanthium	15	0.007	313	Patch	474877	4844220	21S	44E	14	Twin Spring	Rangeland	Upright growth	Preflower	BLM
9	6/10/2019	ONAC	Onopordum acanthium	4	0.004	167	Spot	474897	4844185	21S	44E	14	Twin Spring	Roadside	Upright growth	Preflower	BLM
10	6/10/2019	ONAC	Onopordum acanthium	5	0.002	74	Spot	474832	4844004	21S	44E	14	Twin Spring	Rangeland	Upright growth	Preflower	BLM
12	6/10/2019	ONAC	Onopordum acanthium	1	0.001	51	Spot	474795	4843907	21S	44E	14	Twin Spring	Roadside	Upright growth	Preflower	BLM
13	6/10/2019	ONAC	Onopordum acanthium	50	0.018	793	Patch	474766	4843869	21S	44E	14	Twin Spring	Rangeland	Upright growth	Preflower	BLM
15	6/10/2019	ONAC	Onopordum acanthium	100	0.023	996	Scattered	474767	4843793	21S	44E	14	Twin Spring	Rangeland	Upright growth	Preflower	BLM
16	6/10/2019	ONAC	Onopordum acanthium	7	0.009	394	Spot	474779	4843754	21S	44E	14	Twin Spring	Roadside	Upright growth	Preflower	BLM
17	6/10/2019	ONAC	Onopordum acanthium	200	0.026	1153	Scattered	474737	4843726	21S	44E	14	Twin Spring	Rangeland	Upright growth	Preflower	BLM
18	6/10/2019	ONAC	Onopordum acanthium	12	0.024	1047	Scattered	474755	4843680	21S	44E	14	Twin Spring	Roadside	Upright growth	Preflower	BLM
19	6/10/2019	ONAC	Onopordum acanthium	1	0.001	38	Spot	474682	4843542	21S	44E	14	Twin Spring	Rangeland	Upright growth	Preflower	BLM
20	6/10/2019	ONAC	Onopordum acanthium	15	0.012	509	Patch	474697	4843381	21S	44E	14	Twin Spring	Roadside	Upright growth	Preflower	BLM
21	6/10/2019	ONAC	Onopordum acanthium	11	0.004	171	Patch	474767	4843265	21S	44E	14	Twin Spring	Roadside	Upright growth	Preflower	BLM
22	6/10/2019	ONAC	Onopordum acanthium	120	0.115	5006	Scattered	474800	4843198	21S	44E	14	Twin Spring	Rangeland	Upright growth	Preflower	BLM
23	6/10/2019	ONAC	Onopordum acanthium	2	0.001	50	Spot	474779	4843338	21S	44E	14	Twin Spring	Rangeland	Upright growth	Preflower	BLM
24	6/10/2019	ONAC	Onopordum acanthium	10	0.003	137	Spot	474716	4843399	21S	44E	14	Twin Spring	Roadside	Upright growth	Preflower	BLM
25	6/10/2019	ONAC	Onopordum acanthium	100	0.004	167	Patch	474744	4843592	21S	44E	14	Twin Spring	Rangeland	Upright growth	Preflower	BLM
26	6/10/2019	ONAC	Onopordum acanthium	10	0.044	1902	Scattered	474773	4843670	21S	44E	14	Twin Spring	Roadside	Upright growth	Preflower	BLM
27	6/10/2019	ONAC	Onopordum acanthium	20	0.002	96	Patch	474790	4843746	21S	44E	14	Twin Spring	Roadside	Upright growth	Preflower	BLM
28	6/10/2019	ONAC	Onopordum acanthium	200	0.123	5336	Scattered	474823	4843788	21S	44E	14	Twin Spring	Rangeland	Upright growth	Preflower	BLM
30	6/10/2019	ONAC	Onopordum acanthium	200	0.043	1888	Scattered	474941	4844190	21S	44E	14	Twin Spring	Rangeland	Upright growth	Preflower	BLM
31	6/10/2019	ONAC	Onopordum acanthium	1	0.007	313	Spot	474556	4845771	21S	44E	10	Twin Spring	Roadside	Upright growth	Preflower	BLM
32	6/10/2019	ONAC	Onopordum acanthium	8	0.002	75	Spot	474387	4846095	21S	44E	3	Twin Spring	Roadside	Upright growth	Preflower	BLM
33	6/10/2019	ONAC	Onopordum acanthium	1	0.001	63	Spot	474401	4846232	21S	44E	3	Twin Spring	Rangeland	Upright growth	Preflower	BLM
34	6/10/2019	ONAC	Onopordum acanthium	1	0.001	55	Spot	474387	4846407	21S	44E	3	Twin Spring	Rangeland	Upright growth	Preflower	BLM
35	6/10/2019	ONAC	Onopordum acanthium	1	0.001	57	Spot	474370	4846452	21S	44E	3	Twin Spring	Rangeland	Upright growth	Preflower	BLM
38	6/10/2019	ONAC	Onopordum acanthium	1	0.001	56	Spot	474333	4846476	21S	44E	3	Twin Spring	Roadside	Upright growth	Preflower	BLM
42	6/11/2019	ONAC	Onopordum acanthium	1	0.001	42	Spot	474344	4846605	21S	44E	3	Twin Spring	Rangeland	Upright growth	Preflower	BLM
65	6/11/2019	ONAC	Onopordum acanthium	40	0.013	558	Scattered	474365	4848634	20S	44E	34	Twin Spring	Rangeland	Upright growth	Preflower	BLM
66	6/11/2019	ONAC	Onopordum acanthium	20	0.013	579	Scattered	474367	4848594	20S	44E	34	Twin Spring	Rangeland	Rosette	Preflower	BLM
67	6/11/2019	ONAC	Onopordum acanthium	25	0.007	313	Patch	474319	4848351	20S	44E	34	Twin Spring	Rangeland	Rosette	Preflower	BLM
68	6/11/2019	ONAC	Onopordum acanthium	150	0.022	944	Scattered	474319	4848305	20S	44E	34	Twin Spring	Rangeland	Upright growth	Preflower	BLM
69	6/11/2019	ONAC	Onopordum acanthium	2	0.001	31	Spot	474347	4848204	20S	44E	34	Twin Spring	Rangeland	Upright growth	Preflower	BLM
70	6/11/2019	ONAC	Onopordum acanthium	5	0.007	313	Spot	474378	4848090	20S	44E	34	Twin Spring	Rangeland	Upright growth	Preflower	BLM
71	6/11/2019	ONAC	Onopordum acanthium	25	0.014	599	Scattered	474369	4848120	20S	44E	34	Twin Spring	Roadside	Upright growth	Preflower	BLM
72	6/11/2019	ONAC	Onopordum acanthium	25	0.004	178	Scattered	474342	4848328	20S	44E	34	Twin Spring	Roadside	Upright growth	Preflower	BLM
73	6/11/2019	ONAC	Onopordum acanthium	1	0.002	72	Spot	474348	4848451	20S	44E	34	Twin Spring	Roadside	Upright growth	Preflower	BLM
74	6/11/2019	ONAC	Onopordum acanthium	5	0.001	65	Spot	474400	4848692	20S	44E	34	Twin Spring	Roadside	Rosette	Preflower	BLM
86	6/10/2019	ONAC	Onopordum acanthium	350	0.754	32828	Scattered	471935	4840555	21S	44E	28	Twin Spring	Rangeland	Upright growth	Flowering	BLM
88	6/10/2019	ONAC	Onopordum acanthium	25	0.007	313	Scattered	473066	4841106	21S	44E	22	Twin Spring	Rangeland	Upright growth	Flowering	BLM
89	6/10/2019	ONAC	Onopordum acanthium	300	0.480	20912	Scattered	473863	4841393	21S	44E	22	Twin Spring	Rangeland	Upright growth	Flowering	BLM
90	6/10/2019	ONAC	Onopordum acanthium	2000	2.020	87979	Scattered	474732	4842113	21S	44E	23	Twin Spring	Rangeland	Upright growth	Flowering	BLM
91	6/11/2019	ONAC	Onopordum acanthium	150	2.978	129726	Scattered	474606	4842196	21S	44E	22	Twin Spring	Rangeland	Upright growth	Flowering	BLM
92	6/11/2019	ONAC	Onopordum acanthium	100	0.156	6802	Scattered	474871	4842331	21S	44E	23	Twin Spring	Rangeland	Upright growth	Flowering	BLM
93	6/11/2019	ONAC	Onopordum acanthium	75	0.026	1124	Patch	474940	4842483	21S	44E	23	Twin Spring	Roadside	Upright growth	Flowering	BLM

FID	Date	Code	Species	Count	Acres	Area Sq. Ft.	Relative Freq.	UTM_X	UTM_Y	T	R	S	Road Name	Gen__Location	Growth Form	Growth Stage	Owner
94	6/11/2019	ONAC	Onopordum acanthium	300	0.112	4871	Scattered	474998	4842556	21S	44E	23	Twin Spring	Rangeland	Upright growth	Flowering	BLM
95	6/11/2019	ONAC	Onopordum acanthium	150	0.244	10648	Scattered	474982	4842643	21S	44E	23	Twin Spring	Roadside	Upright growth	Flowering	BLM
96	6/11/2019	ONAC	Onopordum acanthium	140	0.042	1818	Scattered	475058	4842656	21S	44E	23	Twin Spring	Rangeland	Upright growth	Flowering	BLM
97	6/11/2019	ONAC	Onopordum acanthium	50	0.225	9796	Scattered	475142	4842834	21S	44E	14	Twin Spring	Rangeland	Upright growth	Flowering	BLM
98	6/11/2019	ONAC	Onopordum acanthium	2	0.002	72	Spot	475836	4851158	20S	44E	23	Twin Spring	Rangeland	Upright growth	Preflower	BLM
100	6/11/2019	ONAC	Onopordum acanthium	10	0.007	313	Spot	475589	4850864	20S	44E	23	Twin Spring	Rangeland	Upright growth	Preflower	BLM
101	6/12/2019	ONAC	Onopordum acanthium	100	0.007	313	Scattered	476185	4852448	20S	44E	14	Twin Spring	Rangeland	Upright growth	Preflower	BLM
103	6/12/2019	ONAC	Onopordum acanthium	1	0.007	313	Spot	476188	4852558	20S	44E	14	Twin Spring	Rangeland	Upright growth	Preflower	BLM
106	6/12/2019	ONAC	Onopordum acanthium	5	0.006	244	Spot	476192	4852591	20S	44E	14	Twin Spring	Rangeland	Upright growth	Preflower	BLM
107	6/12/2019	ONAC	Onopordum acanthium	30	0.072	3126	Patch	476211	4852584	20S	44E	14	Twin Spring	Rangeland	Upright growth	Preflower	BLM
108	6/12/2019	ONAC	Onopordum acanthium	10	0.266	11578	Patch	476403	4852775	20S	44E	13	Twin Spring	Rangeland	Upright growth	Preflower	BLM
110	6/12/2019	ONAC	Onopordum acanthium	30	0.080	3480	Patch	476456	4852920	20S	44E	13	Twin Spring	Rangeland	Upright growth	Preflower	BLM
121	6/11/2019	ONAC	Onopordum acanthium	12	0.008	351	Patch	475559	4850793	20S	44E	23	Twin Spring	Roadside	Upright growth	Preflower	BLM
128	6/9/2019	ONAC	Onopordum acanthium	300	1.423	61973	Scattered	471490	4835297	22S	44E	8	NA	Riparian	Upright growth	Preflower	BLM
137	6/10/2019	ONAC	Onopordum acanthium	7	0.007	286	Spot	474943	4844505	21S	44E	11	Twin Spring	Rangeland	Upright growth	Preflower	BLM
140	6/10/2019	ONAC	Onopordum acanthium	1	0.009	383	Spot	475107	4844629	21S	44E	11	Twin Spring	Rangeland	Upright growth	Preflower	BLM
141	6/10/2019	ONAC	Onopordum acanthium	1	0.004	190	Spot	475030	4844552	21S	44E	11	Twin Spring	Rangeland	Upright growth	Preflower	BLM
143	6/10/2019	ONAC	Onopordum acanthium	150	0.016	711	Patch	474977	4844315	21S	44E	11	Twin Spring	Roadside	Upright growth	Preflower	BLM
144	6/10/2019	ONAC	Onopordum acanthium	50	0.869	37851	Scattered	475010	4844323	21S	44E	11	Twin Spring	Rangeland	Upright growth	Preflower	BLM
147	6/10/2019	ONAC	Onopordum acanthium	45	0.232	10103	Scattered	475127	4844549	21S	44E	11	Twin Spring	Rangeland	Upright growth	Preflower	BLM
149	6/10/2019	ONAC	Onopordum acanthium	1	0.007	322	Spot	475147	4844643	21S	44E	11	Twin Spring	Rangeland	Upright growth	Preflower	BLM
150	6/10/2019	ONAC	Onopordum acanthium	30	0.442	19253	Scattered	475077	4844778	21S	44E	11	Twin Spring	Rangeland	Upright growth	Preflower	BLM
151	6/10/2019	ONAC	Onopordum acanthium	1	0.003	133	Spot	474618	4845695	21S	44E	10	Twin Spring	Rangeland	Upright growth	Preflower	BLM
154	6/10/2019	ONAC	Onopordum acanthium	3	0.007	323	Spot	474720	4845327	21S	44E	11	Twin Spring	Rangeland	Upright growth	Preflower	BLM
155	6/10/2019	ONAC	Onopordum acanthium	1	0.007	297	Spot	474776	4845201	21S	44E	11	Twin Spring	Roadside	Upright growth	Preflower	BLM
157	6/10/2019	ONAC	Onopordum acanthium	10	0.034	1498	Patch	474821	4845148	21S	44E	11	Twin Spring	Roadside	Upright growth	Preflower	BLM
158	6/10/2019	ONAC	Onopordum acanthium	1	0.007	311	Spot	474862	4845070	21S	44E	11	Twin Spring	Roadside	Upright growth	Preflower	BLM
159	6/10/2019	ONAC	Onopordum acanthium	30	0.029	1250	Patch	474940	4845015	21S	44E	11	Twin Spring	Rangeland	Rosette	Preflower	BLM
160	6/10/2019	ONAC	Onopordum acanthium	1	0.029	1250	Spot	474928	4844972	21S	44E	11	Twin Spring	Roadside	Upright growth	Preflower	BLM
165	6/10/2019	ONAC	Onopordum acanthium	2	0.007	307	Spot	474893	4845030	21S	44E	11	Twin Spring	Roadside	Upright growth	Preflower	BLM
167	6/11/2019	ONAC	Onopordum acanthium	1	0.029	1250	Spot	474268	4847468	21S	44E	3	Twin Spring	Rangeland	Upright growth	Preflower	BLM
168	6/11/2019	ONAC	Onopordum acanthium	50	3.456	150537	Scattered	474311	4847741	20S	44E	34	Twin Spring	Rangeland	Upright growth	Preflower	BLM
170	6/11/2019	ONAC	Onopordum acanthium	1000	1.939	84460	Scattered	474335	4848011	20S	44E	34	Twin Spring	Rangeland	Upright growth	Preflower	BLM
176	6/11/2019	ONAC	Onopordum acanthium	12	0.128	5570	Patch	474428	4848821	20S	44E	34	Twin Spring	Rangeland	Upright growth	Preflower	BLM
180	6/11/2019	ONAC	Onopordum acanthium	100	0.682	29702	Scattered	474482	4849195	20S	44E	27	Twin Spring	Rangeland	Upright growth	Preflower	BLM
181	6/11/2019	ONAC	Onopordum acanthium	200	1.228	53511	Scattered	474568	4849477	20S	44E	27	Twin Spring	Roadside	Upright growth	Preflower	BLM
188	6/12/2019	ONAC	Onopordum acanthium	1	0.006	280	Spot	476496	4853038	20S	44E	13	Twin Spring	Roadside	Upright growth	Preflower	BLM
189	6/12/2019	ONAC	Onopordum acanthium	5	0.007	298	Spot	476531	4853064	20S	44E	13	Twin Spring	Rangeland	Upright growth	Preflower	BLM
190	6/12/2019	ONAC	Onopordum acanthium	50	1.097	47775	Scattered	476660	4853294	20S	44E	13	Twin Spring	Rangeland	Upright growth	Preflower	BLM
195	6/12/2019	ONAC	Onopordum acanthium	2000	20.744	903598	Scattered	476844	4854157	20S	44E	12	Twin Spring	Rangeland	Upright growth	Preflower	BLM
220	6/9/2019	ONAC	Onopordum acanthium	10	0.013	570	Patch	470802	4835740	22S	44E	8	NA	Rangeland	Upright growth	Flowering	BLM
221	6/9/2019	ONAC	Onopordum acanthium	3	0.009	377	Spot	470854	4835904	22S	44E	8	NA	Rangeland	Upright growth	Flowering	BLM
223	6/10/2019	ONAC	Onopordum acanthium	40	0.003	117	Patch	472055	4840617	21S	44E	28	Twin Spring	Rangeland	Upright growth	Preflower	BLM
224	6/10/2019	ONAC	Onopordum acanthium	175	0.102	4426	Scattered	472096	4840687	21S	44E	28	Twin Spring	Rangeland	Upright growth	Preflower	BLM
225	6/10/2019	ONAC	Onopordum acanthium	300	0.193	8408	Scattered	472225	4840815	21S	44E	28	Twin Spring	Rangeland	Upright growth	Preflower	BLM
227	6/10/2019	ONAC	Onopordum acanthium	500	1.598	69598	Scattered	473731	4841333	21S	44E	22	Twin Spring	Roadside	Upright growth	Preflower	BLM

FID	Date	Code	Species	Count	Acres	Area Sq. Ft.	Relative Freq.	UTM_X	UTM_Y	T	R	S	Road Name	Gen__Location	Growth Form	Growth Stage	Owner
228	6/10/2019	ONAC	Onopordum acanthium	12	0.648	28239	Scattered	473799	4841418	21S	44E	22	Twin Spring	Rangeland	Upright growth	Preflower	BLM
229	6/10/2019	ONAC	Onopordum acanthium	30	0.699	30449	Scattered	474455	4841883	21S	44E	22	Twin Spring	Rangeland	Upright growth	Preflower	BLM
230	6/10/2019	ONAC	Onopordum acanthium	1000	5.106	222425	Scattered	474636	4842359	21S	44E	22	Twin Spring	Rangeland	Upright growth	Preflower	BLM
233	6/11/2019	ONAC	Onopordum acanthium	15	0.124	5421	Scattered	474734	4842479	21S	44E	23	Twin Spring	Rangeland	Upright growth	Preflower	BLM
234	6/11/2019	ONAC	Onopordum acanthium	25	0.369	16090	Scattered	474752	4842558	21S	44E	23	Twin Spring	Rangeland	Upright growth	Preflower	BLM
235	6/11/2019	ONAC	Onopordum acanthium	135	0.658	28644	Scattered	474845	4842409	21S	44E	23	Twin Spring	Rangeland	Upright growth	Preflower	BLM
237	6/11/2019	ONAC	Onopordum acanthium	60	0.064	2802	Scattered	474804	4842359	21S	44E	23	Twin Spring	Roadside	Upright growth	Preflower	BLM
238	6/11/2019	ONAC	Onopordum acanthium	1	0.002	78	Spot	474929	4842529	21S	44E	23	Twin Spring	Roadside	Upright growth	Preflower	BLM
239	6/11/2019	ONAC	Onopordum acanthium	1	0.002	98	Spot	474953	4842811	21S	44E	14	Twin Spring	Rangeland	Upright growth	Preflower	BLM
240	6/11/2019	ONAC	Onopordum acanthium	18	0.120	5236	Scattered	474922	4842648	21S	44E	23	Twin Spring	Rangeland	Upright growth	Preflower	BLM
241	6/11/2019	ONAC	Onopordum acanthium	50	0.146	6361	Scattered	474867	4842675	21S	44E	23	Twin Spring	Rangeland	Upright growth	Preflower	BLM
242	6/11/2019	ONAC	Onopordum acanthium	30	0.004	164	Patch	474853	4842769	21S	44E	14	Twin Spring	Rangeland	Upright growth	Preflower	BLM
243	6/11/2019	ONAC	Onopordum acanthium	50	0.432	18829	Patch	475080	4842768	21S	44E	14	Twin Spring	Rangeland	Upright growth	Preflower	BLM
246	6/11/2019	ONAC	Onopordum acanthium	9	0.016	694	Spot	476026	4851310	20S	44E	23	Twin Spring	Rangeland	Upright growth	Preflower	BLM
248	6/11/2019	ONAC	Onopordum acanthium	6	0.007	303	Spot	476054	4851434	20S	44E	23	Twin Spring	Rangeland	Upright growth	Preflower	BLM
250	6/11/2019	ONAC	Onopordum acanthium	13	0.055	2396	Patch	476127	4851808	20S	44E	23	Twin Spring	Rangeland	Upright growth	Preflower	BLM
253	6/11/2019	ONAC	Onopordum acanthium	30	1.561	67987	Scattered	476058	4851738	20S	44E	23	Twin Spring	Rangeland	Upright growth	Preflower	BLM
255	6/11/2019	ONAC	Onopordum acanthium	2	0.007	303	Spot	475988	4851309	20S	44E	23	Twin Spring	Rangeland	Upright growth	Preflower	BLM
257	6/11/2019	ONAC	Onopordum acanthium	12	0.002	107	Patch	475994	4851261	20S	44E	23	Twin Spring	Roadside	Upright growth	Preflower	BLM
259	6/12/2019	ONAC	Onopordum acanthium	1000	2.003	87255	Scattered	476248	4852274	20S	44E	14	Twin Spring	Rangeland	Upright growth	Preflower	BLM
260	6/12/2019	ONAC	Onopordum acanthium	20	0.007	303	Patch	476452	4852776	20S	44E	13	Twin Spring	Rangeland	Upright growth	Preflower	BLM
293	6/10/2019	ONAC	Onopordum acanthium	40	0.315	13732	Patch	470863	4839807	21S	44E	29	Twin Spring	Rangeland	Upright growth	Preflower	BLM
294	6/10/2019	ONAC	Onopordum acanthium	20	0.159	6911	Patch	470589	4839385	21S	44E	32	Twin Spring	Roadside	Upright growth	Preflower	BLM
295	6/10/2019	ONAC	Onopordum acanthium	12	0.116	5047	Patch	471165	4840200	21S	44E	29	Twin Spring	Rangeland	Upright growth	Preflower	BLM
296	6/10/2019	ONAC	Onopordum acanthium	50	0.110	4798	Patch	471597	4840458	21S	44E	28	Twin Spring	Rangeland	Upright growth	Preflower	BLM
297	6/10/2019	ONAC	Onopordum acanthium	10	0.019	841	Spot	471537	4840445	21S	44E	28	Twin Spring	Roadside	Upright growth	Preflower	BLM
298	6/10/2019	ONAC	Onopordum acanthium	80	0.253	11018	Patch	471315	4840205	21S	44E	29	Twin Spring	Rangeland	Upright growth	Flowering	BLM
301	6/10/2019	ONAC	Onopordum acanthium	225	1.458	63489	Scattered	471054	4840081	21S	44E	29	Twin Spring	Rangeland	Upright growth	Preflower	BLM
302	6/10/2019	ONAC	Onopordum acanthium	15	0.049	2125	Patch	471455	4840398	21S	44E	28	Twin Spring	Rangeland	Upright growth	Preflower	BLM
303	6/11/2019	ONAC	Onopordum acanthium	1000	14.496	631457	Scattered	475162	4850375	20S	44E	26	Twin Spring	Rangeland	Upright growth	Preflower	BLM
304	6/11/2019	ONAC	Onopordum acanthium	20	0.076	3289	Patch	474720	4849510	20S	44E	26	Twin Spring	Rangeland	Upright growth	Preflower	BLM
306	6/11/2019	ONAC	Onopordum acanthium	50	0.641	27909	Scattered	474465	4849771	20S	44E	27	Twin Spring	Roadside	Upright growth	Flowering	BLM
307	6/11/2019	ONAC	Onopordum acanthium	50	0.847	36881	Scattered	474784	4849847	20S	44E	26	Twin Spring	Rangeland	Upright growth	Preflower	BLM
308	6/11/2019	ONAC	Onopordum acanthium	10	0.056	2460	Patch	474768	4849947	20S	44E	26	Twin Spring	Rangeland	Upright growth	Preflower	BLM
311	6/12/2019	ONAC	Onopordum acanthium	30	0.220	9566	Patch	477477	4854993	20S	44E	12	Twin Spring	Rangeland	Upright growth	Preflower	BLM
312	6/12/2019	ONAC	Onopordum acanthium	50	0.362	15753	Scattered	477432	4854912	20S	44E	12	Twin Spring	Rangeland	Upright growth	Preflower	BLM
313	6/12/2019	ONAC	Onopordum acanthium	80	0.449	19571	Scattered	477377	4854794	20S	44E	12	Twin Spring	Rangeland	Upright growth	Preflower	BLM
314	6/12/2019	ONAC	Onopordum acanthium	10	0.019	841	Spot	477274	4854703	20S	44E	12	Twin Spring	Rangeland	Upright growth	Preflower	BLM
315	6/12/2019	ONAC	Onopordum acanthium	200	0.847	36891	Scattered	477282	4854564	20S	44E	12	Twin Spring	Rangeland	Upright growth	Preflower	BLM
318	6/12/2019	ONAC	Onopordum acanthium	20	0.068	2982	Patch	477347	4854695	20S	44E	12	Twin Spring	Rangeland	Upright growth	Preflower	BLM
319	6/12/2019	ONAC	Onopordum acanthium	10	0.019	841	Spot	477395	4854742	20S	44E	12	Twin Spring	Rangeland	Upright growth	Preflower	BLM
320	6/12/2019	ONAC	Onopordum acanthium	10	0.019	841	Spot	477412	4854774	20S	44E	12	Twin Spring	Rangeland	Upright growth	Preflower	BLM
323	6/12/2019	ONAC	Onopordum acanthium	30	0.213	9265	Scattered	477456	4854842	20S	44E	12	Twin Spring	Rangeland	Upright growth	Preflower	BLM
324	6/12/2019	ONAC	Onopordum acanthium	30	0.244	10607	Scattered	477502	4854935	20S	44E	12	Twin Spring	Rangeland	Upright growth	Preflower	BLM
339	6/9/2019	ONAC	Onopordum acanthium	40	0.046	2017	Patch	470715	4836900	22S	44E	5	Mine Access	Rangeland	Upright growth	Preflower	BLM
340	6/10/2019	ONAC	Onopordum acanthium	50	0.189	8218	Scattered	472341	4840835	21S	44E	28	Twin Spring	Rangeland	Upright growth	Flowering	BLM

FID	Date	Code	Species	Count	Acres	Area Sq. Ft.	Relative Freq.	UTM_X	UTM_Y	T	R	S	Road Name	Gen__Location	Growth Form	Growth Stage	Owner
341	6/10/2019	ONAC	Onopordum acanthium	15	0.002	90	Patch	472024	4840625	21S	44E	28	Twin Spring	Rangeland	Upright growth	Preflower	BLM
342	6/10/2019	ONAC	Onopordum acanthium	1000	1.121	48844	Scattered	474393	4841759	21S	44E	22	Twin Spring	Rangeland	Upright growth	Flowering	BLM
331	6/12/2019	ONAC	Onopordum acanthium	100	0.906	39447	Scattered	477912	4855526	20S	45E	6	Twin Spring	Rangeland	Upright growth	Preflower	BLM
334	6/12/2019	ONAC	Onopordum acanthium	100	2.298	100104	Scattered	478028	4855759	20S	45E	6	Twin Spring	Rangeland	Upright growth	Preflower	BLM
75	6/13/2019	ONAC	Onopordum acanthium	300	3.312	144251	Scattered	475722	4860248	19S	44E	26	Twin Spring	Rangeland	Upright growth	Preflower	PVT
76	6/13/2019	ONAC	Onopordum acanthium	100	0.085	3691	Scattered	476672	4859588	19S	44E	26	Twin Spring	Rangeland	Upright growth	Preflower	PVT
77	6/13/2019	ONAC	Onopordum acanthium	100	0.040	1729	Scattered	476718	4859489	19S	44E	26	Twin Spring	Rangeland	Upright growth	Preflower	PVT
78	6/13/2019	ONAC	Onopordum acanthium	20	0.003	152	Patch	476767	4859435	19S	44E	26	Twin Spring	Rangeland	Upright growth	Preflower	PVT
79	6/13/2019	ONAC	Onopordum acanthium	1	0.001	37	Spot	476766	4859377	19S	44E	26	Twin Spring	Rangeland	Upright growth	Preflower	PVT
80	6/13/2019	ONAC	Onopordum acanthium	12	0.001	51	Patch	476805	4859320	19S	44E	26	Twin Spring	Rangeland	Upright growth	Preflower	PVT
111	6/12/2019	ONAC	Onopordum acanthium	6000	70.096	3053374	Scattered	477658	4857731	19S	44E	36	Twin Spring	Rangeland	Upright growth	Flowering	PVT
115	6/13/2019	ONAC	Onopordum acanthium	200	0.280	12199	Scattered	475477	4861645	19S	44E	23	Twin Spring	Roadside	Upright growth	Flowering	PVT
120	6/13/2019	ONAC	Onopordum acanthium	200	0.116	5034	Scattered	475450	4861970	19S	44E	15	Russell Road	Rangeland	Upright growth	Flowering	PVT
123	6/8/2019	ONAC	Onopordum acanthium	200	2.013	87691	Scattered	470943	4835577	22S	44E	8	NA	Rangeland	Upright growth	Preflower	PVT
124	6/8/2019	ONAC	Onopordum acanthium	2000	2.937	127927	Scattered	471101	4835314	22S	44E	8	NA	Rangeland	Upright growth	Preflower	PVT
197	6/13/2019	ONAC	Onopordum acanthium	50	0.427	18580	Scattered	475501	4860997	19S	44E	23	Twin Spring	Rangeland	Upright growth	Preflower	PVT
199	6/13/2019	ONAC	Onopordum acanthium	15	0.151	6567	Patch	475736	4860309	19S	44E	26	Twin Spring	Rangeland	Upright growth	Preflower	PVT
206	6/13/2019	ONAC	Onopordum acanthium	300	0.812	35385	Scattered	475466	4861147	19S	44E	23	Twin Spring	Rangeland	Upright growth	Preflower	PVT
207	6/13/2019	ONAC	Onopordum acanthium	11	0.014	625	Patch	475487	4861179	19S	44E	23	Twin Spring	Rangeland	Upright growth	Flowering	PVT
208	6/13/2019	ONAC	Onopordum acanthium	30	0.057	2503	Scattered	475592	4860705	19S	44E	23	Twin Spring	Rangeland	Upright growth	Preflower	PVT
272	6/13/2019	ONAC	Onopordum acanthium	100	0.198	8605	Scattered	475336	4861792	19S	44E	22	Twin Spring	Rangeland	Upright growth	Preflower	PVT
275	6/13/2019	ONAC	Onopordum acanthium	50	0.007	303	Patch	475411	4861814	19S	44E	22	Twin Spring	Rangeland	Upright growth	Preflower	PVT
277	6/13/2019	ONAC	Onopordum acanthium	150	0.027	1160	Scattered	475477	4862041	19S	44E	14	Russell Road	Roadside	Upright growth	Preflower	PVT
326	6/12/2019	ONAC	Onopordum acanthium	200	3.779	164628	Scattered	477690	4855246	20S	44E	12	Twin Spring	Rangeland	Upright growth	Preflower	PVT
329	6/12/2019	ONAC	Onopordum acanthium	60	0.289	12572	Scattered	477813	4855399	20S	44E	12	Twin Spring	Rangeland	Upright growth	Preflower	PVT
330	6/12/2019	ONAC	Onopordum acanthium	15	0.054	2359	Patch	477884	4855415	20S	44E	12	Twin Spring	Rangeland	Upright growth	Preflower	PVT
332	6/12/2019	ONAC	Onopordum acanthium	200	3.529	153702	Scattered	477863	4855749	20S	44E	1	Twin Spring	Rangeland	Upright growth	Preflower	PVT
337	6/13/2019	ONAC	Onopordum acanthium	300	5.926	258147	Scattered	476756	4859526	19S	44E	26	Twin Spring	Rangeland	Upright growth	Preflower	PVT
343	6/12/2019	ONAC	Onopordum acanthium	10	0.005	220	Spot	477841	4855332	20S	44E	12	Twin Spring	Rangeland	Upright growth	Preflower	PVT
				167	174.243												
278	6/13/2019	PHAR3	Phalaris arundinacea	100	0.014	596	Patch	475469	4862005	19S	44E	15	Russell Road	Roadside	Upright growth	Flowering	PVT
182	6/11/2019	PHAU7	Phragmites australis	50	0.076	3296	Scattered	474533	4849466	20S	44E	27	Twin Spring	Riparian	Upright growth	Flowering	BLM
0	6/8/2019	TACA8	Taeniatherum caput-medusae	10000	0.175	7621	Scattered	471720	4835938	22S	44E	8	NA	Rangeland	Upright growth	Preflower	BLM
3	6/9/2019	TACA8	Taeniatherum caput-medusae	25	0.001	63	Patch	471204	4836147	22S	44E	8	NA	Rangeland	Upright growth	Flowering	BLM
4	6/9/2019	TACA8	Taeniatherum caput-medusae	50	0.001	22	Patch	471811	4835250	22S	44E	8	NA	Rangeland	Upright growth	Flowering	BLM
5	6/9/2019	TACA8	Taeniatherum caput-medusae	100	0.003	145	Patch	471730	4835291	22S	44E	8	NA	Rangeland	Upright growth	Flowering	BLM
11	6/10/2019	TACA8	Taeniatherum caput-medusae	3000	0.982	42762	Scattered	474798	4843934	21S	44E	14	Twin Spring	Rangeland	Upright growth	Flowering	BLM
14	6/10/2019	TACA8	Taeniatherum caput-medusae	10000	2.632	114633	Scattered	474735	4843672	21S	44E	14	Twin Spring	Rangeland	Upright growth	Flowering	BLM
29	6/10/2019	TACA8	Taeniatherum caput-medusae	200	0.013	564	Patch	474925	4844138	21S	44E	14	Twin Spring	Rangeland	Upright growth	Flowering	BLM
36	6/10/2019	TACA8	Taeniatherum caput-medusae	100	0.007	313	Patch	474371	4846105	21S	44E	3	Twin Spring	Roadside	Upright growth	Flowering	BLM
37	6/10/2019	TACA8	Taeniatherum caput-medusae	10000	8.033	349937	Scattered	474467	4845980	21S	44E	3	Twin Spring	Rangeland	Upright growth	Flowering	BLM
81	6/11/2019	TACA8	Taeniatherum caput-medusae	10000	3.746	163172	Scattered	474308	4848397	20S	44E	34	Twin Spring	Rangeland	Upright growth	Flowering	BLM
84	6/9/2019	TACA8	Taeniatherum caput-medusae	0	284.958	12412758	Scattered	470483	4835068	22S	44E	8	NA	Rangeland	Upright growth	Flowering	BLM
87	6/10/2019	TACA8	Taeniatherum caput-medusae	1000	1.570	68375	Scattered	472126	4840626	21S	44E	28	Twin Spring	Rangeland	Upright growth	Flowering	BLM

FID	Date	Code	Species	Count	Acres	Area Sq. Ft.	Relative Freq.	UTM_X	UTM_Y	T	R	S	Road Name	Gen__Location	Growth Form	Growth Stage	Owner
125	6/8/2019	TACA8	Taeniatherum caput-medusae	2000	0.068	2942	Patch	471182	4835139	22S	44E	8	NA	Rangeland	Upright growth	Flowering	BLM
126	6/8/2019	TACA8	Taeniatherum caput-medusae	NA	1.121	48836	Scattered	471091	4835084	22S	44E	8	NA	Rangeland	Upright growth	Flowering	BLM
132	6/9/2019	TACA8	Taeniatherum caput-medusae	na	0.467	20356	Scattered	471515	4834925	22S	44E	8	NA	Rangeland	Upright growth	Flowering	BLM
133	6/9/2019	TACA8	Taeniatherum caput-medusae	na	0.029	1250	Patch	471314	4834698	22S	44E	8	NA	Rangeland	Upright growth	Flowering	BLM
134	6/9/2019	TACA8	Taeniatherum caput-medusae	na	0.093	4037	Patch	471508	4834815	22S	44E	8	NA	Rangeland	Upright growth	Flowering	BLM
135	6/10/2019	TACA8	Taeniatherum caput-medusae	na	0.111	4819	Patch	474937	4844478	21S	44E	11	Twin Spring	Rangeland	Upright growth	Flowering	BLM
142	6/10/2019	TACA8	Taeniatherum caput-medusae	2000	0.084	3673	Scattered	475046	4844566	21S	44E	11	Twin Spring	Rangeland	Upright growth	Flowering	BLM
145	6/10/2019	TACA8	Taeniatherum caput-medusae	2000	0.050	2195	Patch	475054	4844409	21S	44E	11	Twin Spring	Rangeland	Upright growth	Flowering	BLM
152	6/10/2019	TACA8	Taeniatherum caput-medusae	5000	0.112	4890	Patch	474617	4845639	21S	44E	10	Twin Spring	Rangeland	Upright growth	Flowering	BLM
153	6/10/2019	TACA8	Taeniatherum caput-medusae	na	1.721	74961	Scattered	474658	4845395	21S	44E	10	Twin Spring	Rangeland	Upright growth	Flowering	BLM
161	6/10/2019	TACA8	Taeniatherum caput-medusae	na	1.157	50385	Scattered	475043	4844826	21S	44E	11	Twin Spring	Rangeland	Upright growth	Flowering	BLM
164	6/10/2019	TACA8	Taeniatherum caput-medusae	500	0.029	1250	Patch	474561	4845651	21S	44E	10	Twin Spring	Rangeland	Upright growth	Flowering	BLM
171	6/11/2019	TACA8	Taeniatherum caput-medusae	na	3.977	173222	Scattered	474330	4847903	20S	44E	34	Twin Spring	Rangeland	Upright growth	Flowering	BLM
172	6/11/2019	TACA8	Taeniatherum caput-medusae	2000	0.025	1071	Patch	474406	4847965	20S	44E	34	Twin Spring	Rangeland	Upright growth	Flowering	BLM
177	6/11/2019	TACA8	Taeniatherum caput-medusae	na	0.605	26348	Scattered	474410	4848969	20S	44E	34	Twin Spring	Roadside	Upright growth	Flowering	BLM
215	6/8/2019	TACA8	Taeniatherum caput-medusae	NA	4.028	175446	Scattered	470569	4836300	22S	44E	5	NA	Rangeland	Upright growth	Flowering	BLM
216	6/8/2019	TACA8	Taeniatherum caput-medusae	NA	0.530	23082	Scattered	470289	4836165	22S	44E	8	NA	Rangeland	Upright growth	Flowering	BLM
217	6/8/2019	TACA8	Taeniatherum caput-medusae	NA	0.060	2603	Scattered	470397	4836421	22S	44E	5	NA	Rangeland	Upright growth	Flowering	BLM
218	6/9/2019	TACA8	Taeniatherum caput-medusae	NA	3.877	168900	Scattered	470133	4836055	22S	44E	7	NA	Rangeland	Upright growth	Flowering	BLM
219	6/9/2019	TACA8	Taeniatherum caput-medusae	2000	0.011	459	Scattered	470306	4836132	22S	44E	8	NA	Rangeland	Upright growth	Flowering	BLM
222	6/10/2019	TACA8	Taeniatherum caput-medusae	NA	0.008	332	Scattered	471941	4840604	21S	44E	28	Twin Spring	Rangeland	Upright growth	Flowering	BLM
283	6/8/2019	TACA8	Taeniatherum caput-medusae	10000	1.633	71114	Scattered	470031	4835419	22S	44E	7	NA	Rangeland	Upright growth	Flowering	BLM
284	6/8/2019	TACA8	Taeniatherum caput-medusae	500	0.386	16795	Scattered	469826	4835395	22S	44E	7	NA	Rangeland	Upright growth	Flowering	BLM
285	6/8/2019	TACA8	Taeniatherum caput-medusae	10000	1.539	67035	Scattered	469834	4835296	22S	44E	7	NA	Rangeland	Upright growth	Flowering	BLM
286	6/8/2019	TACA8	Taeniatherum caput-medusae	10000	0.070	3059	Scattered	469987	4834823	22S	44E	7	NA	Rangeland	Upright growth	Flowering	BLM
287	6/9/2019	TACA8	Taeniatherum caput-medusae	10000	0.907	39509	Scattered	470615	4836555	22S	44E	5	Mine Access	Rangeland	Upright growth	Flowering	BLM
288	6/9/2019	TACA8	Taeniatherum caput-medusae	20000	1.025	44638	Scattered	470648	4836784	22S	44E	5	Mine Access	Rangeland	Upright growth	Flowering	BLM
289	6/9/2019	TACA8	Taeniatherum caput-medusae	5000	0.199	8662	Scattered	470652	4836662	22S	44E	5	Mine Access	Rangeland	Upright growth	Flowering	BLM
290	6/9/2019	TACA8	Taeniatherum caput-medusae	20000	1.049	45711	Scattered	470692	4836967	22S	44E	5	Mine Access	Rangeland	Upright growth	Flowering	BLM
291	6/9/2019	TACA8	Taeniatherum caput-medusae	10000	0.274	11938	Scattered	470860	4837354	22S	44E	5	Mine Access	Rangeland	Upright growth	Flowering	BLM
336	6/12/2019	TACA8	Taeniatherum caput-medusae	200	0.019	841	Scattered	477904	4855772	20S	45E	6	Twin Spring	Rangeland	Upright growth	Flowering	BLM
					327.381												

APPENDIX C

Wildlife Baseline Report

CALICO RESOURCES USA CORP.
GRASSY MOUNTAIN MINE PROJECT
MALHEUR COUNTY, OREGON

WILDLIFE RESOURCES BASELINE REPORT

APRIL 2018
REVISED OCTOBER 2018
REVISED JANUARY 2019
REVISED OCTOBER 2020

Prepared for:

Calico Resources USA Corp.
665 Anderson Street
Winnemucca, Nevada 89445

Prepared by:

Reno:
1650 Meadow Wood Lane
Reno, Nevada 89502
Phone: (775) 826-8822 | Fax: (775) 826-8857

Elko:
825 Railroad Street
Elko, Nevada 89801
Phone: (775) 753-9496 | Fax: (775) 826-8857

CALICO RESOURCES USA CORP.
GRASSY MOUNTAIN MINE PROJECT
WILDLIFE RESOURCES BASELINE REPORT

TABLE OF CONTENTS

1 INTRODUCTION 1
2 RESOURCE STUDY AREA 1
3 REGULATORY FRAMEWORK 4
3.1 Federal 4
3.1.1 Federal Endangered Species Act 4
3.1.2 Bald and Golden Eagle Protection Act 4
3.1.3 Migratory Bird Treaty Act 6
3.1.4 Bureau of Land Management (Manual 6840) – Special Status Species 6
3.1.5 Bureau of Land Management Greater Sage-Grouse Habitat Management Areas 6
3.2 State 6
4 STUDY METHODOLOGY 8
4.1 Literature Review 8
4.2 Field Studies 8
4.2.1 Wildlife Habitat Mapping and Categorization 9
4.2.2 Large-Plot Avian Surveys 10
4.2.3 Small-Plot Avian Surveys 10
4.2.4 Raptor, Golden Eagle, and Burrowing Owl Nest Surveys 12
4.2.5 Greater Sage-Grouse Surveys 13
4.2.6 Leporid Survey 14
4.2.7 Bat Species Investigation 18
4.2.8 General Wildlife Encounters 20
5 RESULTS AND DISCUSSION 20
5.1 Review of Existing Information 20
5.2 Wildlife Habitat Mapping 21
5.2.1 Developed-Road and Agricultural 26
5.2.2 Yellow Rabbitbrush/Bluebunch Wheatgrass Shrubland Association 26
5.2.3 Indian Ricegrass-Bluebunch-Wheatgrass-Sandhill-Muhly Grassland Alliance 26
5.2.4 Wyoming Big Sagebrush/ Cheatgrass Ruderal Shrubland Association 26
5.2.5 Crested Wheatgrass Western Ruderal Perennial Grassland Alliance 26
5.2.6 Cheatgrass Ruderal Grassland Association 26
5.2.7 Wyoming Big Sagebrush / Bluebunch Wheatgrass Shrubland Alliance 27
5.3 Large-Plot Avian Surveys 27
5.4 Small-Plot Avian Surveys 28
5.5 Raptor Nest Surveys 30
5.5.1 NWC 2013, 2014 Surveys 30
5.5.2 EMS 2017 Survey 32
5.5.3 EMS 2018 Survey 33
5.5.4 EMS 2020 Survey 33
5.6 Golden Eagle Nest Monitoring 34
5.6.1 NWC 2013, 2014 Survey 34
5.6.2 EMS 2017 Survey 34
5.6.3 EMS 2018 Survey 34
5.6.4 EMS 2020 Survey 34
5.7 Greater Sage-Grouse Surveys 35

5.7.1 NWC 2013-2014 Surveys 35
5.7.2 EMS 2017-2018 Surveys 36
5.8 Leporid Surveys 36
5.8.1 NWC 2013-2014 Surveys 36
5.8.2 EMS 2017 Survey 36
5.9 Acoustic Bat Surveys 37
5.9.1 NWC 2013-2014 Surveys 37
5.9.2 EMS 2017 Survey 38
5.10 General Wildlife Observations 38
6 BIBLIOGRAPHY 40
7 CONTACTS 43
8 LIST OF PREPARERS 43

LIST OF TABLES

Table 1: ODFW Mitigation Goals and Implementation Standards by Habitat Category 9
Table 2: Small-Plot Descriptions 12
Table 3: Bat Detector Location Descriptions 18
Table 4: ORBIC Occurrences of Wildlife Species within the Two-Mile Buffer WSA 20
Table 5: Federal and State Listed, Proposed, and Sensitive Species Potentially Occurring in the Vicinity of the Wildlife Study Area 21
Table 6: Land Cover and Habitat Types within the Permit Area 24
Table 7: Avian Species Observed in Large-Plot Avian Surveys 27
Table 8: Avian Species Observed Outside of Large-Plot Avian Surveys 28
Table 9: Avian Species Observed in Small-Plot Avian Surveys 29
Table 10: Summary of Nests Observed 35
Table 11: Bat Species Detected by Survey Station June 2013 through May 2014 37
Table 12: Bat Species Detected by Month: June 2013 through May 2014 37
Table 13: Bat Species Detected on May 27 and 28 and June 21 to 23, 2017 38

LIST OF FIGURES

Figure 1: Location Map 2
Figure 2: Permit Area Map 3
Figure 3: Wildlife Study Areas 5
Figure 4: ODFW Greater Sage-Grouse Low Density Area, Avian Survey Plots, and Burrowing Owl Call Locations 11
Figure 5a: Greater Sage-Grouse Brood-Rearing Surveys 15
Figure 5b: Greater Sage-Grouse Winter Use Surveys 16
Figure 5c: Greater Sage-Grouse Lek Surveys 17
Figure 6: Bat Detector Locations 19
Figure 7: ORBIC and USFWS Occurrences of Special Status Wildlife Species within the Two-Mile Buffer WSA 22
Figure 8: Wildfire History 23
Figure 9: Wildlife Habitat Types within the Permit Area 25
Figure 10: Raptor Nest Survey Results (Confidential – submitted separately) 31

APPENDICES

Appendix A **Geographic Information System Data for all Wildlife and Habitat Surveys (Submitted Digitally; Confidential Information submitted separately)**
Appendix B **United States Fish and Wildlife Service IPac Consultation**
Appendix C **ORBIC Report (Confidential and submitted under separate cover)**
Appendix D **Field Survey Data Sheets (Confidential – submitted separately as digital scans)**
Appendix E **Comprehensive List of Wildlife Species Observed**
Appendix F **Grassy Mountain Project 2020 Golden Eagle and Raptor Nesting Survey Report (Confidential and submitted under separate cover)**

ATTACHMENTS

Attachment A: **Wildlife Resources Baseline Study for the Grassy Mountain Gold Project, September 2014**

LIST OF ABBREVIATIONS AND ACRONYMS

BGEPA	Bald and Golden Eagle Protection Act
BLM	Bureau of Land Management
Calico	Calico Resources USA Corp.
CF Cards	compact flash cards
cm	centimeter
DOGAMI	Department of Geology and Mineral Industries
EMS	EM Strategies, Inc.
ESA	Endangered Species Act
FSA	Farm Service Agency
GHMA	General Habitat Management Area
GIS	Geographic Information Systems
GPS	Global Positioning System
GRSG	Greater Sage-Grouse
HDR	HDR Engineering, Inc.
IPaC	Information for Planning and Consultation
NAIP	National Agriculture Imagery Program
NEPA	National Environmental Policy Act
NHD	National Hydrography Dataset
NRCS	Natural Resources Conservation Service
NWC	Northwest Wildlife Consultants, Inc.
NWGAP	Northwest Regional Gap Analysis Project
OAR	Oregon Administrative Rule
ODFW	Oregon Department of Fish and Wildlife
ORBIC	Oregon Biodiversity Information Center
ORS	Oregon Revised Statute
PHMA	Priority Habitat Management Area
Project	Grassy Mountain Mine Project
T&E	threatened and endangered
TES	Threatened, Endangered, and Sensitive Species
U.S.C.	United States Code
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WRC	Wildlife Resource Consultants LLC
WSA	Wildlife Study Area

1 INTRODUCTION

The purpose of this baseline report is to characterize wildlife resources in the study area prior to the start of proposed mining operations at the Grassy Mountain Mine Project (Project) in Malheur County, Oregon. EM Strategies, Inc. (EMS) was contracted by Calico Resources USA Corp. (Calico) to conduct a review of existing wildlife information and a variety of field surveys. The surveys required, and the applicable survey areas, were identified in the *Wildlife Resources Environmental Baseline Work Plan* (EMS 2017). These surveys were intended to provide all the necessary baseline data to fulfill Oregon Administrative Rule (OAR) 632-037-0055 of the Oregon Department of Geology and Mineral Industries (DOGAMI), Oregon Revised Statute (ORS) 517.956, and other relevant Oregon Administrative Rules (OARs) and ORSs.

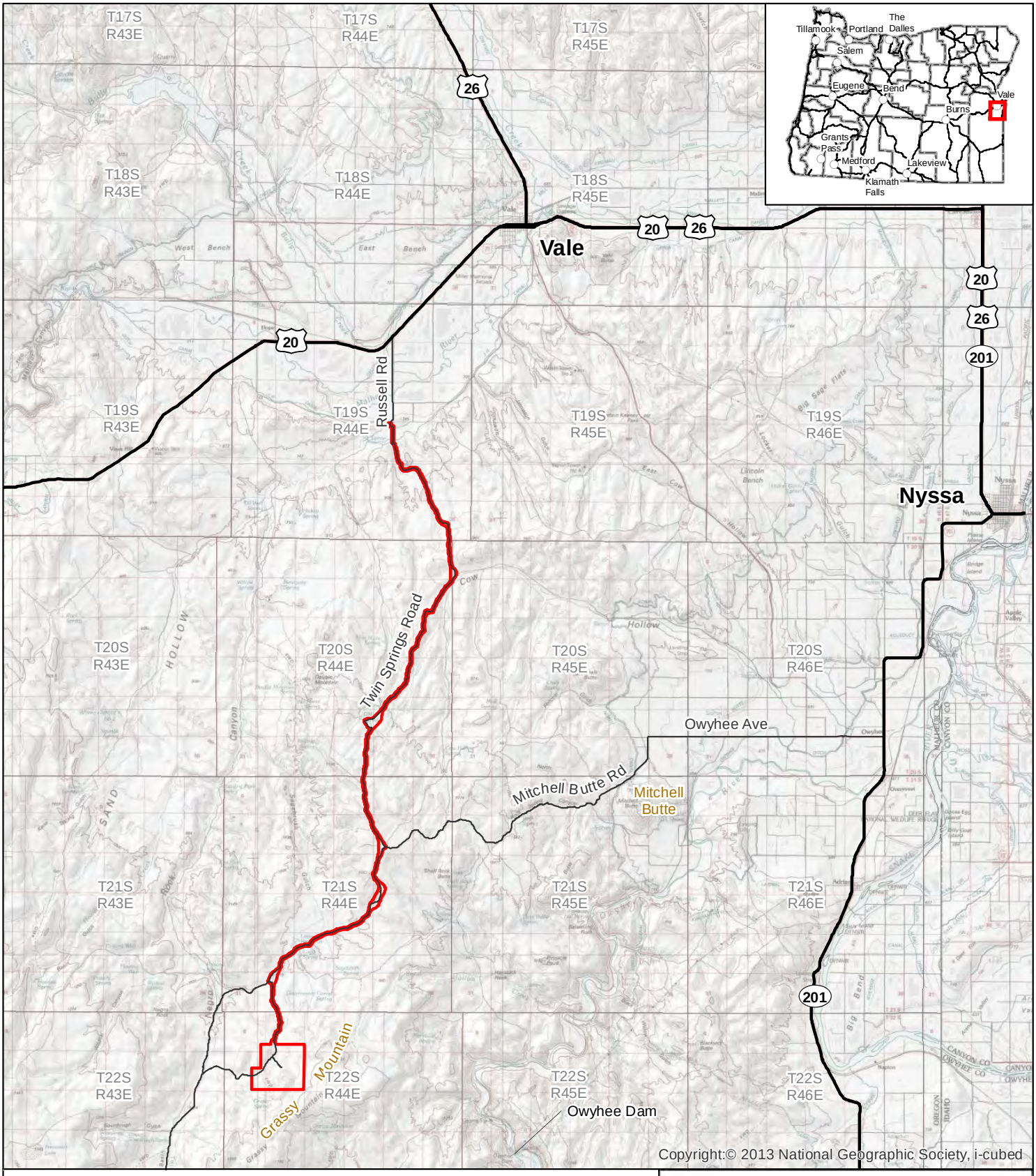
A portion of the text and data used in this report has been incorporated from the September 2014 *Wildlife Resources Baseline Study* prepared for the Project by Northwest Wildlife Consultants, Inc. (NWC), for previously surveyed areas within the current permit area. This report documents results from the 2014 NWC report, as well as new results from surveys conducted in 2017 and 2018 by EMS. The 2014 NWC report is included as Attachment A. Additional data collection may be required based on the findings of the groundwater study being prepared for the Project.

2 RESOURCE STUDY AREA

The Project is in Malheur County, Oregon, approximately 22 miles south-southwest of Vale (Figure 1) and consists of two areas: the Mine and Process Area and the Access Road Area (Permit Area) (Figure 2).

The Mine and Process Area is located on three patented lode mining claims and unpatented lode mining claims that cover an estimated 886 acres. These patented and unpatented lode mining claims are part of a larger land position that includes 419 unpatented lode mining claims and nine mill site claims on lands administered by the Bureau of Land Management (BLM). All proposed mining would occur on the patented claims, with some mine facilities on unpatented claims. The Mine and Process Area is in all or portions of Sections 5 through 8, Township 22 South, Range 44 East (T22S, R44E) (Willamette Meridian).

The Access Road Area is located on public land administered by the BLM, and private land controlled by others (Figure 2). A portion of the Access Road Area is a Malheur County Road named Twin Springs Road. The Access Road Area extends north from the Mine and Process Area to Russell Road, a paved Malheur County Road. The Access Road Area is in portions of Section 5, T22S, R44E, Sections 3, 10, 11, 14, 15, 21 through 23, 28, 29, and 32, T21S, R44E, Sections 1, 12 through 14, 23, 26, 27, and 34, T20S, R44E, Sections 6 and 7, T20S, R45E, and Sections 22, 23, 26, 35, and 36, T19S, R44E (Willamette Meridian). The width of the Access Road Area is 300 feet (150 feet on either side of the access road centerline) to accommodate possible minor widening or re-routing, a potential powerline adjacent to the access road, and for collection of environmental baseline data. There are several areas shown that are significantly wider than 300 feet on the Permit Area Map (Figure 2), which are areas where the final alignment has not yet been determined. The final engineering of the road will be consistent throughout, and within the Permit Area.



Explanation

- Permit Area
- Existing Road

Projection: UTM Zone 11 North, NAD83, meters

0 5,000 10,000 Feet

0 1 2 Miles

N

CALICO RESOURCES USA CORP.

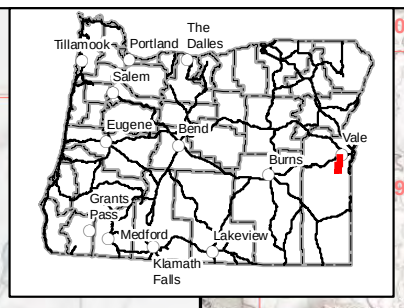
GRASSY MOUNTAIN MINE PROJECT

Location Map

Figure 1

Date:	12/19/2017	Drawn By:	JDB
Revised:		Project No.:	3672
Base Map:	USGS 100K quads: Boise, Brogan, Vale, Weiser		
File Name:	3672G_GrassyMtn_BL__Fig01_Location.mxd		

EM STRATEGIES



Russell Road

Twin Springs Road

Match Line

T19S R44E

T20S R44E

T21S R44E

T20S R45E

T22S R44E

Copyright:© 2013 National Geographic Society, i-cubed

Copyright:© 2013 National Geographic Society, i-cubed

Explanation

- Permit Area
- Mine and Process Area
- Access Road Area
- Patented Lode Claims
- Proposed Access Road
- Possible Road Realignment

Projection: UTM Zone 11 North, NAD83, meters

0 2,000 4,000 6,000 8,000 10,000 Feet

0 1 2 Miles

N

CALICO RESOURCES USA CORP.

GRASSY MOUNTAIN MINE PROJECT

Permit Area Map

Figure 2

Date:	12/19/2017	Drawn By:	JDB
Revised:		Project No.:	3672
Base Map:	USGS 7.5' quads: Double Mountain, Grassy Mountain, Kane Spring Gulch, Sourdough Spring, Vale West		
File Name:	3672G_GrassyMtn_BL__Fig02_PermitArea.mxd		

EM STRATEGIES

The road corridor will be 40 feet wide, which includes a 24-foot wide road travel width (12 feet on either side of the road centerline), four-foot wide shoulders on each side of the road, minimum one-foot wide ditches on each side of the road, and appropriate cut and fill. The Access Road Area totals approximately 876 acres.

A portion of the Permit Area was surveyed in 2013 and 2014 by NWC. The results of the NWC survey are presented in the September 2014 *Wildlife Resources Baseline Study for the Grassy Mountain Gold Project* (Attachment A). The Permit Area changed after the NWC survey. Portions of the new Permit Area that were not surveyed by NWC were surveyed by EMS in 2017 and 2018. The combination of the NWC and EMS survey areas comprises the Wildlife Study Area (WSA) (Figure 3). This report is documentation of the results of both surveys. Information from the 2014 NWC report is incorporated into this report.

3 REGULATORY FRAMEWORK

3.1 Federal

The Council on Environmental Quality regulations discuss "human environment" at 40 Code of Federal Regulations 1508.14. This term broadly relates to the biological, physical, social, and economic elements of the environment. It includes the wildlife resources category. Relevant data is to be used in describing the affected environment as the basis for determining the effects (direct and indirect) of a proposed action. The 2008 BLM National Environmental Policy Act (NEPA) Handbook (H-1790-1) describes potential NEPA-related federal requirements.

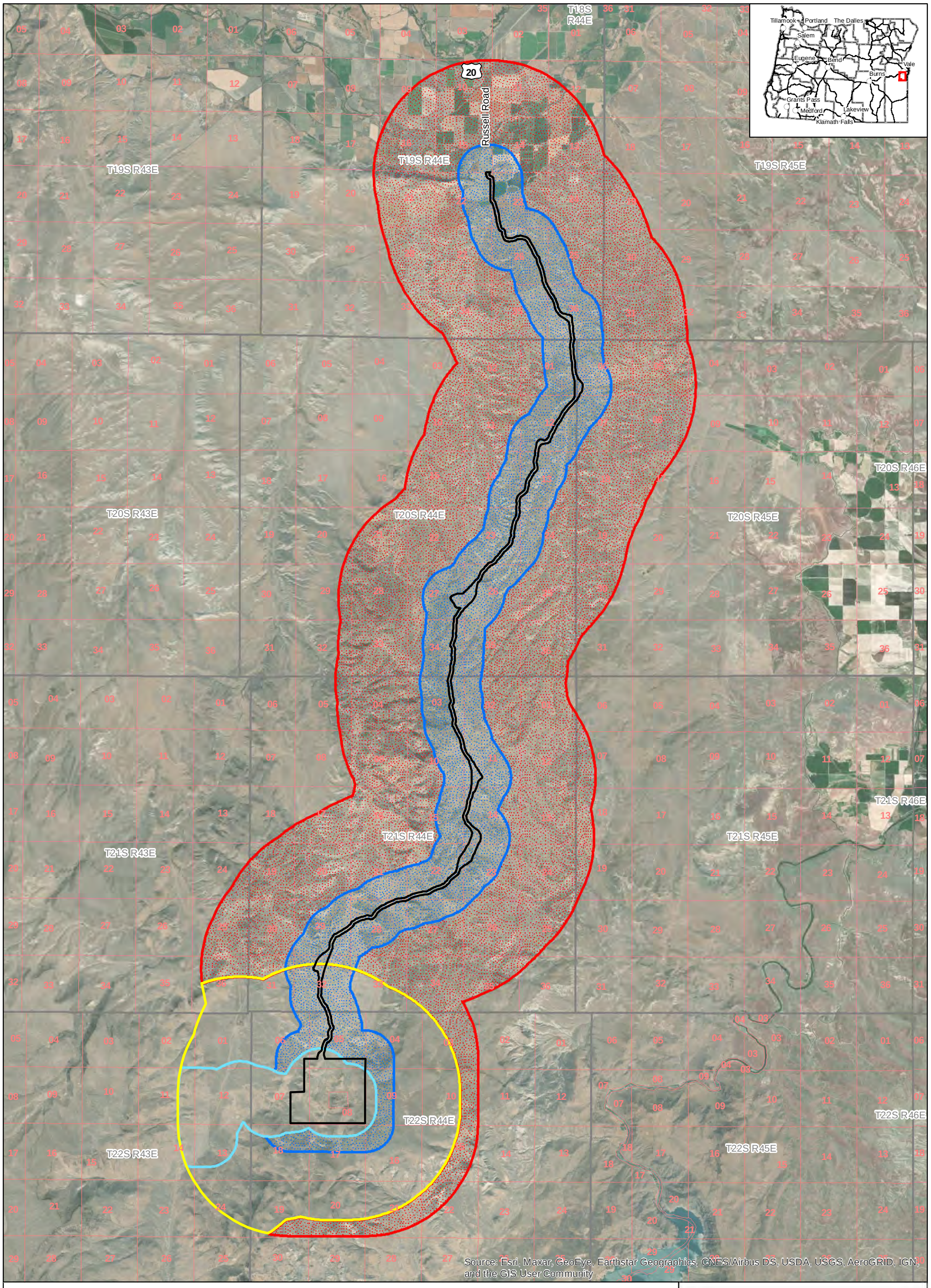
Other federal requirements, such as the Endangered Species Act (ESA) consultations, and critical habitat procedural requirements are discussed in Chapter 175, "Wildlife and Vegetation Protection; Environmental Regulation of the American Law of Mining" (Holland and Hart 2010). The following sections provide a list of relevant federal regulations.

3.1.1 Federal Endangered Species Act

Section 7 of the ESA (19 United States Code [U.S.C] § 1536(c)), as amended, states that any actions authorized, funded, or carried out by a federal agency do not jeopardize the continued existence of a federally-listed endangered or threatened species, or result in the destruction or adverse modification of federally-listed designated critical habitat. The action agencies are required to consult with the United States Fish and Wildlife Service (USFWS) and/or National Oceanic and Atmospheric Administration to determine whether federally-listed threatened and endangered (T&E) species or designated critical habitat are found within the vicinity of the proposed project, and to determine the proposed action's potential effects on those species or critical habitats.

3.1.2 Bald and Golden Eagle Protection Act

When first enacted in 1940, the Bald and Golden Eagle Protection Act (16 U.S.C.§ 668) (BGEPA) prohibited the take, transport or sale of bald eagles, their eggs, or any part of an eagle except where expressly allowed by the Secretary of the Interior. The BGEPA was amended in 1962 to extend the prohibitions to the golden eagle (*Aquila chrysaetos*).



Explanation

- Permit Area
- 2017-2018 EMS Two-mile Buffer WSA
- 2017-2018 EMS 0.5-mile Buffer WSA
- 2013-2014 NWC Two-mile Buffer WSA
- 2013-2014 NWC 0.5-mile Buffer WSA

Projection: UTM Zone 11 North, NAD83, meters

0 1 2 3 4 Miles

N

CALICO RESOURCES USA CORP.

GRASSY MOUNTAIN MINE PROJECT

Wildlife Study Areas

Figure 3

Date: 10/12/2020	Drawn By: JDB/SMH
Revised:	Project No.: 3678
Base Map: USGS 100K quad: Vale	
File Name: 3678H_GrassyMtn_Wildlife_Fig03.mxd	

EM STRATEGIES

3.1.3 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (16 U.S.C. §§ 703-712) implements various treaties and conventions for the protection of migratory birds. Under this Act, taking, killing, or possessing migratory birds (including any part, nest, or egg) is unlawful.

3.1.4 Bureau of Land Management (Manual 6840) – Special Status Species

The BLM's policy for management of special status species is in BLM Manual Section 6840 (BLM 2008). Special status species include the following:

- Federally-listed Threatened or Endangered Species: Any species the USFWS has listed as an endangered or threatened species under the ESA throughout all or a significant portion of its range;
- Proposed Threatened or Endangered Species: Any species the USFWS has proposed for listing as a federally endangered or threatened species under the ESA;
- Candidate Species: Plant and animal taxa under consideration for possible listing as threatened or endangered under the ESA;
- Delisted Species: Any species in the five years following their delisting; and
- BLM Sensitive Species: Species designated as Sensitive by the BLM State Director because they meet the following criteria: Native species found on BLM-administered lands for which the BLM has the capability to significantly affect the conservation status of the species through management, and either: 1) there is information that a species has undergone, is undergoing, or is predicted to undergo a downward trend such that the viability of the species or a distinct population segment of the species is at risk across all or a significant portion of the species range; or 2) the species depends on ecological refugia or specialized or unique habitats on BLM-administered lands, and there is evidence that such areas are threatened with alteration such that the continued viability of the species in that area would be at risk (BLM 2008).

3.1.5 Bureau of Land Management Greater Sage-Grouse Habitat Management Areas

In September 2015, the BLM approved the Oregon Greater Sage Grouse (GRSG) Approved Resource Management Plan Amendment (ARMPA) and Record of Decision (BLM 2015). Two main GRSG habitat management categories were defined: Priority Habitat Management Area (PHMA), which are BLM-administered lands identified as having the highest value to maintaining sustainable GRSG populations; and General Habitat Management Area (GHMA), which is an area of occupied seasonal or year-round habitat outside of PHMA where some special management would apply to sustain GRSG populations. There are approximately 1,024 acres of GHMA mapped in the Permit Area.

3.2 State

The Oregon Department of Fish and Wildlife (ODFW) manages fish and wildlife populations through objectives specified in various management plans. ODFW has direct responsibility for wildlife protection. In the Permit Area, the BLM manages habitat to support fish and wildlife.

The State of Oregon has threatened, endangered, and sensitive (TES) species provisions that protect native vertebrates and plants on state lands (ORS Sections 496.172 to 496.192; 498.026; and 564.100 to 564.135) and requires consideration of the impacts of any action on private land, in this case chemical mining, on T&E species (ORS Sections 517.956. 496.012, and 506.109).

ORS Section 517.956 establishes standards and protection measures that all chemical mining operations will follow that ensure protection measures for fish and wildlife are consistent with ODFW policies, including the following:

a) Protective measures to maintain an objective of zero wildlife mortality;

b) On-site and off-site mitigation ensuring there is no overall net loss of habitat value;

c) No loss of existing critical habitat of any state or federally-listed threatened or endangered species;

d) Fish and wildlife mortality shall be reported in accordance with a monitoring and reporting plan approved by ODFW;

e) ODFW shall establish by rule standards for review of a proposed chemical process mining operation for the purpose of developing conditions for fish and wildlife habitat protection that satisfy the terms of this section for inclusion in a consolidated permit by DOGAMI; and

f) Surface reclamation of a chemical process mine site shall ensure environmental protection and that a self-sustaining ecosystem, comparable to undamaged ecosystems in the area, has been established in satisfaction of the operator's habitat restoration obligations.

The purpose of OAR Chapter 635 Division 420 is to prescribe the standards for ODFW review of proposed chemical process mining operations to protect wildlife and their habitat and to further the Wildlife Policy (ORS 496.012) and the Food Fish Management Policy (ORS 506.109) of the State of Oregon. Baseline data collection will be consistent with what is required in developing a wildlife protection plan in accordance with OAR 635-420-0010, standards to protect wildlife in accordance with OAR 635-420-0015-0025, a habitat mitigation plan in accordance with OAR 635-420-0030, and wildlife mitigation plan in accordance with OAR 635420-0060.

The wildlife mitigation plan shall include the information required in OAR 635-415-0020(5). Affected wildlife habitats shall be evaluated using methodologies approved by the ODFW which are well-documented, measurable and verifiable. Examples of habitats that shall be addressed in the mitigation plan include, but are not limited to, the following:

a) Surface waterways, streams, springs, seeps, wetlands and other wildlife habitats;

b) Riparian areas;

c) Big game habitat;

d) Bird habitat;

e) Habitat for state or federally-listed threatened or endangered species, and state sensitive species;

f) Reproduction and nursery areas;

g) Fish spawning areas;

h) Geomorphic and edaphic habitats including cliffs, caves, sand dunes, playas and local distinctive soils that, along with their vegetation, contrast markedly with the surrounding area; and

i) Wildlife migration and movement corridors.

In addition, ODFW manages wildlife species populations through management objectives specified in their respective management plans; BLM manages adequate habitat to support these numbers. BLM and ODFW work cooperatively to benefit the management of wildlife and wildlife habitat as described in the memorandum of understanding of 2001 between the two agencies.

4 STUDY METHODOLOGY

4.1 Literature Review

A portion of the baseline characterization outlined in this report has been incorporated from the September 2014 NWC report (Attachment A). Prior to initiating the 2017 field surveys, the results of the literature review in the NWC report were reviewed, and updated information on special status species was requested from the USFWS, the Oregon Biodiversity Information Center (ORBIC), and ODFW. ORBIC maintains a computerized inventory of the wildlife, plant, and ecological community resources of Oregon.

4.2 Field Studies

The protocols for the field studies were established in the *Environmental Baseline Work Plans* (EMS 2017). The areas surveyed by NWC in 2014 and EMS in 2017 and 2018 are illustrated in Figure 3. Surveys were conducted within the Permit Area and a 0.5-mile buffer, or the Permit Area and a two-mile buffer, dependent on the species. Throughout this report, the areas will be referred to as 0.5-Mile Buffer WSA, and Two-Mile Buffer WSA. The wildlife surveys conducted in each area were established through discussions and correspondence with the USFWS (letter dated November 6, 2012) and ODFW (personal communication with Philip Milburn, ODFW) based on species presence and life history information. The following studies were performed within each study area:

Two-Mile Buffer WSA

- Greater sage-grouse habitat assessment and lek survey
- Golden eagle nest survey
- Nesting raptor survey
- General observations of special status species and non-listed species

0.5-Mile Buffer WSA

- Pygmy rabbits and white-tailed jackrabbit (leporids)
- Bats
- Burrowing owl
- Landbirds
- General wildlife encounter surveys

4.2.1 Wildlife Habitat Mapping and Categorization

The habitat categories in the Permit Area will be qualitatively categorized based on their importance to fish and wildlife, in accordance with the ODFW Fish and Wildlife Habitat Mitigation Policy. Habitat categorization will be developed using a combination of the results of the terrestrial vegetation surveys of the Permit Area (EMS 2018; HDR Engineering, Inc. [HDR] 2014; HDR 2015) and the United States Geological Survey (USGS) Northwest Regional Gap Analysis Project (NWGAP) land cover classifications (USGS 2011).

Mapping was conducted using a combination of aerial photograph interpretation and on-the-ground verification. Initial habitat boundaries were delineated at a scale of 1:5,000 in a digital geographic information system (GIS) using National Agriculture Imagery Program (NAIP) one-meter resolution orthophoto quadrangle county mosaics (United States Department of Agriculture [USDA] Farm Service Agency [FSA] 2009; USDA FSA 2011; USDA FSA 2012), digital raster graphics of standard series USGS topographic maps, and the Natural Resources Conservation Service (NRCS) soil survey geographic database (NRCS 2017).

Biologists ground-verified and adjusted boundaries, further delineated habitat types, and developed detailed descriptions of each habitat type. These data were used to develop initial habitat categories based on vegetation type and wildlife species use. Initial habitat types were mapped according to current vegetation rather than according to the potential ecological climax for any given location. Habitat types will be rated for habitat quality in the Permit Area based on definitions found in OAR 635-415-0025. This rule defines six habitat categories and establishes mitigation goals and implementation standards for each (Table 1).

Table 1: ODFW Mitigation Goals and Implementation Standards by Habitat Category

Habitat Category	Habitat Characteristics	Mitigation Goal	Achieved by
1	Irreplaceable, essential and limited	No loss of habitat quantity or quality	Avoidance
2	Essential and limited	No net loss of habitat quantity or quality and to provide a net benefit of habitat quantity or quality	In-kind, in-proximity mitigation
3	Essential, important and limited	No net loss of habitat quantity or quality	In-kind, in-proximity mitigation
4	Important	No net loss of habitat quantity or quality	In-kind or out-of-kind, in-proximity or off-proximity mitigation
5	Having high potential to become either essential or important	Net benefit in habitat quantity and quality	Actions that improve habitat conditions
6	Low potential to become essential or important	Minimize impacts	Conscientious Project design

Additional GIS layers, including ODFW Core and Low Density Areas for greater sage-grouse (*Centrocercus urophasianus*), lek locations, and known raptor nest shape files, will be used to further refine the habitat category of a habitat type and area. ODFW has identified throughout the range of the greater sage-grouse Core Areas and Low Density Areas based on the locations of known leks (ODFW 2015a). A portion of the Permit Area is designated Low Density Area (ODFW 2015a) (Figure 4). This designation is a coarse filter based on lek locations.

4.2.2 Large-Plot Avian Surveys

Large-plot avian surveys were conducted by NWC in 2013 and 2014. A variable circular-plot method (Reynolds et al. 1980) was used to obtain information on species composition and relative abundance of birds on and near the Project during diurnal hours. This survey protocol was primarily designed for studying use by large birds (i.e., waterbirds and raptors), but information for all species observed was recorded during each survey. Five 800-meter radius study plots were established (Figure 4). Plots were non-overlapping and were located to provide optimal viewing conditions and thorough coverage. The avian ecologist positioned at the center of the plot recorded all vertebrate wildlife seen or heard during 20-minute point counts. Species, number, flight height, weather, etc., were collected. Survey starting point locations and times of the day were alternated among surveys to reduce spatial and temporal bias. All survey plots were surveyed four times within each of the four survey seasons. Survey dates for each season were:

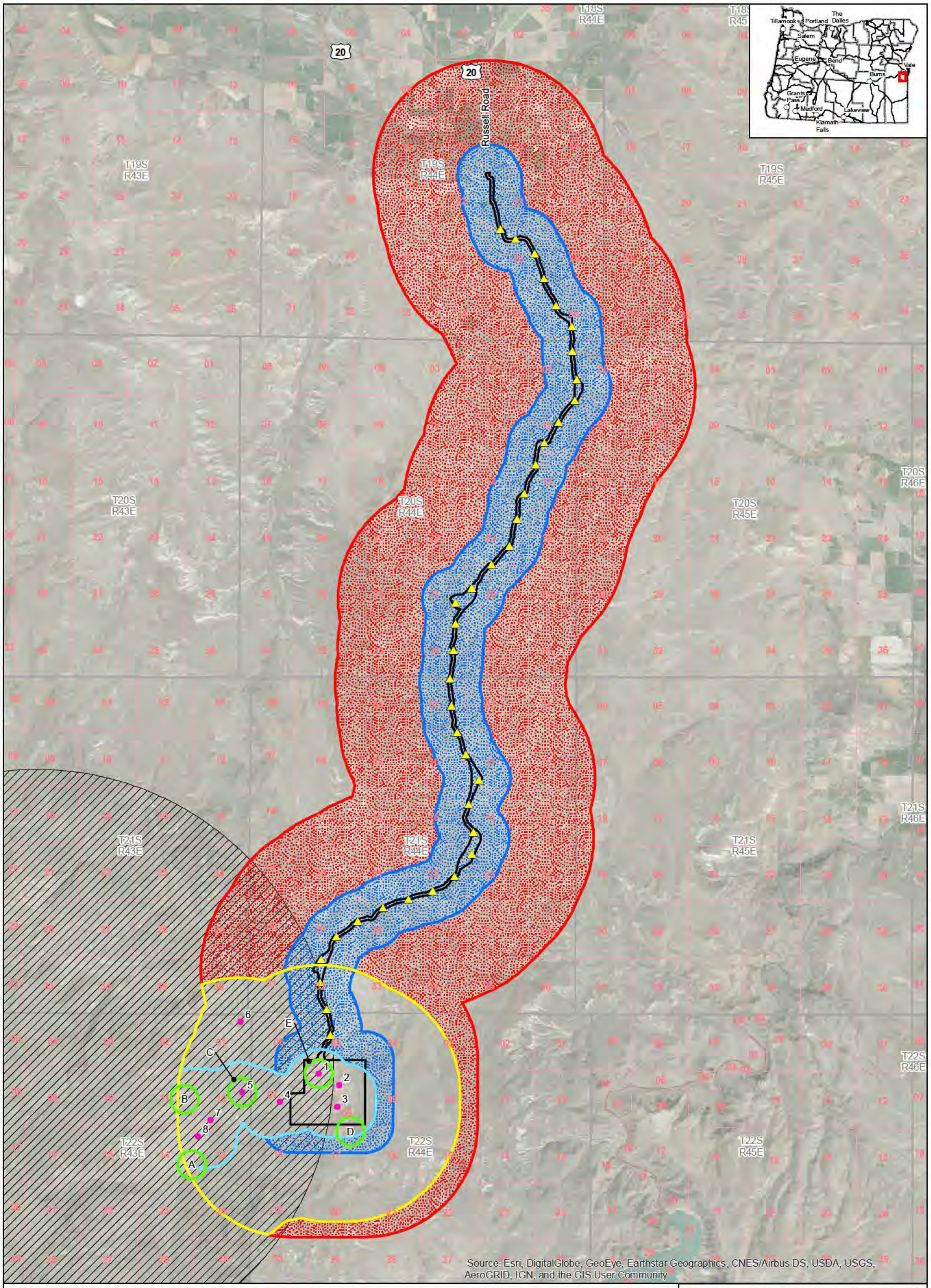
- Summer: June 24 – August 14, 2013; four visits to five plots, 20 surveys
- Fall: September 4 – October 24, 2013; four visits to five plots, 20 surveys
- Winter: November 25, 2013 – February 26, 2014; four visits to five plots, 20 surveys
- Spring: March 19 – May 29, 2014; four visits to five plots, 20 surveys

In four seasons between June 2013 to May 2014, 80 20-minute avian use surveys were conducted for the Project. Flight paths of special status species or raptors were hand-plotted on topographic maps in the field. All detected vertebrate wildlife were recorded, whether inside or outside the fixed-point plot. The avian use surveys conducted in 2013 and 2014 were adequate to characterize avian use in the Permit Area vicinity during all seasons of the year since the composition of the avian population would most likely not have changed substantially between surveys; therefore, large-plot avian surveys were not conducted during the 2017 or 2018 field surveys.

4.2.3 Small-Plot Avian Surveys

Small-plot avian surveys were also conducted by NWC in 2013 and 2014 to complement the large-plot avian surveys. Small-plot avian surveys focused on smaller birds (especially passerines) and utilized the range of habitats in the general vicinity of the Project. These surveys involved the establishment of eight fixed-radius points or plots (Ralph et al. 1993) in summer 2013 (Figure 4). The small-plot avian surveys were conducted 16 times throughout the year, with four complete surveys during each season: summer (June through August), fall (September through October), winter (November through February), and spring (March through May). A total of 128 surveys were conducted.

Plots covered each habitat type within the Two-Mile Buffer WSA (Table 2). Each study plot had a radius of 100 meters. Plots were surveyed by an experienced avian ecologist using a ten-minute observation period, and all surveys were completed between sunrise and five hours after sunrise, consistent with standard protocols. Surveys were not conducted when wind and weather conditions were likely to hamper the researcher's ability to detect whatever birds were present. General data recorded included date, time, and weather variables. Data associated with bird detections included species and number, age and sex, behavior and habitat. The avian use surveys conducted in 2013



Explanation

- Permit Area
- 2017-2018 EMS Two-mile Buffer WSA
- 2017-2018 EMS 0.5-mile Buffer WSA
- 2013-2014 NWC Two-mile Buffer WSA
- 2013-2014 NWC 0.5-mile Buffer WSA
- Large Avian Plot Locations (2013-2014)
- Small Avian Plot Locations (2013-2014)
- Burrowing Owl Call Stations (2017)
- Low Density Area

Projection: UTM Zone 11 North, NAD83, meters

0 1 2 3 4 Miles

N

CALICO RESOURCES USA CORP.

GRASSY MOUNTAIN MINE PROJECT

ODFW Greater Sage-Grouse Low Density Area, Avian Survey Plots, and Burrowing Owl Call Stations

Figure 4

Date:	03/30/2018	Drawn By:	SMH
Revised:		Project No.:	3678
Base Map:	USGS 100K quad: Vale		
File Name:	3678H_GrassyMtn_Wildlife_Fig04_AvianSurvey.mxd		

EM STRATEGIES

and 2014 were adequate to characterize avian use in the Permit Area vicinity during all seasons of the year since the composition of the avian population would most likely not have changed substantially between surveys; therefore, small-plot avian surveys were not conducted during the 2017 or 2018 field surveys.

Table 2: Small-Plot Descriptions

Plot	Description
1	Exposed rock surrounded by sagebrush shrub-steppe habitat.
2	Exposed rock surrounded by sagebrush shrub-steppe habitat.
3	A small amount of exposed rock but was primarily sagebrush shrub-steppe habitat.
4	A mix of big sagebrush shrub-steppe, exotic annual grassland, and exposed rock habitats.
5	Within native perennial grassland.
6	Included a pond with riparian vegetation and a small sagebrush shrub-steppe component.
7	Sagebrush shrub-steppe with some exotic annual grassland.
8	A small patch of sagebrush shrub-steppe surrounded by exotic annual grassland.

4.2.4 Raptor, Golden Eagle, and Burrowing Owl Nest Surveys

4.2.4.1 Raptors and Golden Eagles

The objective of the raptor and golden eagle nest survey was to provide information about breeding activities in the Two-Mile Buffer WSA. The nest searches were performed in accordance with the protocols in *Inventory Methods for Raptors: Standards for Components of British Columbia Biodiversity* (Ministry of Sustainable Resource Management 2001). An aerial survey of the 2014 Permit Area and a two-mile buffer was conducted on April 27, 2014, by NWC. An aerial survey of the Two-Mile Buffer WSA was conducted by EMS April 21 and 22 and April 28 and 29, 2017, and February 6, 2018, in conjunction with the greater sage-grouse lek surveys. Flight lines were recorded for the 2017 and 2018 surveys (Appendix A).

All potential nesting areas (e.g., trees, rock formations, and transmission line towers), were examined during the 2014, 2017, and 2018 aerial surveys. All potential and confirmed raptor nests were recorded using a hand-held Global Positioning System (GPS) unit, regardless of activity status. Determination of nest status (active, inactive, unknown) was made using a combination of visual clues such as adult behavior, presence of eggs or young, presence or absence of whitewash (excrement), or observational data from the ground-based surveys. Inactive nests (no sign of present usage) were assessed for the type of bird that may have built the nest.

Subsequent to the aerial surveys, ground-monitoring surveys were conducted June 21 through 23, 2017, to determine the status of golden eagle territorial pairs and the outcome of any breeding attempts within the Two-Mile Buffer WSA. Adults and potential nest sites were observed from an appropriate distance during ground surveys. Methods followed standard protocols used throughout the range of this species (Pagel et al. 2010).

4.2.4.2 Burrowing Owls

Broadcast call surveys were performed to locate burrowing owls and their burrows (Conway and Simon 2003; Conway et al. 2007) on the following dates: May 17 and 18, June 21 and 22, and

July 3 and 4, 2017. A total of 39 survey stations were called along the access road in the Permit Area (Figure 4). The survey stations were located approximately 800 meters apart. Upon arriving at a station, the biologist spent a three-minute waiting period scanning the horizon with and without binoculars. Then the primary song call was played over a three-minute period with a 360-degree rotation. The total time at each survey station was a minimum of six minutes.

Any responding owls were watched to determine possible nest burrow locations. If no burrows were found, or it was too dark to search, the biologist returned the next day to look for burrows near the detection. A comprehensive search for potential nest burrows within 600 meters of the observation point of the owl was conducted. All burrows with an entrance diameter of greater than ten centimeters (cm) were closely examined for signs of use by burrowing owls, including feathers, pellets, whitewash, nest material such as dung, prey and their parts, or loose soil across the breadth of the burrow floor. While conducting other wildlife surveys, all potential burrows that could be used by burrowing owls were examined for signs of burrowing owl activity including molted feathers, prey remains, pellets, scat, and tracks.

4.2.5 Greater Sage-Grouse Surveys

4.2.5.1 Brood-Rearing Surveys

Brood-rearing surveys were conducted twice between June 15 and July 31, 2014, by NWC; and June 22 through 24 and July 2 through 4, 2017, in the Two-Mile Buffer WSA by EMS. The surveys focused on meadow and/or riparian habitat associated with the springs that were identified from USGS maps and the National Hydrography Dataset (NHD) (USGS 2017). The habitat around the springs was searched for sage-grouse and their sign (e.g., scat, tracks, feathers, carcasses). In order to focus the search effectively, surveyors concentrated their effort in areas most likely to be utilized by greater sage-grouse hens and their broods. One feature commonly associated with brood-rearing in greater sage-grouse is the interface between sagebrush and mesic meadows (Connelly et al. 2004, Atamian et al. 2010, Dzialak et al. 2011, USFWS 2013, Westover et al. 2016). Therefore, springs and associated riparian areas in the Permit Area were intensively searched, especially when they occurred within the Low Density habitat mapped by ODFW (Figure 5a).

The surveys were conducted by walking meandering transects following the standard protocols in Hagen (2011). Survey tracks were recorded (Appendix A). All sage-grouse scats were recorded. Scats were also designated as winter scat (i.e., composed of sagebrush) or spring/summer scat (i.e., fibrous plant matter, invertebrates present). Small, slender scats, narrow in circumference, containing fibrous plants and abundant invertebrate remains were classified as juvenile scat. Any clocker scats were also recorded. Clocker scats are relatively large scat that are composed of smaller scats compacted together typical of nesting hens.

4.2.5.2 Winter Use Surveys

Winter use surveys were conducted by NWC on December 20, 2013, and January 14 and 15, 2014. The surveys were conducted on the ground, on foot and snowmobile, and followed standard protocols (Hagen 2011). Meandering transects were conducted within the highest quality habitat as assessed by NWC biologists with extensive experience in eastern Oregon grassland and shrub-steppe community classification (Attachment A). Survey tracks were recorded (Figure 5b) (Appendix A).

The 2018 winter use surveys were conducted by EMS from the air with a bell 206 L4 helicopter. Two biologists conducted the survey. The first flight was conducted January 25 and consisted of 0.25-mile parallel transects throughout the Two-Mile Buffer WSA, for full coverage. Transects were flown approximately 50 to 150 feet above the ground at speeds of approximately 40 miles per hour. Flight tracks were recorded (Appendix A).

The second survey was conducted 12 days later, on February 6, 2018, which further refined the survey area flown on January 25. Areas consisting of shrubs were delineated via desktop analysis and provided as polygon shapes. These areas were flown with 0.25-mile transects or with a centrally located transect across patches of sagebrush within the polygon. Areas that consisted of agricultural lands, grass, or shrub patches without sagebrush were not surveyed as they do not provide winter habitat for sage-grouse. Flight tracks were recorded (Appendix A).

4.2.5.3 Lek Surveys

Lek surveys were conducted in potentially suitable habitat throughout the Two-Mile Buffer WSA. Existing information on known leks was obtained from ODFW GIS layers and from conversations with the ODFW district biologist (Milburn 2014). No leks are known to occur within the Two-Mile Buffer WSA; therefore, the survey was a search for previously unknown leks.

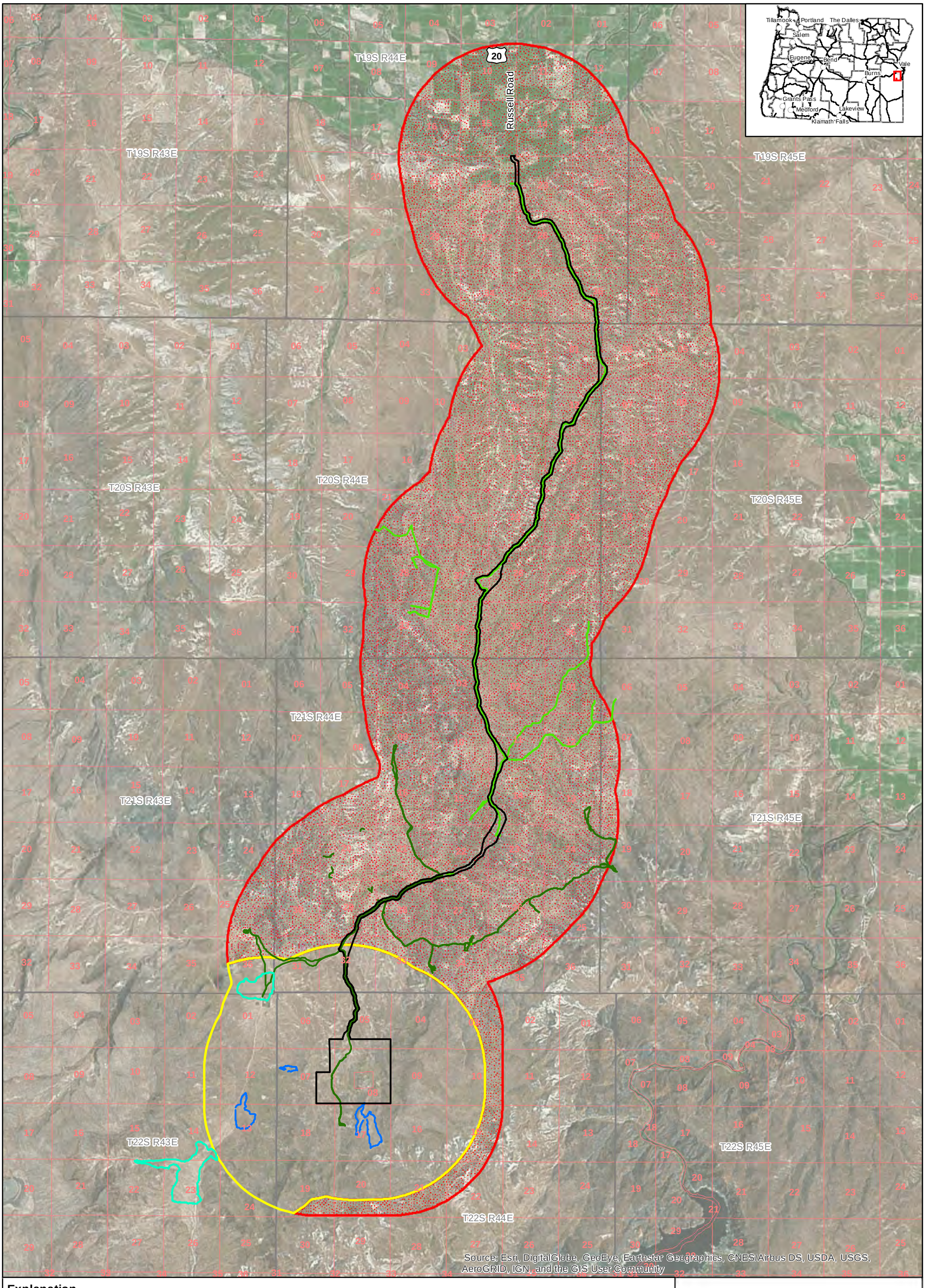
Surveys were conducted by NWC on April 10 and 28, 2014. In 2014, the surveys were performed on the ground. The 2017 surveys were conducted on April 21 and 22 and 28 and 29 by EMS and performed from the air. Within the Low Density Area, transects were flown at 0.25-mile density. Outside of the Low Density Area, transects were flown at 0.25- to 0.5-mile density (Figure 5c) (Appendix A).

4.2.6 Leporid Survey

Surveys for two leporid species of concern - pygmy rabbit (*Brachylagus idahoensis*) and white-tailed jackrabbit (*Lepus townsendii*) - were conducted within the 0.5-Mile Buffer WSA. Meandering transects were walked through potentially suitable habitat. In 2014, leporid surveys were conducted in early winter and again in late spring, times when use of burrows by pygmy rabbits is expected to be highest. The 2017 surveys were performed in May and early July.

The 2017 survey protocol for pygmy rabbit surveys was based on guidelines developed by the multi-state interagency working group titled: Surveying for Pygmy Rabbits (*Brachylagus idahoensis*), Interagency Pygmy Rabbit Working Group, June 2004 version, Boise District, Idaho BLM (Ulmschneider et. al 2004). Potentially suitable habitat that was intensively surveyed included locations with mature big sagebrush, sagebrush draws, patches of sagebrush that were uneven in height and density, and drainages. Spiral and parallel transects were used to survey the potential habitat.

Any observed pygmy rabbits and/or their sign (e.g., burrows, scat, runways) were recorded with a GPS waypoint and photographed. Any burrows were classified as active (clean entrances with signs of use such as the presence of pellets and/or tracks) or inactive (cobwebs, plant debris in entrance, or collapsed). Pellets were classified as pygmy rabbit scat if they were from four to six millimeters (longest axis was measured) and were in piles under sagebrush and/or deposited as carpets of scats. The scats were classified as fresh (dark, glossy, moist), recent (brown or dark gray in color), and old (bleached gray, crumbled easily).



Explanation

- Permit Area
- 2017-2018 EMS Two-mile Buffer WSA
- 2013-2014 NWC Two-mile Buffer WSA

Northwest Wildlife Consultants Surveys

- June 25, 2013
- July 24-25, 2013

EM Strategies Surveys

- June 22-24, 2017
- July 2-4, 2017

Projection: UTM Zone 11 North, NAD83, meters

0 1 2 3 4 Miles

N

CALICO RESOURCES USA CORP.

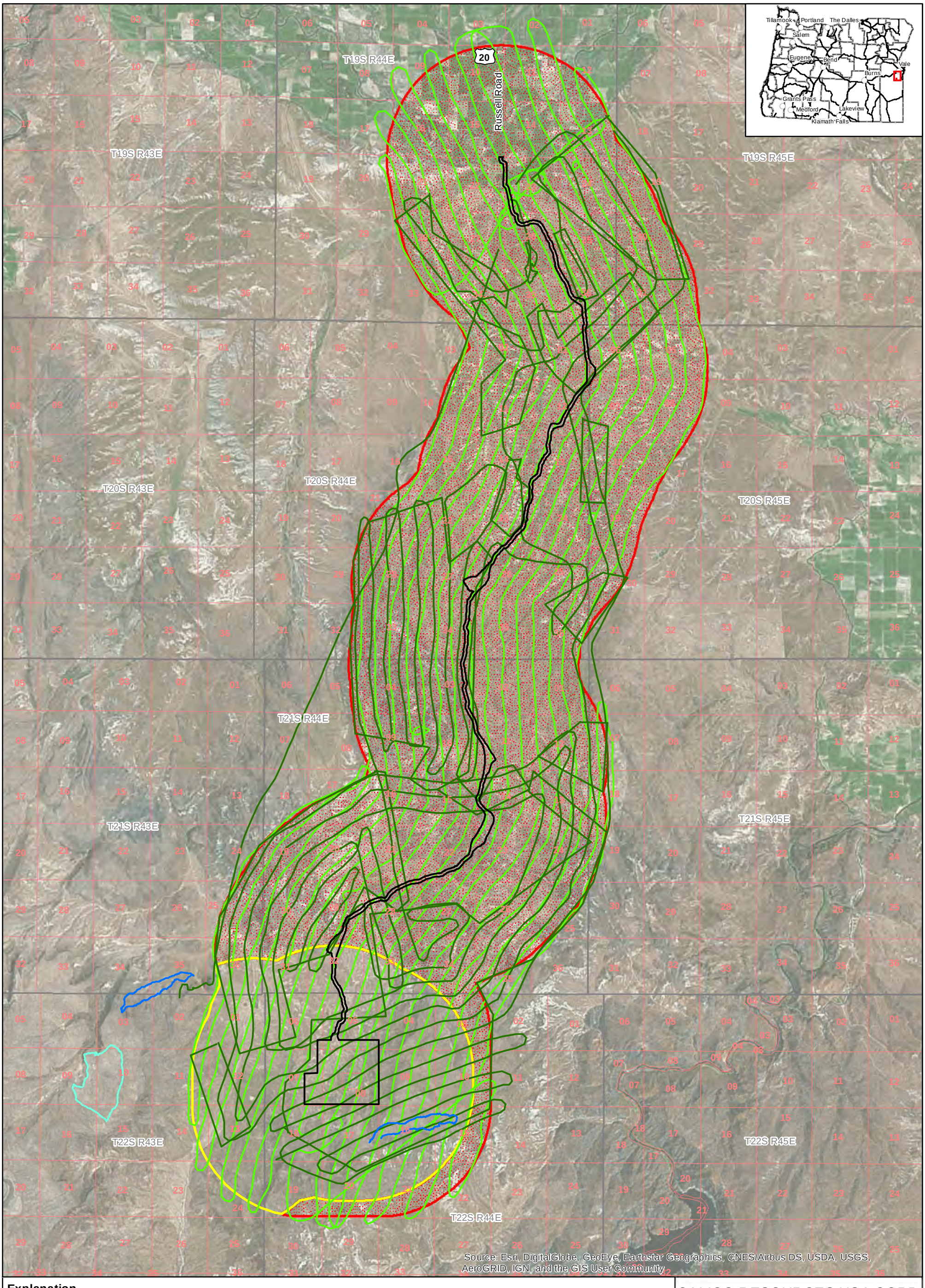
GRASSY MOUNTAIN MINE PROJECT

Greater Sage-Grouse Brood-Rearing Surveys

Figure 5a

Date:	10/13/2020	Drawn By:	TLF
Revised:		Project No.:	3678
Base Map:	USGS 100K quad: Vale, OR		
File Name:	3678T_GrassyMtn_GRSGR_Fig05a_Brood.mxd		

EM STRATEGIES



Explanation

- Permit Area
- 2017-2018 EMS Two-mile Buffer WSA
- 2013-2014 NWC Two-mile Buffer WSA

Northwest Consultant Surveys

- December 20, 2013
- January 14-15, 2014

EM Strategies Surveys

- Janurary 25, 2018
- February 6, 2018

Projection: UTM Zone 11 North, NAD83, meters

0 1 2 3 4 Miles

N

CALICO RESOURCES USA CORP.

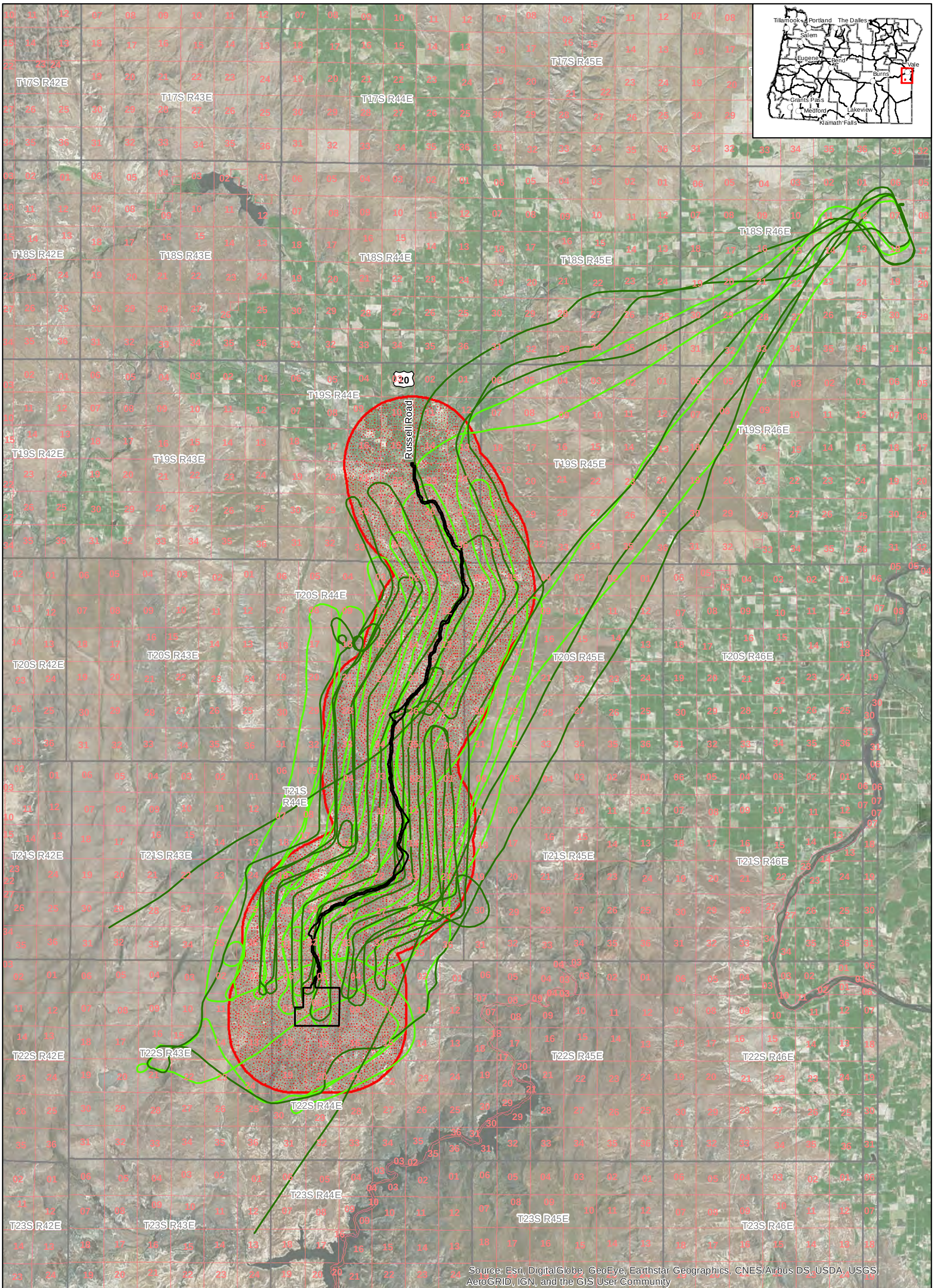
GRASSY MOUNTAIN MINE PROJECT

Greater Sage-Grouse Winter Use Surveys

Figure 5b

Date:	10/13/2020	Drawn By:	TLF
Revised:		Project No.:	3678
Base Map:	USGS 100K quad: Vale, OR		
File Name:	3678T_GrassyMtn_GRSGR_Fig05b_WinterUse.mxd		

EM STRATEGIES



Explanation

- Permit Area
- 2017-2018 EMS Two-mile Buffer WSA

EM Strategies Surveys

- April 21-22, 2017
- April 27-29, 2017

Projection: UTM Zone 11 North, NAD83, meters

0 1 2 3 4 Miles

N

CALICO RESOURCES USA CORP.

GRASSY MOUNTAIN MINE PROJECT

Greater Sage-Grouse
Lek Surveys

Figure 5c

Date:	10/13/2020	Drawn By:	TLF
Revised:		Project No.:	3678
Base Map:	USGS 100K quad: Vale, OR		
File Name:	3678T_GrassyMtn_GRSGR_Fig05c_Lek.mxd		

EM STRATEGIES

All detections of leporids and their sign (pellets and burrows), as well as survey routes, were recorded using a hand-held GPS unit (Appendix A).

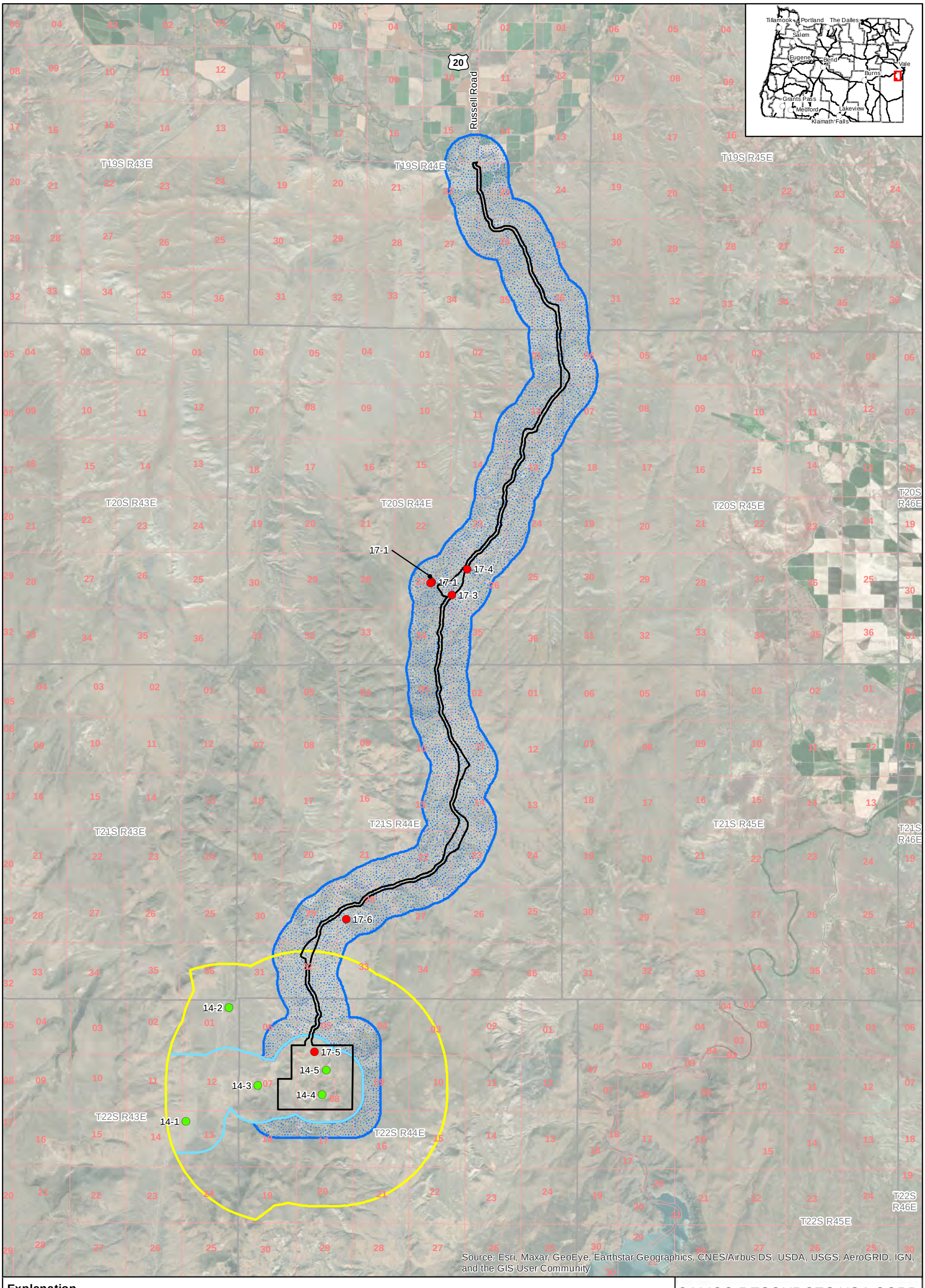
4.2.7 Bat Species Investigation

Acoustic bat surveys were conducted in 2013 and 2014 by NWC and in 2017 by EMS to collect baseline information on bat species use of the 0.5-Mile Buffer WSA. In 2014, five bat detector locations were established in or near the Permit Area at landscape features (rock outcrops, water) most likely to attract bats (Table 3 and Figure 6). Data were collected for a total of 21 nights between June 24 and October 25, 2013; and between April 8 and May 30, 2014. Pettersson D500x ultrasound detectors were used to record the echolocation calls of bats onto compact flash cards (CF cards); each was set to begin recording before dusk and to stop after dawn. Downloaded calls were analyzed using SonoBat® 3.05 acoustic identification software to identify bat species where possible.

Table 3: Bat Detector Location Descriptions

Bat Detector Location	Feature Description
2014	
14-1	In a small patch of sagebrush shrub-steppe surrounded by exotic annual grassland (and coincided with the center of small-avian plot 8).
14-2	By a pond with riparian vegetation and a small sagebrush shrub-steppe component. This plot was within the 2-mile Buffer but more than a mile from the Permit Area (and coincided with the center of small-avian plot 6).
14-3	In annual exotic grassland near the base of a small cliff containing numerous pockets and cracks.
14-4	On the hill where mining is proposed overlooking a slope of scree and jumbled rock. (This location was within small-avian plot 3).
14-5	At the base of a rock outcrop surrounded by sagebrush shrub-steppe. (This location was within small-avian plot 3).
2017	
17-1	DM Spring, oriented across water below cottonwood trees, dense mesic vegetation, primarily surrounded by exotic annual grassland upslope.
17-2	DM Spring oriented upstream near rock outcrops, some willows, intact sagebrush upslope.
17-3	Trough – water in trough, overflows onto ground present as sheet with very shallow pools (<1 cm depth), surrounded by exotic annual grassland, farther away, some sagebrush in narrow ephemeral drainage to north.
17-4	Rock outcrop in downcut ephemeral drainage, complex outcrop on both sides of draw, > 20 feet high from bottom of draw, numerous cracks, fissures, etc. sparse sagebrush upslope .
17-5	Ephemeral drainage – oriented north in shallow drainage surrounded by sagebrush and some grasses.
17-6	In sagebrush, oriented downslope toward Lowe Spring, abundant bare ground due to livestock.

In 2017, acoustic surveys were conducted for bat species at six sites within the 0.5-Mile Buffer WSA associated with the access road (Table 3 and Figure 6). Pettersson ultrasonic detectors (Model D240X) connected to digital recorders were used to record bat calls on May 27 and 28 and June 21, 22, and 23. The detectors were turned on between approximately 6:30 p.m. to 7:45 p.m. and operated throughout the night to sample the temporal activity of bats. Equipment was taken



Explanation

- Permit Area
- 2017-2018 EMS 0.5-mile Buffer WSA
- 2013-2014 NWC Two-mile Buffer WSA
- 2013-2014 NWC 0.5-mile Buffer WSA
- Bat Detector Locations (2017)
- Bat Detector Locations (2013-2014)

Projection: UTM Zone 11 North, NAD83, meters

0 1 2 3 4 Miles

N

CALICO RESOURCES USA CORP.

GRASSY MOUNTAIN MINE PROJECT

Bat Detector Locations

Figure 6

Date: 09/09/2020	Drawn By: JDB/SMH
Revised:	Project No.: 3678
Base Map: USGS 100K quad: Vale	
File Name: 3678H_GrassyMtn_Wildlife_Fig06_BatDetectors.mxd	

EM STRATEGIES

down between 6:00 a.m. and 8:30 a.m. The detectors were placed in locations most likely to have bat activity such as rock outcrops, water, and an ephemeral drainage that might be used as a travel corridor.

Echolocation calls were downloaded and analyzed using SonoBat software (DNDesign, Arcata, California). Recorded calls were compared to reference calls available within the SonoBat software. Characteristics of echolocation calls can be used to distinguish even between closely related species. While intraspecific variation in call characteristics is large relative to interspecific variation, separation of some species can be problematic, especially when only a few call samples are available.

Good call sequences contained greater than one and usually many (greater than ten) calls in which the signal was clearly distinguishable from noise, appeared fully formed (i.e., no missing call components), and might have displayed harmonics that indicated that calls were well recorded. Poor quality recordings had poor signal-to-noise ratios and were of short duration (less than 2.5 milliseconds), reduced bandwidth, or oversimplified shapes. Poor quality recordings are reported in the results as possible identifications and/or are provided as a percent confidence on identification.

4.2.8 General Wildlife Encounters

All terrestrial wildlife species observed during all surveys were recorded. Data recorded for some of these incidental observations included date, time, location, and number of individuals.

5 RESULTS AND DISCUSSION

NWC conducted field surveys between June 24, 2013, and May 30, 2014. EMS conducted field surveys between April 18, 2017, and February 6, 2018. GIS information for all surveys is included in Appendix A and field survey data sheets for all surveys are included in Appendix D.

5.1 Review of Existing Information

The online Information for Planning and Consultation (IPaC) response from the USFWS (Consultation Code: 01EOFW00-2018-SLI-0114) stated that no federally listed or proposed species, or proposed and final designated critical habitat, occur within the Permit Area and/or may be affected by the Project (Appendix B). A list of rare, threatened, and endangered animal records within the Two-Mile Buffer WSA was obtained from ORBIC in April 2017 (Appendix C). The occurrences reported are shown in Figure 7. The species reported are listed in Table 4.

Table 4: ORBIC Occurrences of Wildlife Species within the Two-Mile Buffer WSA

Species	Federal Status	State Status
Desert horned lizard (*Phrynosoma platyrhinos*)	None	None
Golden eagle (*Aquila chrysaetos*)	Regulated under BGEPA	N/A
Great Basin black-collared lizard (*Crotaphytus bicinctores*)	None	None
Ferruginous hawk (*Buteo regalis*)	None	Sensitive
Northern leopard frog (*Lithobates pipiens*)	BLM Sensitive	None
Western burrowing owl (*Athene cunicularia hypugaea*)	None	Sensitive

ORBIC and the USFWS provided information on the location of known golden eagle nests within the Two-Mile Buffer WSA. ORBIC reported two occupied nests were observed in 2012. USFWS reported one additional golden eagle nest (Figure 7). In addition, special status vertebrate wildlife species that might be expected to occur (based on their distribution and habitat requirements) within the Two-Mile Buffer WSA are listed in Table 5 (NWC 2014). Special status species identified during the information review included those that are BLM Sensitive and Strategic species within the Vale District (BLM 2019), those that are ODFW Sensitive Species within the Northern Basin and Range Ecoregion (ODFW 2016), or both.

Table 5: Federal and State Listed, Proposed, and Sensitive Species Potentially Occurring in Vicinity of the Wildlife Study Area

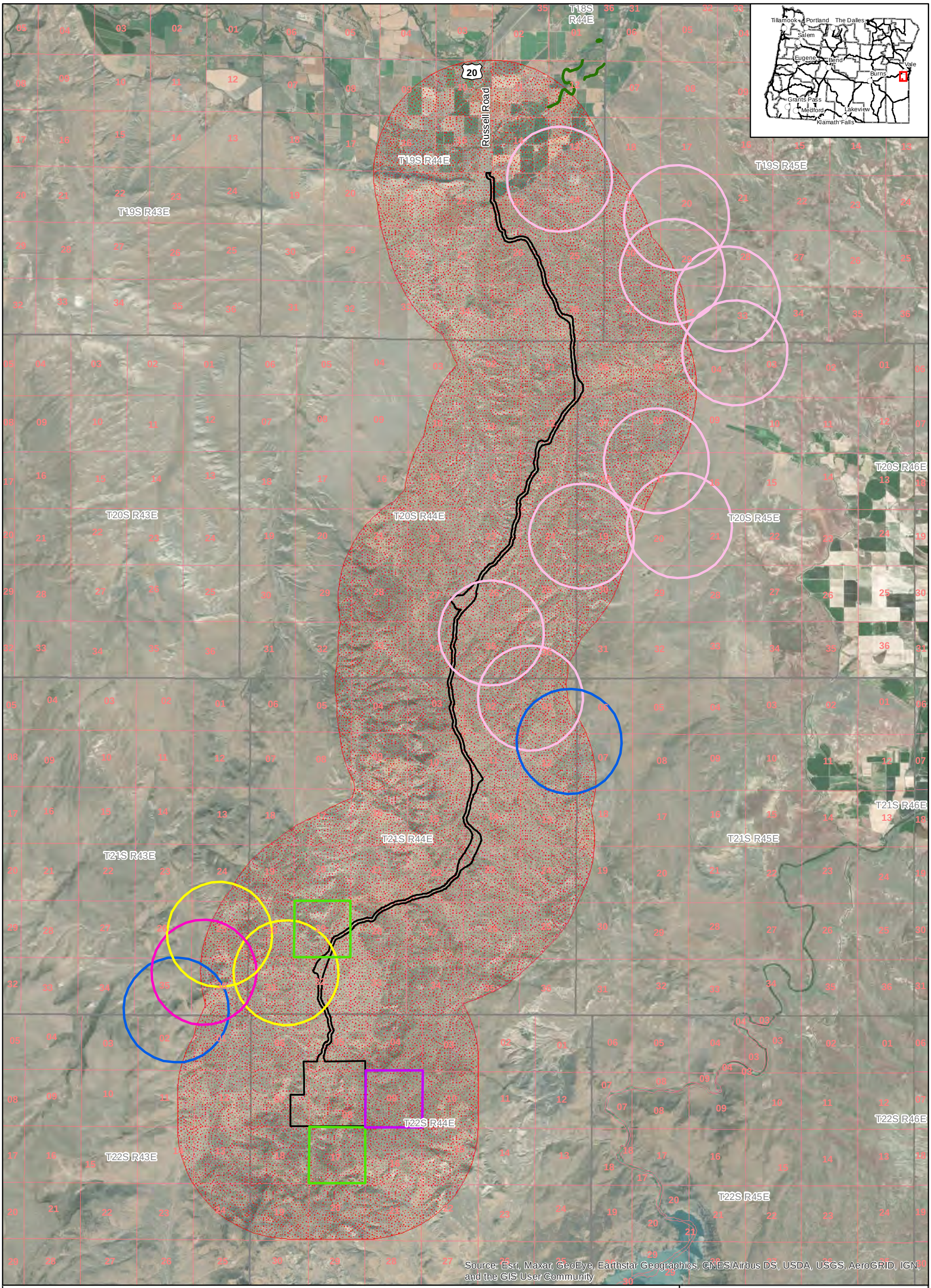
Species	Federal Status	State Status
Greater sage-grouse (*Centrocercus urophasianus*)	BLM Sensitive	Sensitive
Swainson's hawk (*Buteo swainsoni*)	None	Sensitive
White-tailed jack rabbit (*Lepus townsendii*)	None	Sensitive
Pygmy Rabbit (*Brachylagus idahoensis*)	BLM Sensitive	Sensitive
Townsend's big-eared bat (*Corynorhinus townsendii*)	BLM Sensitive	Sensitive
Spotted bat (*Euderma maculatum*)	BLM Sensitive	Sensitive
Fringed myotis (*Myotis thysanodes*)	BLM Sensitive	Sensitive

5.2 Wildlife Habitat Mapping

Three-tenths of a mile of the northernmost portion of the Permit Area, approximately 12 acres, is irrigated agricultural row crops. The area has been extensively grazed for several years. Conditions on the ground are largely a result of seeding with crested wheatgrass (*Agropyron cristatum*) in rangeland improvement projects and in response to wildfire. Approximately 52 percent of the Two-Mile Buffer WSA has been impacted by wildfire during the period of 1980 to 2018 (BLM 2018) (Figure 8).

Vegetation community types identified within the Permit Area during field surveys (EMS 2019) were classified using the United States National Vegetation Classification (USNVC) Standard (USNVC 2019). The five terrestrial ecological groups and their alliances or associations include:

- CGR019 – Vegetable Crop Cultural Group
- G311 – Intermountain Semi-Desert Grassland Group
    - A1262 – Indian ricegrass (*Achnatherum hymenoides*) – Bluebunch Wheatgrass (*Pseudoroegneria spicata*) – Sandhill Muhly (*Muhlenbergia pungens*) Grassland Alliance
- G600 – Great Basin-Intermountain Ruderal Dry Shrubland and Grassland Group
    - A4148 – Crested Wheatgrass Western Ruderal Perennial Grassland Alliance
    - CEGL003019 – Cheatgrass (*Bromus tectorum*) Ruderal Grassland Association
    - CEGL005477 – Wyoming Big Sagebrush (*Artemisia tridentata* subsp. *wyomingensis*) / Cheatgrass Ruderal Shrubland Association
- G310 – Intermountain Semi-Desert Steppe and Shrubland Group



Explanation

- Permit Area
- 2017-2018 EMS Two-mile Buffer WSA

ORBIC Wildlife Data

- Desert Horned Lizard
- Ferruginous Hawk
- Golden Eagle
- Great Basin Black-Collared Lizard
- Northern Leopard Frog
- Western Burrowing Owl

- USFWS Reported Golden Eagle Nests 2017

Projection: UTM Zone 11 North, NAD83, meters

0 1 2 3 4 Miles

N

CALICO RESOURCES USA CORP.

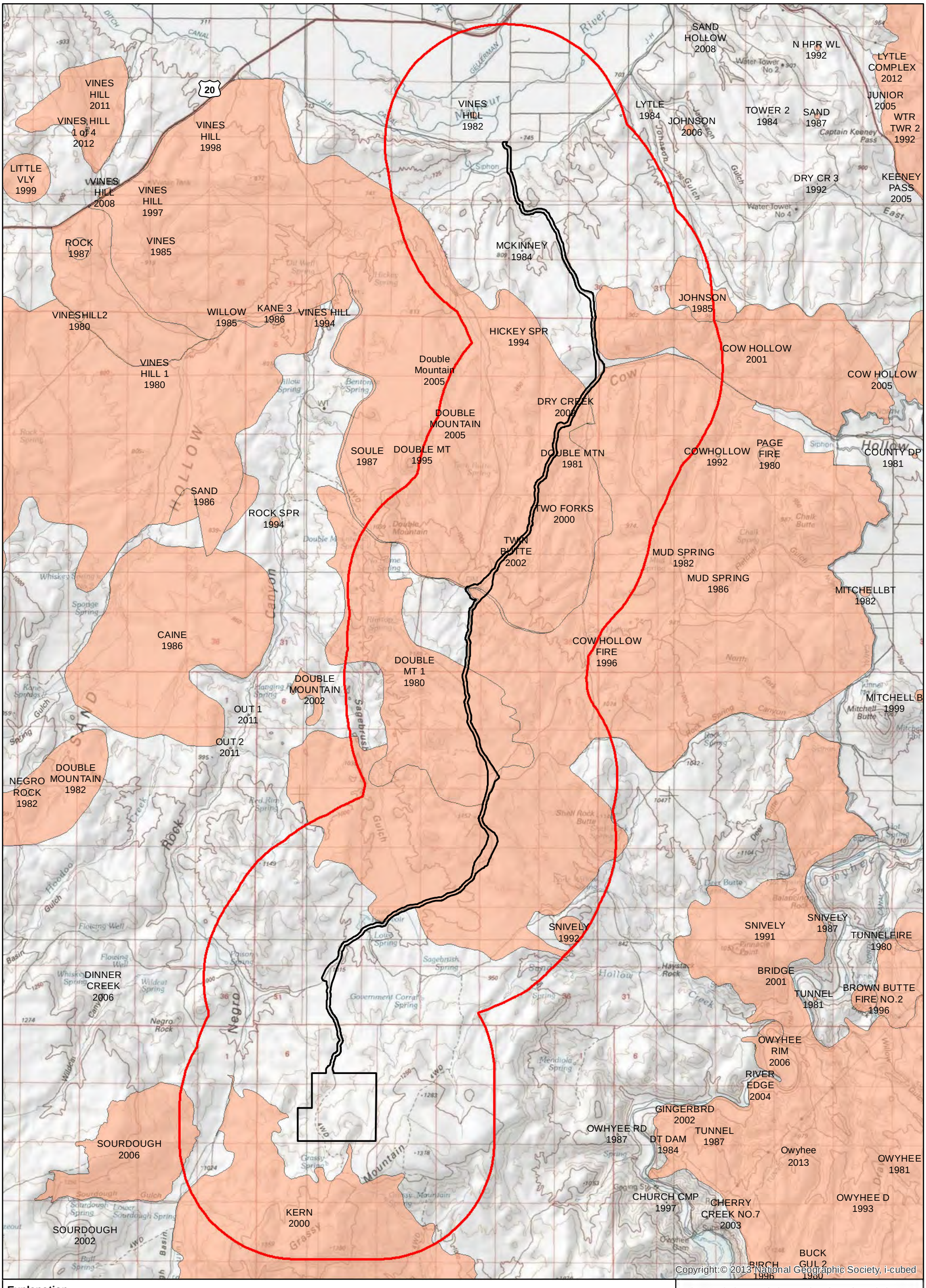
GRASSY MOUNTAIN MINE PROJECT

ORBIC & USFWS Occurrences of Wildlife Species within the Two-mile Buffer WSA

Figure 7

Date:	09/09/2020	Drawn By:	JDB/SMH
Revised:		Project No.:	3678
Base Map:	USGS 100K quad: Vale		
File Name:	3678H_GrassyMtn_Wildlife_Fig07_ORBIC.mxd		

EM STRATEGIES



Explanation

- Permit Area
- 2017-2018 EMS Two-mile Buffer WSA
- Fire History (1980-2013)

Projection: UTM Zone 11 North, NAD83

0 1 2 Miles

N

CALICO RESOURCES USA CORP.

GRASSY MOUNTAIN MINE PROJECT

Wildfire History

Figure 8

Date: 09/09/2020	Drawn By: GSL/SMH
Revised:	Project No.: 3678
Base Map: USGS 100K quad: Vale	
File Name: 3678H_GrassyMtn_Wildlife_Fig08_Fire.mxd	

EM STRATEGIES

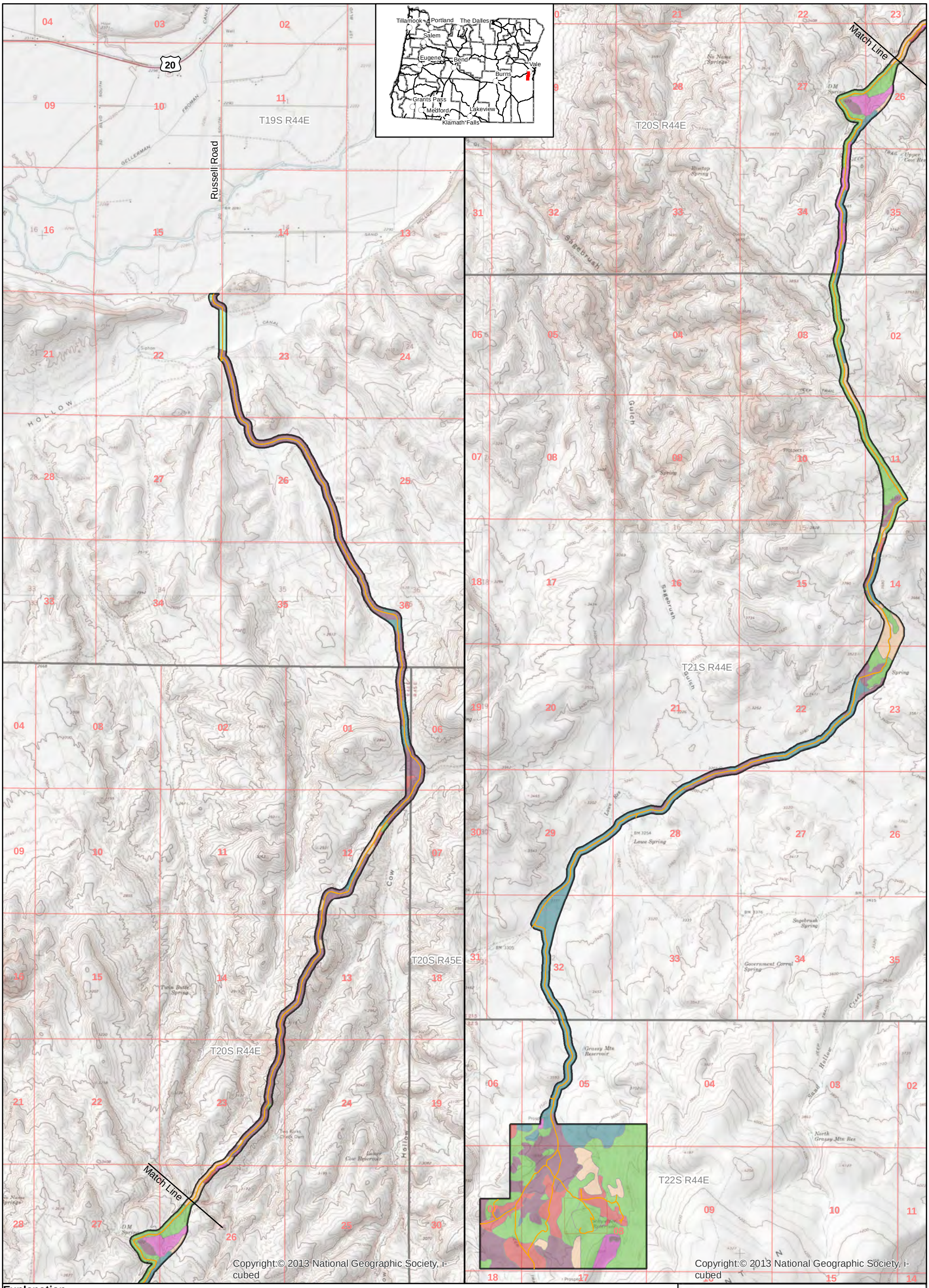
    - CEGL005594 – Yellow Rabbitbrush (*Chrysothamnus viscidiflorus*) / Bluebunch Wheatgrass Shrubland Association
- G302 – Intermountain Mesic Tall Sagebrush Steppe and Shrubland Group
    - CEGL001009 – Wyoming Big Sagebrush / Bluebunch Wheatgrass Shrubland Association

Additionally, the Permit Area contains several roads that are devoid of vegetation. All vegetation and land cover types are summarized in Table 6 and mapped in Figure 9. Detailed discussion of these habitat types and their use by wildlife on a site-specific basis will be included in the Wildlife Mitigation Plan.

Table 6: Land Cover and Habitat Types within the Permit Area

USNVC[1] Group	USNVC Alliance or Association	Habitat Type Description	Acres in Permit Area
Vegetable Crop Cultural	N/A (Agricultural)	Cultivated fields.	12.0
N/A	Roads	Compacted gravel or dirt roads devoid of vegetation and offering no value to wildlife.	57.9
Intermountain Semi-Desert Steppe and Shrubland Group	Yellow Rabbitbrush/ Bluebunch Wheatgrass Shrubland	Sparse to moderate shrub cover with bluebunch wheatgrass and other native bunchgrasses in the understory.	71.7
Intermountain Semi-Desert Grassland	Indian Ricegrass-Bluebunch-Wheatgrass-Sandhill-Muhly Grassland	Co-dominated by bluebunch wheatgrass and cheatgrass, with native perennial forbs and grasses commonly occurring throughout. Potentially a transitioning state as a result of shrub cover lost due to rangeland wildfires.	118.5
Great Basin-Intermountain Ruderal Dry Shrubland and Grassland	Wyoming Big Sagebrush/ Cheatgrass Ruderal Shrubland	A disturbed native plant community with Wyoming big sagebrush and an understory that is dominated by non-native annuals, including medusahead grass (*Taeniatherum caput-medusae*, tansy mustard (*Descurainia pinnata*), and cheatgrass.	138.4
	Crested Wheatgrass Western Ruderal Perennial Grassland	Non-native vegetation type due to restoration seeding following rangeland fires. Dominated by crested wheatgrass with cheatgrass and Sandberg bluegrass (*Poa secunda*) also occurring. Sparse shrub cover occurs sporadically.	283.4
	Cheatgrass Ruderal Grassland	Highly disturbed, weedy, and dominated by non-native species, namely cheatgrass, and including noxious weeds like Scotch thistle (*Onopordum acanthium*) and rush skeleton weed (*Chondrilla juncea*). Some native grasses and forbs are present.	508.3
Intermountain Mesic Tall Sagebrush Steppe and Shrubland	Wyoming Big Sagebrush/ Bluebunch Wheatgrass Shrubland	Dominated by sparse to moderate cover of Wyoming big sagebrush with low to moderate cover of bluebunch wheatgrass. Other native bunchgrass and forb species are present.	571.5
Total Acres			**1761.7**

[1] USNVC 2019



Explanation

- Permit Area
- Developed Road
- A1262 Indian Ricegrass-Bluebunch Wheatgrass-Sandhill Muhly Grassland Alliance
- A4148 Crested Wheatgrass Western Ruderal Perennial Grassland Alliance
- CEGL001009 Wyoming Big Sagebrush/Bluebunch Wheatgrass Shrubland Alliance
- CEGL003019 Cheatgrass Ruderal Grassland Association
- CEGL005477 Wyoming Big Sagebrush/Cheatgrass Ruderal Shrubland Association
- CEGL005594 Yellow Rabbitbrush/Bluebunch Wheatgrass Shrubland Association
- CGR019 Vegetable Crop Cultural Group

Miles
0 1 2

N

Projection: UTM Zone 11 North, NAD83, meters

CALICO RESOURCES USA CORP.

GRASSY MOUNTAIN MINE PROJECT

Wildlife Habitat Types within the Permit Area

Figure 9

Date:	10/01/2020	Drawn By:	JDB/SMH
Revised:		Project No.:	3678
Base Map:	USGS 7.5' quads: Double Mountain, Grassy Mountain, Kane Spring Gulch, Sourdough Spring, Vale West		
File Name:	3678H_GrassyMtn_Wildlife_Fig09_WildlifeHabitat.mxd		

EM STRATEGIES

5.2.1 Developed-Road and Agricultural

Approximately 58 acres of the Permit Area are developed in the form of compacted gravel or dirt roads relatively devoid of vegetation and offering little value to most wildlife. Roads are a potential source of the spread of noxious and invasive exotic grasses and weeds. Approximately 12 acres of cultivated agricultural fields are located at the north end of the Permit Area.

5.2.2 Yellow Rabbitbrush/Bluebunch Wheatgrass Shrubland Association

Approximately 72 acres of the Permit Area are considered Yellow Rabbitbrush/Bluebunch Wheatgrass Shrubland Association. This habitat is dominated by a sparse to moderate cover of yellow rabbitbrush with bluebunch wheatgrass in the understory. Other native bunch grasses are present, including Sandberg bluegrass, squirreltail, needle-and-thread grass, and Indian ricegrass.

5.2.3 Indian Ricegrass-Bluebunch-Wheatgrass-Sandhill-Muhly Grassland Alliance

This vegetation community type occurs throughout the Permit Area, covering a total of 118.5 acres. Bluebunch wheatgrass and cheatgrass co-dominate, with native perennial forbs and other grass species commonly occurring. There are areas within this alliance where disturbance has increased the number of non-native forbs, and where cheatgrass and medusahead grass co-dominate with bluebunch wheatgrass. Loss of shrub cover due to wildfire may have led to this community state.

5.2.4 Wyoming Big Sagebrush/ Cheatgrass Ruderal Shrubland Association

This association covers 138.4 acres in the Permit Area and is a disturbed native plant community type. The understory and openings within this association are dominated by a moderate to heavy cover of cheatgrass and other non-native annuals. There are also scattered to extensive areas of medusahead grass. Low density greater sage-grouse habitat overlaps with some portions of this association.

5.2.5 Crested Wheatgrass Western Ruderal Perennial Grassland Alliance

There are portions of this alliance in both the Mine and Process Area and the Access Road Area, covering a total of 283.4 acres. Crested wheatgrass dominates, likely as a result of restoration seeding following rangeland fires. Cheatgrass and Sandberg bluegrass are common throughout and comprise a high percentage of total cover. Native grasses and forbs occur sparsely, including squirreltail, Indian ricegrass, and bluebunch wheatgrass. There are scattered Wyoming big sagebrush and yellow rabbitbrush within this alliance type.

5.2.6 Cheatgrass Ruderal Grassland Association

This habitat type covers 508.3 acres in the Permit Area and occurs in areas that are heavily grazed. It is dominated by exotic annuals, particularly cheatgrass and medusahead (*Taeniatherum caput-medusae*). Native bunchgrasses are absent or, where present, a minor component. Noxious weeds are present in this association, including Scotch thistle, burningbush, and rush skeleton weed.

5.2.7 Wyoming Big Sagebrush / Bluebunch Wheatgrass Shrubland Alliance

This alliance occurs throughout the Permit Area, covering 571.5 acres. This native vegetation community type is dominated by a sparse to moderate cover of Wyoming big sagebrush, and a low to moderate cover of bluebunch wheatgrass. This plant community may include other native bunch grass and forb species, including Sandberg bluegrass, squirreltail, Indian ricegrass, and needle-and-thread grass. Within this alliance are scattered areas of Basin big sagebrush (*Artemisia tridentata* subsp. *tridentata*) with a high native forb cover.

5.3 Large-Plot Avian Surveys

Seventeen species were detected during large-plot avian surveys conducted by NWC between June 2013 and May 2014 (Table 7). Three of these species, horned lark, western meadowlark, and common raven (*Corvus corax*), were found during all seasons and accounted for 137 of the 171 individuals detected. Observations of large birds outside of the plots are listed in Table 8.

Golden eagles were detected during all seasons. Ferruginous hawks, a BLM Sensitive species, were detected during summer and spring (and found nesting during the 2014 raptor nest survey [Section 5.5]). The burrowing owl, also a BLM Sensitive species, was detected in the summer and fall of 2013, but was not found during any subsequent surveys. Other raptors detected outside of the large-plot surveys were northern harrier, red-tailed hawk (*Buteo jamaicensis*), rough-legged hawk (*Buteo lagopus*), short-eared owl (*Asio flammeus*), long-eared owl (*Asio otus*), and prairie falcon. The prairie falcon was confirmed nesting within the Two-Mile Buffer WSA; northern harrier was believed to be nesting within the Two-Mile Buffer WSA in 2014, and long-eared owl was estimated to have bred successfully in 2013.

Table 7: Avian Species Observed in Large-Plot Avian Surveys

Species	Summer[1]		Fall[2]		Winter[3]		Spring[4]	
	# GRP	# IND	# GRP	# IND	# GRP	# IND	# GRP	# IND
Waterfowl		**0**		**0**		**0**		**13**
Green-winged teal	0	0	0	0	0	0	1	13
Raptors		**0**		**0**		**0**		**2**
Buteos		0		0		0		1
Red-tailed hawk	0	0	0	0	0	0	1	1
Eagles		0		0		0		1
Golden eagle	0	0	0	0	0	0	1	1
Gamebirds		**1**		**0**		**0**		**0**
Chukar	1	1	0	0	0	0	0	0
Shorebirds		**0**		**0**		**0**		**1**
Long-billed curlew	0	0	0	0	0	0	1	1
Passerines		**26**		**116**		**27**		**155**
Songbirds		25		115		21		150
Western king-bird	0	0	0	0	0	0	1	1
Loggerhead shrike	3	3	0	0	0	0	2	2
Horned lark	8	16	14	110	6	19	13	95
Barn swallow	0	0	1	3	0	0	0	0
Rock wren	0	0	1	1	0	0	2	2
Sage thrasher	1	1	0	0	0	0	2	2
Brewer's sparrow	0	0	0	0	0	0	4	6
Vesper sparrow	1	1	0	0	0	0	0	0

Species	Summer[1]		Fall[2]		Winter[3]		Spring[4]	
	# GRP	# IND	# GRP	# IND	# GRP	# IND	# GRP	# IND
Sagebrush sparrow	0	0	0	0	0	0	1	2
White-crowned sparrow	0	0	0	0	0	0	1	3
Western meadowlark	4	4	1	1	2	2	13	37
Corvids	0	1		1		6		5
Common raven	1	1	1	1	4	6	5	5
Totals	**19**	**27**	**18**	**116**	**12**	**27**	**48**	**171**

Survey dates:
[1] Summer: June 24 through August 14, 2013; four visits to five plots = 20 surveys
[2] Fall: September 4 through October 24, 2013; four visits to five plots = 20 surveys
[3] Winter: November 25, 2013 through February 26, 2014; four visits to five plots = 20 surveys
[4] Spring: March 19 through May 29, 2014; four visits to five plots = 20 surveys

Table 8: Avian Species Observed Outside of Large-Plot Avian Surveys

Species	Summer 2013	Fall 2013	Winter 2013-14	Spring 2014	Total
Canada goose	0	0	10	0	10
American wigeon	0	0	0	4	4
Mallard	2	0	0	0	2
Northern shoveler	1	0	0	0	1
Northern harrier	1	0	0	1	2
Red-tailed hawk	1	1	0	1	3
Ferruginous hawk	2	0	0	2	4
Rough-legged hawk	0	1	0	0	1
Golden eagle	2	3	9	3	17
Long-billed curlew	0	0	0	2	2
Long-eared owl	3	0	0	0	3
Short-eared owl	0	1	0	0	1
Burrowing owl	1	2	0	0	3
Prairie falcon	2	0	0	0	2
Totals	**15**	**8**	**19**	**13**	**55**

5.4 Small-Plot Avian Surveys

Forty-seven species were detected during small-plot avian surveys conducted between June 2013 and May 2014 (Table 9). Of these, 25 were found only at plot 6, which was more than a mile from the Permit Area and contained habitats not found in the Permit Area. Together, the pond, marsh, and riparian trees at plot 6 constituted an oasis that attracted not only waterfowl, marsh birds, and riparian obligates (some of which nested there) but also migrants (including passerines) that used this taller, denser vegetation for cover and foraging during stopovers. Twenty-two species were detected at the other seven plots in habitat that is found within the Permit Area (Figure 4).

Horned lark and western meadowlark were each found at six of the seven small plots, the only species found during all four survey seasons, and the most commonly detected species. Rock wren (*Salpinctes obsoletus*) was detected during spring, summer, and fall seasons (at the three plots containing a small amount of exposed rock). Six species were detected multiple times during spring and summer seasons; these were Brewer's sparrow, lark sparrow, loggerhead shrike, Say's phoebe (*Sayornis saya*), sagebrush sparrow, and sage thrasher (Table 9). All these birds are presumed to breed in or near the Permit Area, and active nests of horned lark, lark sparrow, and common nighthawk were found incidentally during other surveys.

Table 9: Avian Species Observed in Small-Plot Avian Surveys

Species	Study Plots								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
Gadwall	0	0	0	0	0	4	0	0	**4**
American wigeon	0	0	0	0	0	2	0	0	**2**
Mallard	0	0	0	0	0	28	0	0	**28**
Northern pintail	0	0	0	0	0	4	0	0	**4**
Blue-winged teal	0	0	0	0	0	3	0	0	**3**
Green-winged teal	0	0	0	0	0	14	0	0	**14**
California quail	0	1	0	0	0	0	0	0	**1**
Northern harrier	0	0	0	0	0	4	0	0	**4**
Ferruginous hawk	0	0	0	0	0	0	1	0	**1**
American coot	0	0	0	0	0	3	0	0	**3**
Killdeer	0	0	0	0	1	6	0	0	**7**
Greater yellowlegs	0	0	0	0	0	1	0	0	**1**
Mourning dove	0	0	0	0	0	10	1	0	**11**
Long-eared owl	0	0	0	0	0	3	0	0	**3**
Common nighthawk	0	0	0	0	0	13	0	0	**13**
Northern flicker	0	0	0	0	0	1	0	0	**1**
Say's phoebe	0	1	0	3	0	1	0	0	**5**
Loggerhead shrike	0	1	0	1	0	0	2	0	**4**
Cassin's vireo	0	0	0	0	0	2	0	0	**2**
Common raven	0	5	0	0	0	0	0	0	**5**
Horned lark	29	11	17	0	79	2	82	100	**320**
Cliff swallow	0	0	0	0	0	20	0	0	**20**
Barn swallow	25	0	0	0	0	41	0	0	**66**
Mountain chickadee	0	0	0	0	0	4	0	0	**4**
Rock Wren	0	5	7	4	0	0	0	0	**16**
Canyon wren	0	0	1	0	0	0	0	0	**1**
Ruby-crowned kinglet	0	0	0	0	0	2	0	0	**2**
Mountain bluebird	12	6	0	0	0	0	0	0	**18**
American robin	0	0	0	0	0	1	0	0	**1**
Sage thrasher	2	5	0	0	0	0	0	0	**7**
European starling	0	0	0	0	0	17	0	0	**17**
Brewer's sparrow	4	3	0	2	0	0	3	1	**13**
Lark sparrow	2	6	3	1	0	1	0	0	**13**
Black-throated sparrow	0	0	1	0	0	0	0	0	**1**
Sagebrush sparrow	3	0	3	0	0	0	0	0	**6**
Song sparrow	0	0	0	0	0	9	0	0	**9**
Swamp sparrow	0	0	0	0	0	2	0	0	**2**
White-crowned sparrow	0	0	0	5	0	0	0	0	**5**
Dark-eyed junco	0	0	0	1	0	0	0	0	**1**
Lazuli bunting	0	0	0	0	0	1	0	0	**1**
Red-winged blackbird	0	0	0	0	0	96	0	0	**96**
Tricolored blackbird	0	0	0	0	0	9	0	0	**9**
Western meadowlark	11	19	15	14	7	2	5	0	**73**
Brewer's blackbird	1	0	0	0	0	2	0	0	**3**
Brown-headed cowbird	0	0	0	0	0	3	0	0	**3**
House finch	0	0	0	0	0	0	6	0	**6**
Lesser goldfinch	0	0	0	0	0	4	0	0	**4**
Total	**89**	**63**	**47**	**31**	**87**	**315**	**100**	**101**	**833**

Mountain bluebirds (*Sialia currucoides*) were detected at two plots, but these detections occurred on a single fall survey day. Twelve other species were detected on a single occasion and at a single plot: ferruginous hawk, California quail (*Callipepla californica*), mourning dove, common raven, barn swallow (*Hirundo rustica*), canyon wren (*Catherpes mexicanus*), black-throated sparrow, white-crowned sparrow (*Zonotrichia leucophrys*), dark-eyed junco (*Junco hyemalis*), Brewer's blackbird (*Euphagus cyanocephalus*), and house finch (*Haemorhous mexicanus*) (Table 9).

5.5 Raptor Nest Surveys

5.5.1 NWC 2013, 2014 Surveys

5.5.1.1 Ground Survey 2013

Three raptor nests were active in 2013 (Figure 10). One of these, a common raven nest, was active again in 2014. A burrowing owl nest was identified by the presence of an adult owl and an abundance at the burrow entrance of pellets and excrement of this species. Only a single individual was ever seen at any one time, however, so whether a breeding attempt occurred remains uncertain (Surveys did not begin in 2013 until after breeding would be expected to be complete). A successful breeding attempt by long-eared owls was documented by the presence at the pond of three young of this species and a stick nest in a tree with pellets and excrement in and beneath it. This nest was likely originally built by black-billed magpies (*Pica hudsonia*).

5.5.1.2 Aerial Survey 2014

One active ferruginous hawk nest was observed within the Two-Mile Buffer WSA during the April 27, 2014, aerial raptor nesting survey performed by NWC (NWC 2014) (Figure 10). This nest was inactive during subsequent surveys in 2017 and 2018 (see Sections 5.5.2 and 5.5.3).

Within ten meters of the active ferruginous hawk nest, there was an inactive alternate nest. There were also two older inactive nests built by ferruginous hawks approximately two and three kilometers to the northeast and east-northeast of the active nest. These nests likely represented a separate ferruginous hawk breeding territory from the past.

Three active common raven nests were also located during the aerial survey (Figure 10). These nests could be used in future years by raptors, especially by great horned owl (*Bubo virginianus*) or prairie falcon, both of which will use stick nests constructed by other species. There were two other inactive stick nests (besides those of ferruginous hawk) identified during the aerial survey.

Active raptor nest density in 2014 was extremely low in the Two-Mile Buffer WSA, despite the great abundance of ground squirrels (Merriam's and Belding's). It is likely that nesting substrate is a more important factor in limiting use of this area by breeding raptors than is prey abundance or availability. The only trees in the survey area were the few small deciduous ones associated with the lone pond, and only the few rock outcrops and rimrock provided substrate for placement of the stick nests used by most raptors.

Figure 10: Raptor Nest Survey Results (Confidential – submitted separately)

5.5.2 EMS 2017 Survey

5.5.2.1 Aerial Survey

Raptor nest surveys were flown within the Two-Mile Buffer WSA on April 21 and 28, 2017, in conjunction with the greater sage-grouse lek surveys. Potential nesting sites for raptors were surveyed from 100 feet to 350 feet from the aircraft. Nest sites transect routes were flown along likely habitat on rock outcropping, cliff faces, trees, and power line structures. The flight tracks are included in Appendix A.

No occupied raptor nests were recorded during the aerial survey. A single red-tailed hawk was observed on two occasions during the surveys south of Grassy Mountain along the rimrock. Although there were many perch sites, no nests were found in the area. It is suspected the hawk may be resident of the Owyhee Canyon cliff faces immediately south of Grassy Mountain, as both times the hawk departed the area in the direction of the canyon to the south. A red-tailed hawk was also observed perched on a power transmission pole southeast of the Permit Area.

5.5.2.2 Ground Survey

Raptors

Seven raptor nests were recorded during the June 21 through 23, 2017, ground surveys (Figure 10). Two stick raptor nests were recorded on a southeast oriented rock outcrop in Sagebrush Gulch: a large raptor nest was approximately 25 feet from the ground on an approximately 35-foot high outcrop; and a small raptor nest is situated east of the larger nest at approximately the same height. No raptors were observed at or near the nests during visits on June 21 and 22. No evidence of occupancy such as recent white wash and/or feathers was observed at the larger nest. However, one old pellet, possibly from a red-tailed hawk, as well as a few old bleached rabbit bones were found below the nest. The small raptor nest had abundant white wash on the rock face below the nest and a few dark downy feathers were visible in sticks above the nest bowl. It is possible a common raven used the nest at one time, however no raven pellets or feathers were found below the nest.

A pair of red-tailed hawks was observed perched and flying near the golden eagle nest OR GE 1327. The birds were observed in courtship behavior during the May 27 survey. Numerous perch sites were found on several rocks and sagebrush on the ridge line approximately 750 feet southeast of the nest location with abundant white wash, molted feathers, and prey remains of rabbits. No further breeding activity at this nest was observed during the June and July surveys.

A female Cooper's hawk (*Accipiter cooperii*) was recorded June 23 in the cottonwood trees that surround the pond below Sagebrush Spring. At least three small stick nests were observed in the trees. The hawk gave an alarm call but remained in the cover of the trees while the biologist surveyed the site for sage-grouse broods from approximately 100 meters away. No Cooper's hawks were observed during site visits on July 4 and 5 and it is unlikely any of the nests were used by Cooper's hawks.

On June 22, an inactive large raptor nest was recorded in a cottonwood tree at No Name Springs. Two adult red-tailed hawks were observed soaring approximately 0.25 mile south of the nest tree. No raptors were observed perched in or near the tree during a one-hour observation period. No

sign (e.g., whitewash, scat, feathers, prey remains, pellets) was found below or near the nest. On June 23, an inactive prairie falcon nest was recorded on a rock outcrop at the south end of Double Mountain. No falcons were observed during a 1.5-hour monitoring session. Molted feathers, old egg shells, and pellets were present beneath the nest ledge. No downy feathers, recent prey remains, or scat, which could suggest use in 2017, were found. Two pairs of rock doves (*Columbia livia*) were nesting in a horizontal ledge in the outcrop. A hive of bees occupied a pothole in the outcrop. Two closed-leghold trap sets were also located along the base of the outcrop.

Burrowing Owls

No burrowing owls or burrowing owl nests were found during the three broadcast surveys conducted in 2017. No evidence of burrowing owl presence within the 0.5-Mile Buffer WSA, such as pellets, feathers, tracks, and scat, were found during surveys conducted for other wildlife species. Potentially suitable breeding habitat is present along the access road in locations dominated by grass and low shrubs. Numerous burrows dug by ground squirrels, badgers, and coyotes, which could provide potential nest sites, are found throughout the 0.5-Mile Buffer WSA.

5.5.3 EMS 2018 Survey

Observations of raptors and raptor nests were recorded January 25 and February 6, 2018, while flying aerial winter sage-grouse surveys in the Two-Mile Buffer WSA. A red-tailed hawk was observed perched at a large raptor nest in a cottonwood tree along the Malheur River. A second red-tailed hawk was observed perched at a large raptor nest in a cottonwood tree next to a farm house.

A pair of ferruginous hawks was recorded at a platform nest in the foothills south of the J H Canal. One bird was perched on the platform and the other bird flushed from the ground near the platform. A ferruginous hawk nest was recorded upslope of Cow Hollow on a low relief rock outcrop approximately ten feet above the ground. A pair of prairie falcons was recorded at the nest identified in 2017 on a rock outcrop at the south end of Double Mountain.

5.5.4 EMS 2020 Survey

Aerial surveys for raptor nests were flown May 7 and June 12, 2020, by Ms. Sue Fox of Wildlife Resource Consultants LLC (WRC). The surveys encompassed a two-mile buffer of the Permit Area. Results are summarized in this section and a full report of findings is included in Appendix F. On the first aerial survey, an intensive nest search was conducted to locate all golden eagle and raptor nests. The aerial surveys focused on potential nesting habitats, including rock outcrops, cliffs, patches of riparian woodlands, cottonwood trees, and manmade structures such as powerline poles. All nests encountered during the intensive nest search were recorded, including common raven nests. In addition, the 2018 nest inventory was used to navigate to previously recorded nests. During the first aerial survey, all nests were closely inspected for evidence of occupation this year, including repair and decoration, or extensive mutes (whitewash or droppings). All raptor nests were visited on the second survey.

Red-tailed hawks, prairie falcons, barn owls (*Tyto alba*), long-eared owls, turkey vultures (*Cathartes aura*), and northern harriers were observed during the aerial surveys. The long-eared owl was observed in two locations and both were flushed from cover. The northern harrier was a

female flushed from the margin of a pond; no male harrier was observed. Additional details regarding nest occupancy can be found in Section 5.6.4.

5.6 Golden Eagle Nest Monitoring

5.6.1 NWC 2013, 2014 Survey

The golden eagle nests located and monitored by NWC in the 2014 aerial survey are outside of the Two-Mile Buffer WSA, and therefore, are not discussed in this report.

5.6.2 EMS 2017 Survey

5.6.2.1 Aerial Survey

An aerial survey was conducted of the Two-Mile Buffer WSA on April 21 and 28, 2017, in conjunction with the greater sage-grouse lek survey. No occupied golden eagle nests were observed.

5.6.2.2 Ground Survey

Golden eagle nest OR GE 1327, which is within the Two-Mile Buffer WSA, was observed for a four-hour period on May 27. A pair of red-tailed hawks was engaged in courtship behavior near the nest, however no golden eagles were observed.

5.6.3 EMS 2018 Survey

Observations of golden eagles were recorded during the aerial survey for winter use by greater sage-grouse in the Two-Mile Buffer WSA. Golden eagle nest OR GE 1327 was observed from the air on both January 24 and February 6; no golden eagles were observed near the nest nor were recent greens present in the nest. Two golden eagle nests were recorded on a pinnacle rock outcrop approximately 0.75-mile upslope of Sagebrush Gulch (Figure 10). An adult golden eagle flushed from the rock outcrop. One nest is approximately 30 feet above the ground while the other nest is approximately 40 feet above the ground on a 60-foot rock outcrop. Both nests are located on ledges. One eagle was observed perched on the outcrop on January 24 while a pair of eagles was observed at the outcrop during the February 6 survey. The eagles were variously seen flying together or perched on the outcrop with nests. In addition, observations of four adults and one immature golden eagle were recorded during both the January 24 and February 6 flights at locations that were not associated with nest sites.

5.6.4 EMS 2020 Survey

Aerial surveys for golden eagles were conducted on May 7 and June 12, 2020 by Ms. Sue Fox of WRC. The full results, along with survey datasheets and figures, are reported in Appendix F and summarized in this section. The primary objective of this survey was to determine nest occupancy status and territory (or breeding area) distribution.

Forty-nine stick nests were observed in or near the two-mile buffer survey area, and 18 of these were classified as occupied (Table 10). In order to be classified as occupied, a nest must contain eggs, young, or an incubating bird; or, the nest has a pair of birds on or near it or has been recently repaired or decorated (Postupalsky 1974, Millsap et al. 2015). One nest was occupied by golden

eagles, five were occupied by ferruginous hawks, five were occupied by red-tailed hawks, one was occupied by prairie falcons, and one was occupied by barn owls. There were also five occupied common raven nests in the survey area.

Table 10: Summary of Nests Observed

Nest Type	Total Nests	Occupied Nests	Occupied By	Confirmed Nesting Attempts
Ferruginous hawk	18	5	Ferruginous hawk	5
Golden eagle	9	1	Golden eagle	0
Large raptor	10	5	Red-tailed hawk	5
Small raptor	7	2	Prairie falcon	1
			Barn owl	1
Common raven	5	5	Common raven	5
Totals	**49**	**18**	**NA**	**17**

Based on aerial survey data, it is estimated that there are five golden eagle nesting territories that contain nests within the survey area. In order to be classified as occupied, a territory had to meet one or more of the following conditions: Contain a nest where a breeding attempt occurred; contain an occupied nest; or have eagle presence observed at or near a nest within the territory (Steenhof and Newton 2007). According to these criteria, two nesting territories were designated as occupied. The remaining three golden eagle nesting territories were unclassified, as surveys were conducted too late in the breeding season to detect territory occupancy by eagles that did not breed or had a failed nesting attempt.

5.7 Greater Sage-Grouse Surveys

Portions of the Permit Area and the Two-Mile Buffer WSA are designated by ODFW as Low Density Area (Figure 4). Greater sage-grouse surveys were conducted in shrub-dominated portions of the Two-Mile Buffer WSA.

5.7.1 NWC 2013-2014 Surveys

5.7.1.1 Brood Rearing Surveys

Greater sage-grouse brood-rearing surveys were conducted on June 25, 2013, and July 25, 2013. No sign of use of the Two-Mile Buffer WSA by greater sage-grouse was detected. No birds were encountered, nor were any feathers, tracks, or scat found. No greater sage-grouse or their sign were encountered during any other field surveys.

5.7.1.2 Winter Use Surveys

Winter use surveys were conducted on December 20, 2013, and January 14 and 15, 2014; the latter were done under ideal conditions, clear days with a covering of snow on the ground. No sign of use of the survey area by greater sage-grouse was detected. No birds were encountered, nor were any feathers, tracks, or scat found.

5.7.1.3 Lek Surveys

No known greater sage-grouse leks are known to exist within the Two-Mile Buffer WSA (Milburn 2014). No sign of this species was found during any surveys prior to the April lekking season; therefore, there were no areas of potential concentration to be checked for leks. Listening for drumming males during the hour before and after sunset (on April 10 and April 28, 2014) yielded no detections of greater sage-grouse or their leks.

5.7.2 EMS 2017-2018 Surveys

5.7.2.1 Brood Rearing Surveys

No sage-grouse hens and chicks or evidence of sage-grouse presence (e.g., scat, tracks, feathers) were found in any of the surveyed spring locations during the June and July 2017 surveys.

5.7.2.2 Winter Use Surveys

No greater sage-grouse were detected during the two aerial winter-use surveys in January and February 2018.

5.7.2.3 Lek Surveys

No leks were found during ten hours of aerial transect surveys in April 2017.

5.8 Leporid Surveys

5.8.1 NWC 2013-2014 Surveys

No potentially suitable pygmy rabbit habitat was identified within the 0.5-Mile Buffer WSA. The most nearly suitable areas were surveyed on November 26, 2013, and May 30, 2014. No pygmy rabbits or their sign (scat or burrows) were detected. No pygmy rabbits or their sign were detected during any of the other surveys conducted within the Two-Mile Buffer WSA.

No potentially suitable white-tailed jackrabbit habitat was identified within the 0.5-Mile Buffer WSA. The most nearly suitable areas were surveyed on November 26, 2013, and May 30, 2014. No white-tailed jackrabbits were encountered, and all jackrabbit pellets found were in habitat more characteristic of the widespread congeneric black-tailed jackrabbit. No white-tailed jackrabbits were detected during any of the surveys conducted within Two-Mile Buffer WSA.

5.8.2 EMS 2017 Survey

No pygmy rabbits or their sign (e.g., burrows, scat, tracks) were found in the 0.5-Mile Buffer WSA along the access road during the May and July 2017 surveys. Potentially suitable habitat is present in the extensive patch of sagebrush that extends from DM Spring south approximately 2.5 miles. Within this area, surveys focused on patches of sagebrush that were uneven in height and density and in drainages. The sagebrush habitat in the other mapped patches lacks the shrub density and canopy cover characteristic of occupied pygmy rabbit habitat as described by Ulmschneider et al. (2004).

Small scats produced by juvenile cottontail rabbits in summer can be similar in size to those of pygmy rabbits. To confirm species attribution of these scats, three samples were collected and submitted for species identification via DNA analysis to the University of Idaho Laboratory for Ecological, Evolutionary and Conservation Genetics. The scats were from mountain cottontails (*Sylvilagus nuttallii*), not pygmy rabbits.

During the 2017 surveys, no white-tailed jackrabbits were observed in any of the survey areas. The large lagomorph scats found were typical of black-tailed jackrabbit not the larger scats produced by white-tailed jackrabbits. This species can also be readily observed during aerial surveys, but none were detected during the low-elevation 2018 winter aerial surveys conducted for sage-grouse. Potential habitat is present in the sagebrush steppe habitat in the southern portion of the 0.5-Mile Buffer WSA along the access road.

5.9 Acoustic Bat Surveys

5.9.1 NWC 2013-2014 Surveys

No caves or mine adits were found during the field surveys, and no areas with potential to concentrate roosting or maternal colonies were identified within the Permit Area. Bat detectors were operational from before sunset to after sunrise at each of the five locations (Figure 6) during a total of 21 nights between June 24 and October 25, 2013, and between April 8 and May 30, 2014. Ten species of bats were detected over the course of the study (Table 11). The number and locations of detections are listed in Table 12.

Table 11: Bat Species Detected by Survey Station June 2013 through May 2014

Common Name	Scientific Name	Protection Status	Detector Location				
			1	2	3	4	5
California myotis	*Myotis californicus*	ODFW Sensitive		X	X		
Small-footed myotis	*Myotis ciliolabrum*	None	X	X	X	X	X
Long-eared myotis	*Myotis evotis*	None					X
Yuma myotis	*Myotis yumanensis*	None	X			X	
Hoary bat	*Lasiurus cinereus*	ODFW Sensitive			X		
Silver-haired bat	*Lasionycteris noctivagans*	ODFW Sensitive	X	X	X		X
Canyon bat	*Parastrellus hesperus*	None	X	X	X	X	X
Big brown bat	*Eptesicus fuscus*	None					X
Spotted bat	*Euderma maculatum*	BLM Sensitive ODFW Sensitive		X			
Pallid bat	*Antrozous pallidus*	BLM Sensitive ODFW Sensitive		X		X	X

Table 12: Bat Species Detected by Month: June 2013 through May 2014

Common Name	Month						
	APR	MAY	JUN	JUL	AUG	SEP	OCT
California myotis		X	X	X	X		
Small-footed myotis	X	X	X	X	X	X	
Long-eared myotis				X			
Yuma myotis			X	X		X	X
Hoary bat						X	

Common Name	Month						
	APR	MAY	JUN	JUL	AUG	SEP	OCT
Silber-haired bat	X	X		X		X	X
Canyon bat	X	X		X	X	X	
Big brown bat					X		
Spotted bat							X
Pallid bat				X	X		

Small-footed myotis appears to be present near the Permit Area from at least April through September. Canyon bat and California myotis are also likely present in the Permit Area through a majority of the survey season, with the latter having a slightly more protracted period of presence. Silver-haired bat appears to move through the area during spring and late summer migration with some regularity. The other species detected are uncommon or rare, with the possible exception of pallid bat, for which there were detections at three locations (Table 11) and on several nights in July and August (Table 12)

5.9.2 EMS 2017 Survey

Three bat species were detected during the acoustic surveys (Table 13). Three of the six survey locations did not have any recordings. All equipment was working.

Table 13: Bat Species Detected on May 27 and 28 and June 21 to 23, 2017

Common Name	Scientific Name	Protection Status	Detector Location					
			17-1	17-2	17-3	17-4	17-5	17-6
California myotis	*Myotis californicus*	ODFW Sensitive	X	X	X			
Small-footed myotis	*Myotis ciliolabrum*	None	X	X	X			
Silver-haired bat	*Lasionycteris noctivagans*	ODFW Sensitive		X	X			

Fewer species were detected in 2017 as compared to 2014 likely due to only five survey nights. In addition, the 0.5-Mile Buffer WSA of the Permit Area along the access road provides little structural diversity that can provide day-roosting habitat for bats. No adits, shafts, or caves were found. Potential day-roosting habitat consists of a few rock outcrops and the deciduous trees at DM Spring. The three sites with recordings had water that probably attracted bats for foraging and drinking.

5.10 General Wildlife Observations

Wildlife species and habitats occurring within and adjacent to the 0.5-Mile Buffer WSA are consistent with desert areas of the Great Basin and consist of desert-rangeland type habitat where sagebrush and grasses are the dominant species. A comprehensive list of all vertebrate wildlife species observed during the NWC and EMS surveys is in Appendix E.

Mule deer (*Odocoileus hemionus*) and pronghorn antelope are present in the 0.5-Mile Buffer WSA year-round, but in low densities. ODFW-designated mule deer winter range is bisected by approximately five miles of the north end of the Permit Area. There is no other big game winter range that intersects the Permit Area (ODFW 2015b). During the NWC surveys in 2014, the largest herds of mule deer and pronghorn antelope were observed at the northern end of the Permit Area along the access road where they presumably feed in the alfalfa fields. During the 2017 EMS

surveys, mule deer and pronghorn antelope were observed primarily in the vicinity of springs. Elk (*Cervus canadensis*) scat was noted in a few locations near springs and one bull elk was observed near an unnamed spring east of Sagebrush Gulch. During the 2018 aerial winter sage-grouse surveys, groups of mule deer were recorded throughout the Two-Mile Buffer WSA while a herd of 30 pronghorn antelope was observed in Cow Hollow. No elk were observed.

Use of the 0.5-Mile Buffer WSA is low by water-dependent species, such as the migratory waterfowl and shorebirds that travel within the Pacific Flyway. Lake Owyhee, located six miles to the southeast of the site, attracts several species of migrating waterfowl, shorebirds, and passerines. Many of these birds cross the 0.5-Mile Buffer WSA in transit. Sagebrush-dependent species, like sage sparrow, occur in the 0.5-Mile Buffer WSA, but in low numbers due to the high degree of disturbance to the existing habitat and the dominance of cheatgrass. Raptor use is common.

During the NWC surveys, the Pacific chorus frog (*Pseudacris regilla*) was detected numerous times at the single pond within the Permit Area and at DM Spring. The sagebrush lizard and western fence lizard were generally associated with small rock outcrops, like those at Small Avian Plots 1-3. The long-nosed leopard lizard, Great Basin collared lizard, western whiptail, desert horned lizard, and pygmy short-horned lizard were encountered primarily in sagebrush shrub-steppe and in sandy soil types.

Ground squirrels, especially Merriam's, were extremely abundant in the 0.5-Mile Buffer WSA. They provide an important source of prey for the raptor species that breed in the area. Both badger and coyote were present; these species prey on the abundant ground squirrels, create their own burrows and expand those of their prey, and provide potential burrows for burrowing owls and other wildlife. A bobcat (*Lynx rufus*) was encountered on one occasion during the NWC survey, and tracks were found during winter surveys. Porcupines (*Erethizon dorsatum*) were observed in several locations within the 0.5-Mile Buffer WSA.

6 BIBLIOGRAPHY

Atamian, M.T., J.S. Sedinger, J.S. Heaton and E.J. Blomberg. 2010. Landscape-Level Assessment of Brood Rearing Habitat for Greater Sage-Grouse in Nevada. Journal of Wildlife Management 74(7): 1533-1543.

Bureau of Land Management (BLM). 2008. *Special Status Species Management. BLM Manual Handbook 6840*.

_____. 2015. Record of Decision and Approved Resource Management Plan Amendments for the Great Basin Region, Including the Greater Sage-Grouse Sub-Regions of Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah. United States Department of the Interior, Bureau of Land Management, Washington, DC. Available online at https://www.blm.gov/or/energy/opportunity/files/gbrod.pdf.

_____. 2018. BLM OR Fire History Polygon. https://www.blm.gov/or/gis/data-details.php?id=463.

_____. 2019. Final OR/WA State Director Special Status Species List, February 25, 2019. Available online at https://www.fs.fed.us/r6/sfpnw/issssp/agency-policy/.

Connelly, J.W., S.T. Knick, M.A. Schroeder and S.J. Stiver. 2004. Conservation Assessment of Greater Sage-Grouse and Sagebrush Habitats. Western Association of Fish and Wildlife Agencies. Unpublished Report. Cheyenne, Wyoming.

Conway, C.J. and J. Simon. 2003. Comparison of detection probability associated with burrowing owl survey methods. Journal of Wildlife Management 67:501-511.

Conway, C.J., V. Garcia, M.D. Smith, and K. Hughes. 2007. Factors affecting detection of burrowing owl nests during standardized surveys. Journal of Wildlife Management 72:688-696.

Dzialak, M.R., C.V. Olsen, S.M. Harju, S.L. Webb, J.P. Mudd, J.B. Winstead and L.D. Hayden-Wing. 2011. Identifying and Prioritizing Greater Sage-Grouse Nesting and Brood-Rearing Habitat for Conservation in Human-Modified Landscapes. PLoS ONE 6(10).

EM Strategies, Inc. 2017. Environmental Baseline Study Work Plans, Grassy Mountain Project. Prepared for Calico Resources USA Corporation (Calico). September 22, 2017.

_____. 2018. Draft Terrestrial Vegetation Baseline Report, Grassy Mountain Mine Project. Prepared for Calico Resources USA Corporation.

Hagen, C.A. 2011. Greater sage-grouse conservation assessment and strategy for Oregon: a plan to maintain and enhance populations of habitat. Oregon Department of Fish and Wildlife, Salem, Oregon.

HDR Engineering, Inc. (HDR). 2014. Draft Vegetation Baseline Report, Grassy Mountain Exploration Project. Prepared for Calico Resources USA Corporation (Calico). May 2014.

_____. 2015. Draft Terrestrial Vegetation Baseline Study Addendum #1. Grassy Mountain Exploration Project. Prepared for Calico Resources USA Corporation (Calico). July 2015.

Holland & Hart. 2010. *Wildlife and Vegetation Protection; Environmental Regulation of the American Law of Mining*.

Milburn, P. 2014. Personal phone communication between P. Milburn, ODFW Malheur District wildlife biologist, and R. Gerhardt, Northwest Wildlife Consultants, Inc., on April 8, 2014.

Millsap, B.A., T.G. Grubb, R.K. Murphy, T. Swem and J.W. Watson. 2015. Conservation significance of alternative nests of golden eagles. Global Ecology and Conservation 3:234-241.

Ministry of Sustainable Resource Management. 2001. Inventory Methods for Raptors: Standards for Components of British Columbia Biodiversity. Province of British Columbia.

Natural Resources Conservation Service (NRCS). 2017. Web Soil Survey. Soil Survey Staff, United States Department of Agriculture. Available online at: http://websoilsurvey.nrcs.usda.gov/.

Northwest Wildlife Consultants, Inc. (NWC). 2014. Wildlife Resources Baseline Study. Grassy Mountain Exploration Project, Calico Resources USA Corporation. Prepared for HDR Engineering, Inc. and Calico Resources USA Corporation.

Oregon Department of Fish and Wildlife (ODFW). 2015a. Oregon Explorer Sage-Grouse Development Siting Tool. Sage-Grouse Mitigation Planning Site. Available online at https://tools.oregonexplorer.info/OE_HtmlViewer/index.html?viewer=sage_grouse_dev_siting.

_____. 2015b. ODFW winter range for Eastern Oregon (deer and elk). Available online at: http://nrimp.dfw.state.or.us/DataClearinghouse/default.aspx?p=202&XMLname=885.xml.

Pagel, J.E., D.M. Whittington, and G.T. Allen. 2010. Interim golden eagle technical guidance: inventory and monitoring protocols; and other recommendations in support of eagle management and permit issuance. Division of Migratory Bird Management, U.S. Fish and Wildlife Service.

Postupalsky, S. 1974. Raptor reproductive success: some problems with methods, criteria and terminology. Raptor Research Report No. 2:21-31.

Ralph, C. J., G. R. Geupel, P. Pyle, T. E. Martin, and D. F. DeSante. 1993. Handbook of field methods for monitoring landbirds. USDA Forest Service, General Technical Report PSW-GTR-144. 41p.

Reynolds, R. T., J. M. Scott, and R. A. Nussbaum. 1980. A variable circular-plot method for estimating bird numbers. Condor 82:309–313.

Steenhof, K. and I. Newton. 2007. Assessing nesting success and productivity. Pg. 181-191 *in* D.M. Bird and K. Bildstein (eds.), Raptor Research and Management Techniques. Hancock House, Blaine, Washington, USA.

Ulmschneider, Helen, Dave Hays, Hadley Roberts, Janet Rachlow, Todd Forbes, John Himes, Eveline Sequin, Marcy Haworth, Todd Katzner, Adam Kozlowski, Ryan Rauscher, and Pat Lauridson. 2004. Surveying for pygmy rabbits (Brachylagus idahoensis). Boise District, Idaho BLM. June 2004.

United States Department of Agriculture (USDA) Farm Service Agency (FSA). 2009. National Agriculture Imagery Program (NAIP), Malheur County, Oregon compressed county mosaic, 1-meter resolution. Created and distributed by the USDA Aerial Photography Field Office. Salt Lake City, Utah.

_____. 2011. National Agriculture Imagery Program (NAIP), Malheur County, Oregon compressed county mosaic, 1-meter resolution. Created and distributed by the USDA Aerial Photography Field Office. Salt Lake City, Utah.

_____. 2012. National Agriculture Imagery Program (NAIP), Malheur County, Oregon compressed county mosaic, 1-meter resolution. Created and distributed by the USDA Aerial Photography Field Office. Salt Lake City, Utah.

United States Fish and Wildlife Service (USFWS). 2013. Greater Sage-grouse (*Centrocercus urophasianus*) Conservation Objectives: Final Report. U.S. Fish and Wildlife Service, Denver, CO. February 2013.

United States Geological Survey, Gap Analysis Program (GAP). May 2011. National Land Cover, Version 2. Available online at: https://gapanalysis.usgs.gov/gaplandcover/data/.

_____. National Hydrography Dataset (NHD). Available online at: http://nhd.usgs.gov/index.html. Accessed on June 22, 2017. Last updated January 23, 2018.

United States National Vegetation Classification (USNVC). 2019. United States National Vegetation Classification Database, V2.03. Federal Geographic Data Committee, Vegetation Subcommittee, Washington DC. [usnvc.org] Accessed September 14, 2020.

Westover, M., J. Baxter, R. Baxter, C. Day, R. Jensen, S. Petersen and R. Larsen. 2016. Assessing Greater Sage-Grouse Selection of Brood-Rearing Habitat Using Remotely-Sensed Imagery: Can Readily Available High-Resolution Imagery Be Used to Identify Brood-Rearing Habitat Across a Broad Landscape? PLoS ONE 11(5).

7 CONTACTS

Richard DeLong
EM Strategies, Inc.
1650 Meadow Wood Lane
Reno, Nevada 89502
(775) 826-8822
rich@emstrats.com

Kris Kuyper
EM Strategies, Inc.
1650 Meadow Wood Lane
Reno, Nevada 89502
(775) 826-8822
kris@emstrats.com

8 LIST OF PREPARERS

EM Strategies, Inc.
Sarah Harrelson – Report Preparation
Kris Kuyper – Report Preparation
Jim Branch – GIS Figure Creation
Catherine Lee – Technical Review
Rich DeLong – Technical Review
Ellen Farley – Editorial Review

APPENDIX A

GEOGRAPHIC INFORMATION SYSTEM DATA FOR ALL WILDLIFE AND HABITAT SURVEYS
(SUBMITTED DIGITALLY)

APPENDIX B

U.S. FISH & WILDLIFE SERVICE IPAC CONSULTATION

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Oregon Fish And Wildlife Office
2600 Southeast 98th Avenue, Suite 100
Portland, OR 97266-1398
Phone: (503) 231-6179 Fax: (503) 231-6195
https://www.fws.gov/oregonfwo/articles.cfm?id=149489416

In Reply Refer To:
Consultation Code: 01EOFW00-2018-SLI-0114
Event Code: 01EOFW00-2018-E-00212
Project Name: Grassy Mountain

December 01, 2017

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the

human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 et seq.), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to investigate opportunities for incorporating conservation of threatened and endangered species into project planning processes as a means of complying with the Act. If you have questions regarding your responsibilities under the Act, please contact the Endangered Species Division at the Service's Oregon Fish and Wildlife Office at (503) 231-6179. For information regarding listed marine and anadromous species under the jurisdiction of NOAA Fisheries Service, please see their website (http://www.nwr.noaa.gov/habitat/habitat_conservation_in_the_nw/habitat_conservation_in_the_r).

Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Oregon Fish And Wildlife Office
2600 Southeast 98th Avenue, Suite 100
Portland, OR 97266-1398
(503) 231-6179

Project Summary

Consultation Code: 01EOFW00-2018-SLI-0114

Event Code: 01EOFW00-2018-E-00212

Project Name: Grassy Mountain

Project Type: MINING

Project Description: Exploration project permit area and access road

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/43.78722054961776N117.31858383599294W

Counties: Malheur, OR

Endangered Species Act Species

There is a total of 0 threatened, endangered, or candidate species on this species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

APPENDIX C

ORBIC REPORT
(CONFIDENTIAL AND SUBMITTED UNDER SEPARATE COVER)

APPENDIX D

FIELD SURVEY DATA SHEETS
(CONFIDENTIAL - SUBMITTED SEPARATELY AS DIGITAL SCANS)

APPENDIX E

COMPREHENSIVE LIST OF WILDLIFE SPECIES OBSERVED

Appendix E. Comprehensive list of all vertebrate wildlife observed during field surveys 2013-2014 and 2017-2018

Common Name	Scientific Name
Birds	
Canada goose	Branta canadensis
Turkey vulture	Cathartes aura
Gadwall	Anas strepera
American wigeon	Anas americana
Mallard	Anas platyrhrnchos
Northern pintail	Anas acuta
Blue-winged teal	Anas discors
Green-winged teal	Anas crecca
Northern shoveler	Anas clypeata
California quail	Callipepla californica
Chukar	Alectoris chukar
Northern harrier	Circus cyaneus
Red-tailed hawk	Buteo jamaicensis
Ferruginous hawk*	Buteo regalis
Rough-legged hawk	Buteo lagopus
Golden Eagle*	Aquila chrysaetos
American coot	Fulica americana
Killdeer	Charadrius vociferous
Greater yellowlegs	Tringa melanoleuca
Long-billed curlew	Numenius americanus
Mourning dove	Zenaida macroura
Long-eared owl	Asio otus
Short-eared owl	Asio flammeus
Burrowing owl*	Athene cunicularia hypugaea
Common nighthawk	Chordeiles minor
Northern flicker	Colaptes auratus
American kestrel	Falco sparverius
Prairie falcon	Falco mexicanus
Say's phoebe	Sayornis saya
Western kingbird	Tyrannus verticalis
Loggerhead shrike*	Lanius ludivicianus
Cassin's vireo	Vireo cassinii
Common raven	Corvus corax
Horned lark	Eremophila alpestris
Cliff swallow	Petrochelidon pyrrhonota
Barn swallow	Hirundo rustica
Mountain chickadee	Poecile gambeli
Rock wren	Salpinctes obsoletus
Canyon wren	Catherpes mexicanus

Ruby-crowned kinglet	Regulus calendula
Mountain bluebird	Sialia currucoides
American robin	Turdus migratorius
Sage thrasher	Oreoscoptes montanus
European starling	Sturnus vulgaris
Brewer's sparrow	Spizella breweri
Vesper sparrow	Pooecetes gramineus
Lark sparrow	Chondestes grammacus
Black-throated sparrow	Amphispiza billneata
Sagebrush sparrow	Artemisiospiza nevadensis
Song sparrow	Melospiza melodia
Swamp sparrow	Melospiza georgiana
White-crowned sparrow	Zonotrichia leucophrys
Dark-eyed junco	Junco hyemalis
Lazuli bunting	Passerina cyanea
Red-winged blackbird	Agelaius phoeniceus
Tricolored blackbird	Agelaius tricolor
Western meadowlark	Sturnella neglecta
Brewer's blackbird	Euphagus cyanocephalus
Brown-headed cowbird	Molothrus ater
House finch	Carpodacus mexicanus
Lesser goldfinch	Carduelis psaltria
American goldfinch	Carduelis tristis
Mammals	
California myotis	Myotis californicus
Small-footed myotis	Myotis ciliolabrum
Long-eared myotis	Myotis evotis
Yuma myotis	Myotis yumanensis
Hoary bat*	Lasiurus cinereus
Silver-haired bat*	Lasionycteris noctivagans
Canyon bat	Parastrellus Hesperus
Big brown bat	Eptesicus fuscus
Spotted bat*	Euderma maculatum
Pallid bat*	Antrozous pallidus
Black-tailed jackrabbit	Lepus americanus
Mountain cottontail	Sylvilagus nuttallii
Belding's ground squirrel	Urocitellus beldingi
Merriam's ground squirrel	Urocitellus canus
Northern pocket gopher	Thomomys talpoides
Ord's kangaroo rat	Dipodomys ordii
Deer mouse	Peromyscus maniculatus
Bushy-tailed woodrat	Neotoma cinerea
Montane vole	Microtus montanus
Common porcupine	Erethizon dorsatum
Coyote	Canis latrans

American badger	Taxidea taxus
Bobcat	Lynx rufus
Elk	Cervus canadensis
Mule deer	Odocoileus hemionus
Pronghorn	Antilocarpa Americana
	Amphibians and Reptiles
Pacific chorus frog	Pseudacris regilla
Great basin collared lizard	Crotaphytus bicinctores
Long- nosed leopard lizard	Gambelia wislizenii
Western fence lizard	Sceloporus occidentails
Sagebrush lizard	Sceloporus graciosus
Desert horned lizard	Phrynosoma platyrhinos
Pygmy short- horned lizard	Phrynosoma douglasi
Western whiptail	Cnemidophorus tigris
Racer	Coluber contrictor
Striped whipsnake	Masticophis taeniatus
Gopher snake	Pituophis catenifer
Western rattlesnake	Crotalus viridis

*denotes species is of state or federal status

APPENDIX F

GRASSY MOUNTAIN PROJECT 2020 GOLDEN EAGLE AND RAPTOR NESTING SURVEY REPORT
(CONFIDENTIAL AND SUBMITTED UNDER SEPARATE COVER)

ATTACHMENT A

WILDLIFE BASELINE STUDY FOR THE GRASSY MOUNTAIN GOLD PROJECT, SEPTEMBER 2014
BY NORTHWEST WILDLIFE CONSULTANTS, INC.

Wildlife Resources Baseline Study for the Grassy Mountain Gold Project

Malheur County, Oregon

Prepared for:

Calico Resources USA Corporation

and

HDR Engineering, Inc.
412 E. Parkcenter Blvd., Suite 100
Boise, Idaho 83706-6659

Prepared by:

Rick Gerhardt and Brett Anderson
Northwest Wildlife Consultants, Inc.
815 NW 4th Street
Pendleton, Oregon 97801

September 30, 2014

CONTENTS

1.0 INTRODUCTION 1

2.0 REGULATORY ENVIRONMENT 1

2.1 Federal Laws 2

2.1.1 Federal Endangered Species Act 3

2.1.2 Bald and Golden Eagle Protection Act 3

2.1.3 Migratory Bird Treaty Act 3

2.1.4 Bureau of Land Management (Manual 6840) – Special Status Species 3

3.0 STUDY AREA 3

4.0 METHODOLOGY 4

4.1 Literature Review 4

4.2 Field Surveys 4

4.2.1 Wildlife Habitat Mapping and Categorization 4

4.2.2 Large-Plot Avian Surveys 5

4.2.3 Small-Plot Avian Surveys 6

4.2.4 Raptor Nest Survey 7

4.2.5 Golden Eagle Nest Monitoring 7

4.2.6 Greater Sage-Grouse Surveys 7

4.2.7 Leporid Surveys 8

4.2.8 Bat Species Investigation 8

4.2.9 General Wildlife Encounters 9

5.0 RESULTS AND DISCUSSION 9

5.1 Review of Existing Information 10

5.2 Wildlife Habitat Mapping and Categorization 10

5.2.1 Developed–Road 10

5.2.2 Grassland–Exotic Annual Grassland 10

5.2.3 Grassland–Native Perennial Grassland 11

5.2.4 Shrub-steppe–Sagebrush Shrub-steppe 11

5.3 Large-Plot Avian Surveys 11

5.4 Small-Plot Avian Surveys 12

5.5 Raptor Nest Survey 12

5.6 Golden Eagle Nest Monitoring 14

5.7 Greater Sage-Grouse Surveys 14

5.8 Leporid Surveys 15

5.9 Bat Species Investigation 15

5.10 General Wildlife Encounters 16

6.0 REFERENCES 18

7.0 TABLES 20
8.0 FIGURES 26
9.0 APPENDICES 33

Tables

Table 1. General land cover and wildlife habitat types within Permit Area of the Grassy Mountain Gold Project, Malheur County, Oregon. 20
Table 2. General land cover and wildlife habitat types within Permit Area of the Grassy Mountain Gold Project, Malheur County, Oregon. 21
Table 3. Avian species observed within 800-meter study plots in the Grassy Mountain Wind avian use study during four seasons, 2013-2014. 22
Table 4. Avian species observed while in-transit during surveys at Grassy Mountain Wind Project, summer 2013 through spring 2014. 23
Table 5. Avian species detected during small-plot surveys at Grassy Mountain Gold Project, June 2013 through May 2014. 24
Table 6. Bat species detected by survey station at Grassy Mountain Gold Project, June 2013 through May 2014. 25
Table 7. Bat species detected by month at Grassy Mountain Gold Project, June 2013 through May 2014. 25

Figures

Figure 1. Wildlife Analysis Area for the Grassy Mountain Gold Project, Malheur County, Oregon. 27
Figure 2. Wildlife Habitat Types at the Grassy Mountain Gold Project, Malheur County, Oregon. 28
Figure 3. Nests of Raptors and Other Large Birds near the Grassy Mountain Gold Project, Malheur County, Oregon. (Confidential—submitted separately) 29
Figure 4. Detections of Leporids during Wildlife Surveys at Grassy Mountain Gold Project, Malheur County, Oregon. 30
Figure 5. Detections of Reptiles and Amphibians during Wildlife Surveys at Grassy Mountain Gold Project, Malheur County, Oregon. 31
Figure 6. Detections of Mammals (excluding leporids and some rodent species) during Wildlife Surveys at Grassy Mountain Gold Project, Malheur County, Oregon. 32

Appendices

Appendix A. Special status vertebrate wildlife species occurrence in the Grassy Mountain area based on comprehensive wildlife surveys, June 2013–May 2014. 33
Appendix B. Comprehensive list of all vertebrate wildlife observed during avian use surveys, raptor nest surveys, greater sage-grouse surveys, leporid surveys, and bat species investigation, including incidental and in-transit sightings, Grassy Mountain Gold Project (listed taxonomically within classes). 35
Appendix C. Global Positioning System data for all wildlife and habitat studies at Grassy Mountain Gold Project, Malheur County, Oregon, June 2013–May 2014 (provided on accompanying CD). 38

Appendix D. Copies of all field data forms associated with wildlife and habitat studies at Grassy Mountain Gold Project, Malheur County, Oregon, June 2013–May 2014 (provided as digital scans on accompanying CD). 38
Appendix E. Copies of all QA forms associated with wildlife and habitat studies at Grassy Mountain Gold Project, Malheur County, Oregon, June 2013–May 2014 (provided as digital scans on accompanying CD)..... 38

ACRONYMS

BGEPA	Bald and Golden Eagle Protection Act
BLM	Bureau of Land Management
Calico	Calico Resources USA Corporation
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
DOGAMI	Oregon Department of Geology and Mineral Industries
ESA	Endangered Species Act
FSA	Farm Service Agency
GIS	Geographic Information System
GPS	Global Positioning System
HDR	HDR Engineering, Inc.
MBTA	Migratory Bird Treaty Act
MOU	Memorandum of Understanding
NEPA	National Environmental Policy Act
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Service
NWC	Northwest Wildlife Consultants, Inc.
OAR	Oregon Administrative Rule
ODFW	Oregon Department of Fish and Wildlife
OEF	Oregon Eagle Foundation
ORS	Oregon Revised Statute
TES	Threatened, Endangered, and Sensitive Species
USC	United States Code
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

1 INTRODUCTION

Calico Resources USA Corporation (Calico) is proposing a gold mining exploration project (Project) near Grassy Mountain, Malheur County, Oregon. The project site is located south of the town of Vale and is within the Northern Basin and Range Ecoregion (ODFW 2008). The Project consists of a mining site of approximately 62 acres, a processing area of approximately 281 acres, and an access road between the two that covers approximately 45 acres (Figure 1).

Northwest Wildlife Consultants, Inc. (NWC) was subcontracted by HDR to conduct a review of existing wildlife information and a variety of field surveys to characterize the use of the Project and surrounding area by terrestrial wildlife in general and by wildlife species of concern in particular. The surveys required and the applicable survey areas were identified through discussions by HDR with representatives of the United States Fish and Wildlife Service (USFWS) and the Oregon Department of Fish and Wildlife (ODFW). These surveys were intended to provide all of the necessary baseline data to fulfill Oregon Administrative Rule (OAR) 632-037-0055 of the Oregon Department of Geology and Mineral Industries (DOGAMI), Oregon Revised Statute (ORS) 517.956, and other relevant OARs and ORSs.

The studies described in this report are:

Habitat typing and categorization
Large-plot avian use surveys
Small-plot avian use surveys
Raptor nest survey
Golden eagle nest monitoring
Greater sage-grouse surveys (brood-rearing surveys, winter use surveys, and lek surveys)
Leporid (pygmy rabbit and white-tailed jackrabbit) surveys
Bat species investigation
General wildlife encounters

2 REGULATORY ENVIRONMENT

The State of Oregon has threatened, endangered, and sensitive (TES) species provisions that protect native vertebrates and plants on state lands ORS sections 496.172 to 496.192; 498.026; 564.100 to 564.135), and requires consideration of the impacts of any action on private land, in this case chemical mining, on TES species (ORS sections 517.956. 496.012, and 506.109).

ORS section 517.956 establishes standards and protection measures that all chemical mining operations will follow that ensure protection measures for fish and wildlife are consistent with ODFW policies, including the following:

(a) Protective measures to maintain an objective of zero wildlife mortality;

(b) On-site and off-site mitigation ensuring that there is no overall net loss of habitat value;

(c) No loss of existing critical habitat of any state or federally-listed threatened or endangered species;

(d) Fish and wildlife mortality shall be reported in accordance with a monitoring and reporting plan approved by ODFW;

(e) ODFW shall establish by rule standards for review of a proposed chemical process mining operation for the purpose of developing conditions for fish and wildlife habitat protection that satisfy the terms of this section for inclusion in a consolidated permit by DOGAMI; and

(f) Surface reclamation of a chemical process mine site shall ensure environmental protection and that a self-sustaining ecosystem, comparable to undamaged ecosystems in the area, has been established in satisfaction of the operator's habitat restoration obligations.

The purpose of OAR Chapter 635 Division 420 is to prescribe the standards for ODFW review of proposed chemical process mining operations for the purpose of developing conditions for protection of wildlife and their habitat, to further the Wildlife Policy (ORS 496.012) and Food Fish Management Policy (ORS 506.109) of the State of Oregon. Baseline data collection should be consistent with what is required in developing a wildlife protection plan in accordance with OAR 635-420-0010, standards to protect wildlife in accordance with OAR 635-420-0015-0025, a habitat mitigation plan in accordance with OAR 635-420-0030, and wildlife mitigation plan in accordance with 635-420-0060. Species to be addressed include all species listed under the Oregon Endangered Species Act (OAR 635-100-0100 to 0130) and Oregon Sensitive Species Rule (OAR 635-100-040).

The wildlife mitigation plan shall include the information required in OAR 635-415-0020(5). Affected wildlife habitats shall be evaluated using methodologies approved by ODFW, which are well-documented, measurable and verifiable. Examples of habitats that shall be addressed in the mitigation plan include, but are not limited to the following:

(a) Surface waterways, streams, springs, seeps, wetlands and other aquatic habitats;

(b) Riparian areas;

(c) Big game habitat;

(d) Bird habitat;

(e) Habitat for state or federally-listed T&E species, and state sensitive species;

(f) Reproduction and nursery areas;

(g) Fish spawning areas;

(h) Geomorphic and edaphic habitats including cliffs, caves, sand dunes, play as and local distinctive soils that, along with their vegetation, contrast markedly with the surrounding area; and

(i) Wildlife migration and movement corridors.

In addition, ODFW manages wildlife species populations through management objectives specified in their respective management plans; BLM manages adequate habitat to support these numbers. BLM and ODFW work cooperatively to benefit the management of wildlife and wildlife habitat as described in the 2001 memorandum of understanding (MOU) between the two agencies. BLM species are discussed further in the federal law section of this work plan.

2.1 Federal Laws

The Council on Environmental Quality (CEQ) regulations discuss "human environment" at 40 Code of Federal Regulations (CFR) 1508.14. This term broadly relates to the biological, physical, social and economic elements of the environment. It includes the wildlife resources category. Relevant data is to be used in describing the affected environment as the basis for determining the effects (direct and indirect) of a proposed action. The 2008 BLM *NEPA*

Handbook (H-1790-1) describes potential National Environmental Policy Act (NEPA)-related federal requirements.

Other federal requirements, such as the Endangered Species Act (ESA) consultations, and critical habitat procedural requirements are discussed in Chapter 175, “Wildlife and Vegetation Protection; Environmental Regulation of the American Law of Mining” (2010 Holland and Hart). These primarily involve USFWS. The following sections provide a list of relevant federal regulations.

2.1.1 Federal Endangered Species Act

Section 7 of the ESA (19 United States Code [USC] § 1536(c)), as amended, states that any action authorized, funded, or carried out by a federal agency does not jeopardize the continued existence of a federally-listed T&E species, or result in the destruction or adverse modification of federally-listed designated critical habitat. The action agencies are required to consult with USFWS and/or the National Oceanic and Atmospheric Administration (NOAA) to determine whether federally-listed T&E species or designated critical habitat are found within the vicinity of the proposed project, and to determine the proposed action’s potential effects on those species or critical habitats.

2.1.2 Bald and Golden Eagle Protection Act

When first enacted in 1940, the Bald and Golden Eagle Protection Act (16 U.S.C.§ 668) (BGEPA) prohibited the take, transport or sale of bald eagles, their eggs, or any part of an eagle except where expressly allowed by the secretary of interior. The Act was amended in 1962 to extend the prohibitions to the golden eagle.

2.1.3 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (16 U.S.C. §§ 703-712) (MBTA) implements various treaties and conventions for the protection of migratory birds. Under this act, taking, killing, or possessing migratory birds (including any part, nest, or egg) is unlawful.

2.1.4 Bureau of Land Management (Manual 6840) – Special Status Species

BLM Manual 6840 defines sensitive species as *"... those species not already included as BLM special status species under (1) federal listed, proposed, or candidate species, or (2) State of Oregon listed species. Native species may be listed as ‘sensitive’ if one of the following applies: (1) could become endangered or extirpated from a state or significant portion of its range; (2) is under review by the USFWS; (3) numbers or habitat capability are declining so rapidly that federal listing may become necessary; (4) has typically small and widely dispersed populations; (5) inhabits ecological refugia, specialized, or unique habitats; or (6) is state-listed; although, is better conserved through application of the BLM sensitive species status."*

3 STUDY AREA

The Grassy Mountain Project area is located in Malheur County, Oregon, about 25 miles south-southwest of Vale. The mine is located on three patented lode mining claims that cover an estimated 62 acres. The three patented lode claims are part of a larger land position defined as three patented lode claims, 419 un-patented lode claims managed by the Bureau of Land Management (BLM), and 1,300 acres of the land, including six associated placer claims all controlled by Calico Resources USA Corp. (Calico).

The project area encompasses portions of Section 32, Township 21 South, Range 44 East; Sections 1 and 12, Township 22 South, Range 43 East; Sections 5, 6, 7, and 8, Township 22 South, Range 43 East.

Three different areas are mentioned in this report. The Permit Area consists of the proposed mining site, processing area, and access road (which together comprise approximately 388 acres) and a larger area around them (a total area of approximately 1,552 acres; Figure 1). Some of the surveys were conducted primarily on the Permit Area and within a 0.5-mile buffer of the Permit Area (Figure 1). Other surveys were conducted throughout an area that extended 2 miles beyond the Permit Area; these included surveys designed to detect nesting raptors and species of concern, including BLM sensitive species (Figure 1).

4 METHODOLOGY

4.1 Literature Review

Prior to initiating field surveys, NWC conducted a review of available existing information. Resources examined included reports of previous studies specific to the Project area (Western Technologies 1988; IMS 1989; Cedar Creek Associates 1991; Newmont 1993) and the Wildlife Resources Baseline Study Work Plan (Wallace and Whittaker 2013). Also consulted were the BLM Southeastern Oregon Resource Management Plan (BLM 2001), which includes a list of BLM special status species, the ODFW list of special status species (ODFW 2008), the ODFW big game winter range delineation (ODFW 2013a),the ODFW core and low density greater sage-grouse layer (ODFW 2013b), ODFW's sage-grouse conservation assessment and strategy (Hagen 2011), and the Oregon Eagle Foundation (OEF) state-wide golden eagle nest database (Isaacs 2012).

NWC also interviewed the ODFW district biologist (Milburn 2014) and the lead researcher for OEF (Isaacs 2013).

4.2 Field Surveys

Field studies were designed with the input of ODFW and USFWS biologists and followed protocols developed and used by NWC (e.g., NWC 2010; Gerhardt and Gritski 2011) and others in studying proposed developments (especially wind energy facilities) in Oregon and elsewhere.

4.2.1 Wildlife Habitat Mapping and Categorization

Biologists used a combination of historical land cover data, color aerial image interpretation, topographic information, soil data, and on-site verification to characterize the range of habitat types present within the wildlife analysis area (Figure 1) from the perspective of wildlife use, both general (for species assemblages, e.g. shrub-steppe obligates) and specific (for individual taxa, i.e., special status species).

Habitat types within the smaller Permit Area were mapped (Figure 2) according to current vegetation rather than according to the potential ecological climax for any given location. Habitat was mapped at the major plant community level utilizing a combination of in-office and on-site delineations. All habitats represented in the Permit Area were field-assessed at some point during the habitat mapping/wildlife survey periods.

Initial habitat boundaries were delineated at a scale of 1:5,000 in a digital geographic information system (GIS) using NAIP 1-meter (m) resolution orthophoto quadrangle county mosaics (USDA-FSA 2009; USDA-FSA 2011; USDA-FSA 2012), digital raster graphics of standard series U.S. Geological Survey (USGS) topographic maps, and the Natural Resources Conservation Service (NRCS) soil survey geographic database (USDA NRCS, 2013). Initial boundaries were delineated based on obvious differences in vegetation, land form, and land use. An NWC biologist then ground-verified and adjusted boundaries, further delineated habitat types, and developed detailed descriptions of each habitat type.

Habitat types were rated for habitat quality (Categories 1–6) based on definitions found in Oregon Administrative Rule (OAR) 635-415-0025. This rule defines six habitat categories and establishes mitigation goals and implementation standards for each.

Category	Habitat Characteristics
1	Irreplaceable, essential and limited
2	Essential and limited
3	Essential, or important and limited
4	Important
5	Having high potential to become either essential or important
6	Low potential to become essential or important

ODFW has identified throughout the range of the greater sage-grouse core areas and low density use areas based on the locations of known leks (ODFW 2013b). Core area is considered by ODFW to be Category 1 habitat, irreplaceable, essential, and limited; none of this habitat exists within the Grassy Mountain wildlife survey area. Low density use areas are considered by ODFW to be Category 2, essential and limited; a large proportion of the Permit Area and of the larger wildlife survey area is so designated (ODFW 2013b; Figure 1). This designation is a coarse filter based on lek locations; final habitat assessment depends on a site specific determination of whether these areas either contain habitat upon which sage-grouse depend or contain signs of use by this species. Where neither applied, habitat categorization was based on vegetation characteristics or the presence of other sensitive species.

Both biologists performing this habitat mapping and characterization (BA and RG) have assessed habitat values and categorized wildlife habitat on more than a dozen projects in grassland and shrub-steppe habitats in eastern Oregon, each of them involving thousands of acres and with the resulting assessments approved by ODFW.

4.2.2 Large-Plot Avian Surveys

An avian ecologist (RG)—with more than ten years of experience at conducting avian surveys in grassland, shrub-steppe, and riparian habitats in eastern Oregon—conducted avian point counts with a variable circular-plot method (Reynolds et al. 1980) to obtain information on species composition and relative abundance of birds on and near the Project during diurnal hours. This survey protocol was primarily designed for studying use by large birds (i.e., waterbirds and raptors), but information for all species observed was recorded during each survey.

Five 800m-radius study plots were established to provide excellent coverage of the Permit Area and the area within 0.5 miles of the Permit Area (Figure 1). Plots were non-overlapping and were located to provide optimal viewing conditions and thorough coverage. The avian ecologist positioned at the center of the plot recorded all vertebrate wildlife seen or heard during 20-minute point counts. Species, number, flight height, weather, etc., were collected. Survey starting point locations and times of the day were alternated among surveys to reduce spatial and temporal bias. All survey plots were surveyed four times within each of the four survey seasons.

Survey dates for each season were:

- Summer: June 24–August 14, 2013; 4 visits to 5 plots, 20 surveys
- Fall: September 4–October 24, 2013; 4 visits to 5 plots, 20 surveys
- Winter: November 25, 2013–February 26, 2014; 4 visits to 5 plots, 20 surveys
- Spring: March 19–May 29, 2014; 4 visits to 5 plots, 20 surveys

In all, 80 20-minute avian use surveys were conducted during the period June 2013–May 2014 for the Grassy Mountain Gold Project in four seasons.

Flight paths of special status species or raptors were hand-plotted on topographic maps in the field. All detected vertebrate wildlife were recorded, whether inside or outside the fixed-point plot.

4.2.3 Small-Plot Avian Surveys

Small-plot avian surveys complement the large-plot avian surveys, in particular by focusing on smaller birds (especially passerines) utilizing the range of habitats in the general vicinity of the Project. These surveys involved the establishment of eight fixed-radius points or plots (Ralph et al. 1993) in summer 2013. The small-plot avian surveys were conducted 16 times throughout the year, with four complete surveys during each season: summer (June–August), fall (September–October), winter (November–February), and spring (March–May). In all, 128 surveys were conducted. The resulting data can aid in describing overall habitat quality and value for native wildlife of the Permit Area and vicinity.

Plots covered each habitat type within the Permit Area, and one plot (Plot 6) was established at the single pond outside the Permit Area but within the wildlife analysis area (Figure 1). Each study plot had a radius of 100 meters. Plots were surveyed by an experienced avian ecologist using a ten-minute observation period, and all surveys were completed between sunrise and five hours after sunrise, consistent with standard protocols used nationwide. Surveys were not conducted when wind and weather conditions were likely to hamper the researcher's ability to detect whatever birds were present.

General data recorded included date, time, and weather variables. Data associated with bird detections included species and number, age and sex, behavior and habitat.

4.2.3.1 Plot Descriptions

Plot 1 consisted of exposed rock surrounded by sagebrush shrub-steppe habitat.

Plot 2 consisted of exposed rock surrounded by sagebrush shrub-steppe habitat. This plot was entirely outside of, but quite near, the Permit Area.

Plot 3 contained a small amount of exposed rock, but was primarily sagebrush shrub-steppe habitat.

Plot 4 was a mix of big sagebrush shrub-steppe, exotic annual grassland, and exposed rock habitats.

Plot 5 was entirely within native perennial grassland.

Plot 6 included a pond with riparian vegetation and a small sagebrush shrub-steppe component. This plot was within the 2-mile buffer but more than a mile from the Permit Area.

Plot 7 was primarily in sagebrush shrub-steppe but with some exotic annual grassland.

Plot 8 was in a small patch of sagebrush shrub-steppe surrounded by exotic annual grassland.

4.2.4 Raptor Nest Survey

The objective of the raptor nest survey was to provide information about raptor breeding in the vicinity of the proposed Project. The primary potential impact to nesting raptors is expected to be disturbance during the breeding season.

An aerial survey of the Permit Area and a 2-mile buffer of the Permit Area was conducted on April 27, 2014; the total survey area was 14,979 acres (6,061 ha; Figure 3). The helicopter pilot had more than ten years' experience at this type of survey, and the raptor biologist (RG) conducting these surveys has been searching for and monitoring raptor nests since 1988.

All potential nesting areas—including trees, rock formations, and transmission line towers—were examined during the aerial survey. (Many were identified and examined prior to the aerial survey as the biologist conducted other surveys throughout the study area.) All potential and confirmed raptor nests were recorded, regardless of activity status. Determination of nest status (active, inactive, unknown) was made using a combination of visual clues such as adult behavior, presence of eggs or young, presence or absence of whitewash (excrement), or observational data from the ground-based surveys. Inactive nests (no sign of present usage) were assessed for the type of bird that may have built the nest.

Species for which this survey is not effective include cavity-nesting raptors (small owl species and American kestrel) and ground-nesting raptors (northern harrier and burrowing and short-eared owls). During the course of conducting the other studies and travelling between surveys during the raptor breeding season, the surveyor had ample opportunity to search for nests of these species within the 0.5-mile buffer of the Permit Area and through much of the 2-mile buffer, and every tree within the 2-mile buffer was checked from the ground for cavity nests.

All nest locations were recorded using a hand-held Global Positioning System (GPS) unit. All data were inspected and then entered into a GIS database.

4.2.5 Golden Eagle Nest Monitoring

For areas within the larger survey area where golden eagles were identified, monitoring was conducted during the 2014 breeding season to determine the status of territorial pairs and the outcome of any breeding attempts. Adults and potential nest sites were observed from an appropriate distance—close enough to view eagles and nests with the aid of binoculars and spotting scope, but far enough so as not to disturb the eagles. Observations were also made during the aerial nest survey (Section 2.4). Methods followed standard protocols used throughout the range of this species (Pagel et al. 2010). This monitoring was done by an eagle specialist (RG) with more than 20 years' experience studying this species, including banding, telemetry, and prey studies in addition to nest surveys and monitoring.

4.2.6 Greater Sage-Grouse Surveys

Greater sage-grouse use surveys were conducted in suitable habitat within the 2-mile buffer area. Brood-rearing surveys were conducted during summer, and winter use surveys were conducted during a period when snow covered the ground. Both types of survey involved walking meandering transects through the highest quality habitat looking for sage-grouse and their sign (pellets and tracks), following standard protocols (Hagen 2011).

ODFW GIS data layers for core and low density sage-grouse areas (ODFW 2013b; shown on Figure 1) served as the foundation for characterizing habitat for this species. Within these areas—and, if appropriate, outside these areas—suitable habitat was defined by the character and quality of sagebrush shrub-steppe and its proximity to meadows, springs, or riparian areas.

Brood-rearing surveys were conducted twice between June 15 and July 31 (and separated by 10 days). Winter use surveys occurred twice between December 1 and January 21 (and separated by 10 days), with the ideal conditions being a clear day with snow on the ground. During all surveys, locations of all detections—of sage-grouse, their tracks, or their droppings—were recorded with a hand-held GPS unit and stored in a GIS environment. Survey routes were also recorded in GPS and stored in GIS. All sage-grouse were counted and classified by age and sex.

Lek surveys involved the counting of displaying male and attending female sage-grouse on previously identified or newly found leks in suitable habitat throughout the 2-mile buffer area. The surveyor also stopped at different points throughout the survey area to listen for the drumming of male sage-grouse. Surveys occurred in April, at the height of the lekking season, and from one hour before to one hour after sunrise. Existing information on known leks was obtained from ODFW GIS layers and from conversation with the ODFW district biologist (Milburn 2014). Evidence of previously unknown leks—concentrations of tracks, droppings, and feathers—was noted during all other ground surveys.

All greater sage-grouse surveys were conducted by a biologist (RG) with more than six years' experience conducting lek monitoring and surveying for this species in central and eastern Oregon.

4.2.7 Leporid Surveys

Surveys for two leporid species of concern, pygmy rabbit and white-tailed jackrabbit, were conducted within the 0.5-mile buffer of the Permit Area. A wildlife biologist (RG) with more than six years' experience surveying for both species in central and eastern Oregon first identified the most suitable habitat for each species, and then walked meandering transects through that habitat searching for individuals or their sign. Sign included pellets and—for pygmy rabbits—burrows. (Individuals and sign of these two species were recorded whenever encountered during any of the other surveys as well.) All detections of leporids and their sign were recorded using a hand-held GPS unit and the resulting data were stored in a GIS environment. Survey routes were also recorded in GPS and stored in GIS.

Classic habitat for pygmy rabbit—dense and tall big sagebrush in deep soils (Ulmschneider 2004)—was not found within the survey area. Likewise, there was a dearth of suitable habitat for white-tailed jackrabbit—high-quality native perennial grassland—while habitat more suitable to the congeneric black-tailed jackrabbit was relatively abundant. The wildlife biologist surveyed the areas within the 0.5-mile buffer that most nearly approximated suitable pygmy rabbit and white-tailed jackrabbit habitat; in addition, one survey was conducted outside the 0.5-mile buffer—but within the 2-mile buffer—in the likeliest pygmy rabbit habitat. Leporid surveys were conducted in early winter and again in late spring, times when use of burrows by pygmy rabbits is expected to be highest.

4.2.8 Bat Species Investigation

NWC conducted a ground level, habitat-based bat species inventory. The primary goal of the study was to investigate bat species diversity within the Project boundary using acoustic

monitoring equipment. The objective was to field-collect baseline information on bat species presence during specific periods in specific areas. Specifically, this inventory was designed to verify the presence on the Project of species of concern, especially Townsend's big-eared bat.

The Permit Area and the area within 0.5 miles of the Permit Area were examined closely for caves or mine adits that might harbor roosting bats. This area contained a very limited amount of cliffs and rock outcrops where caves or adits could exist, and during the full year of surveys, these were searched by the surveyor numerous times. Since none were found, five bat detector locations were established on or near the Permit Area at landscape features (rock outcrops, water) most likely to attract bats (Figure 1).

4.2.8.1 Bat Detector Location Descriptions

Location 1 was in a small patch of sagebrush shrub-steppe surrounded by exotic annual grassland (and coincided with the center of small-avian plot 8).

Location 2 was by a pond with riparian vegetation and a small sagebrush shrub-steppe component. This plot was within the 2-mile buffer but more than a mile from the Permit Area (and coincided with the center of small-avian plot 6).

Location 3 was in annual exotic grassland near the base of a small cliff containing numerous pockets and cracks.

Location 4 was on the hill where mining is proposed overlooking a slope of scree and jumbled rock. (This location was within small-avian plot 3.)

Location 5 was at the base of a rock outcrop surrounded by sagebrush shrub-steppe. (This location was within small-avian plot 3.)

Field investigations were conducted periodically between June and October 2013 and during April and May 2014. Five Pettersson D500x ultrasound detectors were used to record the echolocation calls of bats onto compact flash cards (CF cards); each was set to begin recording before dusk and to stop after dawn. Downloaded calls were analyzed using SonoBat® 3.05 acoustic identification software to identify and delete unusable files (those containing only background/ambient/insect noise) and then identify bat species where possible. Recordings for which species identification was unclear were not used. The biologist (BA) who conducted these analyses had more than five years' experience at designing, implementing, and analyzing the results of such bat inventories.

4.2.9 General Wildlife Encounters

All terrestrial vertebrate species of concern, uncommon species, all big game, and all reptiles encountered during all surveys and whenever the researcher was within the larger survey area, were recorded. Data recorded with these incidental observations included date, time, location, number of individuals, and age and sex (where appropriate and discernible).

5 RESULTS AND DISCUSSION

Wildlife field studies began on June 24, 2013 and concluded on May 30, 2014. Results are presented here and in Tables 1-7 and Figures 1-6. Appendix A summarizes the results with regard to special status wildlife species with the potential to occur on the Permit area and

within 2 miles of the Permit Area, and Appendix B is a comprehensive list of all terrestrial vertebrate wildlife species encountered during the course of these field studies.

5.1 Review of Existing Information

The review of existing information yielded a list of terrestrial vertebrate wildlife species of special status that might be expected to occur (based on their distribution and habitat requirements) within the wildlife analysis area. These species—five mammalian species and six avian species—are included in Appendix A along with notes describing whether or not they were subsequently found during surveys. (A sixth mammalian species—spotted bat—was not expected based on the habitat within the wildlife analysis area, but is included in Appendix A because it was subsequently detected during field studies.) Special status species identified during the information review included those that are BLM special status species within the Vale District (BLM 2001), those that are ODFW special status species within the Northern Basin and Range Ecoregion (ODFW 2008), or both. Also included is golden eagle, which is protected under the Bald and Golden Eagle Protection Act (BGEPA). Greater sage-grouse—a BLM sensitive species and an ODFW sensitive-vulnerable species—is also a candidate for listing under the Endangered Species Act.

No ODFW-designated big game winter range overlaps the wildlife analysis area (ODFW 2013a), though deer winter range lies to the southeast (Figure 1). A large proportion of the Permit Area and of the larger wildlife analysis area is designated greater sage-grouse low density use area (ODFW 2013b; also see Sections 2.1 and 3.2 and Figure 1)

5.2 Wildlife Habitat Mapping and Categorization

Three general land cover types and four specific habitat types were found within the Permit Area (Figure 2); these are described below and summarized in Table 1.

5.2.1 Developed–Road

Approximately 6.5 acres of the Permit Area are developed in the form of roads. These are compacted gravel or dirt roads relatively devoid of vegetation and offering little value to most wildlife. Roads are a potential source of the spread of noxious and invasive exotic grasses and weeds. They also constitute a potential source of fatality for birds, snakes, lizards, and mammals, though there is currently very little traffic on the roads within the Permit Area. This habitat type is all characterized as Category 6 habitat, with low potential to become important or essential (Table 2).

5.2.2 Grassland–Exotic Annual Grassland

The largest habitat type within the Permit Area is exotic annual grassland, which constitutes approximately 1,128.5 acres of this area (Figure 2). This habitat type is dominated by exotic annuals, particularly cheatgrass and medusahead, with native bunchgrasses being absent or a minor component. Heavy livestock grazing and low and very seasonal precipitation result in low value to wildlife, as exotic annual grasslands provide little nutrition or cover. Wildlife use of this habitat is predicated more on soil type and open landscape than on vegetation. The most common breeding bird is horned lark. This habitat is also used by pronghorn, American badger, coyote, Merriam's and Belding's ground squirrels, and burrowing owl. During late winter and spring, an abundance of Merriam's ground squirrels (which is expected to vary among years but which was quite high in spring 2014) likely provides good hunting for mammalian predators and raptors, including ferruginous hawk, golden eagle, northern harrier, and prairie falcon.

Based on the presence of a known greater-sage grouse lek to the west of the area, ODFW has mapped all of this habitat type as Category 2 (ODFW 2013b). Ground verification

yielded the conclusion, however, that this area contains neither habitat upon which sage-grouse depend nor evidence of sage-grouse use. Therefore, based on habitat type, condition, and use by wildlife, all of the exotic annual grassland within the Project area is characterized as Category 4—important—habitat (Table 2).

5.2.3 Grassland–Native Perennial Grassland

Approximately 72.5 acres of the Permit Area are native perennial grassland (Figure 2). This habitat type is dominated by native perennial grasses, including Idaho fescue and Sandberg's bluegrass, which together comprise at least 20% of the ground cover. Shrubs (big sagebrush and green rabbitbrush), if present, are an inconspicuous component. This habitat provides forage and some cover for Merriam's and Belding's ground squirrels, which in turn provide prey for ferruginous hawk, golden eagle, and other raptors, as well as American badger and coyote. Common breeding species include horned lark and western meadowlark. This habitat likely provides important forage for pronghorn, and may support burrowing owl denning and breeding where soils are deep and sandy. Exotic annuals—especially cheatgrass—are found between the bunchgrasses, where they tend to outcompete more nutritional forbs and limit this habitat's value to wildlife. Due to livestock grazing and the low and seasonal nature of the precipitation, wildlife use of this habitat is largely limited to spring season.

Based on the presence of a known greater-sage grouse lek to the west of the area, ODFW has mapped all of this habitat type as Category 2 (ODFW 2013b). Ground verification yielded the conclusion, however, that this area contains neither habitat upon which sage-grouse depend nor evidence of sage-grouse use. Therefore, based on habitat type, condition, and use by wildlife, all of the native perennial grassland within the Project area is characterized as Category 3—essential, or important and limited—habitat (Table 2).

5.2.4 Shrub-steppe–Sagebrush Shrub-steppe

Approximately 345 acres of the Permit Area are sagebrush shrub-steppe (Figure 2). This habitat is dominated by >20% cover of basin big sagebrush and green rabbitbrush. This type offers high-quality breeding habitat for shrub obligate species including loggerhead shrike, sage thrasher, Brewer's sparrow, sagebrush sparrow, and black-throated sparrow. Also breeding in this habitat are western meadowlark, lark sparrow, common nighthawk, and mourning dove. In sandy or rocky soils, sagebrush lizard, desert horned lizard, pygmy short-horned lizard, Great Basin collared lizard, long-nosed leopard lizard, western whiptail, striped whipsnake, western rattlesnake, and other reptiles are found. Exotic grasses—especially cheatgrass—are found beneath and between the shrub layer of this habitat type throughout the Permit Area; these exotics tend to outcompete native grasses and forbs, and limit the value of this habitat to wildlife.

Based on the presence of a known greater-sage grouse lek to the west of the area, ODFW has mapped a portion (248 of the 345 acres) of this habitat type as Category 2 (ODFW 2013b). Ground verification yielded the conclusion, however, that this area contains neither habitat upon which sage-grouse depend nor evidence of sage-grouse use. Therefore, based on habitat type, condition, and use by wildlife, all of the sagebrush shrub-steppe within the Project area is characterized as Category 3—essential, or important and limited—habitat (Table 2).

5.3 Large-Plot Avian Surveys

Seventeen species were detected during large-plot avian surveys conducted between June 2013 and May 2014 (Table 3). Three of these species, horned lark, western meadowlark,

and common raven, were found during all seasons and accounted for 137 of the 171 individuals detected. Golden eagle was detected on one occasion during spring.

Although the large-plot avian surveys were designed to detect large birds—raptors and waterbirds—using the 0.5-mi buffer area, very few detections resulted. Many more detections of such species occurred within the larger (2-mile buffer) survey area while the surveyor was travelling between surveys of all types (Table 4). Golden eagles were detected during all seasons, indicating two golden eagle territories that were occupied year round. Ferruginous hawk—a BLM special status species—was detected during summer and spring (and found nesting during the raptor nest survey, as described below). Burrowing owl—another BLM special status species—was detected in summer and fall of 2013 (but was not found during any surveys during 2014).

Other raptors detected outside of surveys were northern harrier, red-tailed hawk, rough-legged hawk, short-eared owl, long-eared owl, and prairie falcon. Prairie falcon was confirmed nesting within the 2-mile survey area; northern harrier was believed to be nesting within the 2-mile survey area in 2014, and long-eared owl was deemed to have bred successfully in 2013 (Section 3.4; Figure 3).

5.4 Small-Plot Avian Surveys

Forty-seven species were detected during small-plot avian surveys conducted between June 2013 and May 2014 (Table 3). Of these, 25 were found only at plot 6, which was more than a mile from the Permit Area and which contained habitats not found on the Permit Area. Together, the pond, marsh, and riparian trees at plot 6 constituted an oasis that attracted not only waterfowl, marsh birds, and riparian obligates (some of which nested there) but also migrants (including passerines) that used this taller, denser vegetation for cover and foraging during stopovers. Whereas some of these species may fly over or through the Permit Area, of more relevance are those 22 species detected at the seven plots on or adjacent to the Project area.

Horned lark and western meadowlark were each found at six of the seven Permit Area small plots, were the only species found during all four survey seasons, and were by far the most commonly detected species. Rock wren was detected during spring, summer, and fall seasons (at the three plots containing a small amount of exposed rock). Six species were detected multiple times during spring and summer seasons; these were Brewer's sparrow (at five Permit Area small plots), lark sparrow (four plots), loggerhead shrike (three plots), and Say's phoebe, sagebrush sparrow, and sage thrasher (two plots each; Table 4). All of these are presumed to breed on or near the Permit area, and active nests of horned lark, lark sparrow, and common nighthawk were found incidentally during other surveys.

Mountain bluebird was detected at two plots, but these detections occurred on a single fall survey day. Twelve other species were detected on a single occasion and at a single plot: ferruginous hawk, California quail, mourning dove, common raven, barn swallow, canyon wren, black-throated sparrow, white-crowned sparrow, dark-eyed junco, Brewer's blackbird, and house finch (Table 4).

5.5 Raptor Nest Survey

The aerial raptor nest survey covered an area of approximately 14,979 acres (6,061 ha; Figure 3). Raptor survey results displayed on Figure 3 (confidential, submitted under separate cover) include results of searches for suitable raptor nests sites in conjunction with

other surveys (during both 2013 and 2014) in addition to the aerial survey of April 27, 2014.

During the complete aerial survey, three active raptor nests were found within the survey area; they were:

- 1 ferruginous hawk
- 1 golden eagle
- 1 prairie falcon

Within 10 meters of the active ferruginous hawk breeding attempt there was an alternate nest not being used. There were also two older inactive nests built by ferruginous hawks to the northeast and east-northeast of the active nest (Figure 3); at approximately 2 and 3 km from the active nest, these likely represent a separate ferruginous hawk breeding territory in the past.

Within the territory of the active golden eagle breeding attempt (the Negro Rock territory), there were two alternate nests identified, one on the same rock monolith where the breeding attempt occurred (and for which this territory is named), and one approximately 1.4 miles to the west-southwest (Figure 3). There was another inactive golden eagle nest identified just outside the survey area on a rimrock to the southwest; this was within a different territory (the Sourdough Basin territory). During 2013 surveys, a golden eagle nest was identified on a transmission tower in this territory and within the 2-mile survey area; though shown on Figure 3, this nest was no longer present at the time of the aerial survey in 2014. For further information about these golden eagle territories, see Section 3.5 below).

There were five active common raven nests found within the survey area (Figure 3). These could be used in future years by raptors, especially by great horned owl or prairie falcon, both of which will use—but do not themselves construct—stick nests. Another raven nest and an active American kestrel breeding attempt were documented just outside the survey area (on the rimrock between the survey area boundary and the inactive golden eagle nest) and are shown on Figure 3. There were four other inactive stick nests (besides those of ferruginous hawk and golden eagle) identified during the aerial survey.

Also shown on Figure 3 are three nests active in 2013. One of these—a common raven nest—was active again in 2014. A burrowing owl nest was identified by the presence of an adult owl and of an abundance at the burrow entrance of pellets and excrement of this species. Only a single individual was ever seen at any one time, however, so whether a breeding attempt actually occurred here remains uncertain. (Surveys did not begin in 2013 until after breeding would be expected to be complete.) A successful breeding attempt by long-eared owls was documented by the presence at the pond of three young of this species and a stick nest in a tree with pellets and excrement in and beneath it (Figure 3). This nest was likely originally built by black-billed magpies.

Active raptor nest density in 2014 was extremely low in the survey area. This was despite the great abundance of ground squirrels (Merriam's and Belding's; see Section 3.9). It is likely that nesting substrate is a more important factor in limiting use of this area by breeding raptors than is prey abundance or availability. The only trees in the raptor nest survey area were the few small deciduous ones associated with the lone pond, and only the few rock outcrops and rimrock provided substrate for placement of the stick nests used by most raptors.

Two of the three raptors nesting in 2014—and the burrowing owl possibly breeding in 2013—are species of concern. Ferruginous hawk and burrowing owl are BLM special status species (BLM 2001), and golden eagle is protected under the Bald and Golden Eagle Protection Act (BGEPA).

5.6 Golden Eagle Nest Monitoring

There were two golden eagle territories identified (see Section 3.4) for which nest monitoring took place. At one, a breeding attempt occurred in 2014, but it resulted in failure during the nestling stage. At the other territory, only a single adult was found during the 2014 breeding season, and no breeding attempt was documented. Included in this discussion are the territory names and numbers used by the Oregon Eagle Foundation (OEF) in its state-wide tracking database (Isaacs 2012).

A pair of adult golden eagles was discovered at the Negro Rock territory (OEF #C0418) when surveys began in late June 2013. They remained on their territory throughout the year, and were often found perching on Negro Rock or the rock outcrop across the draw from it. On April 11, a prey exchange between the adults led to the discovery of an active breeding attempt in the lower of the two nests on Negro Rock (Figure 3). During the aerial raptor nest survey of April 27, the nest contained a single young between one and two weeks old. By May 29, however, the nest was empty, there was no sign of the young on or below the nest cliff, and this breeding attempt was deemed to have failed. A third nest built by golden eagles, approximately 1.4 miles west-southwest of Negro Rock, is considered by OEF a potentially separate territory (designated #C1328). No eagles were found occupying this site, and the NWC eagle specialist believes this to be an alternate site for the Negro Rock territory and not a separate territory.

A single adult eagle was documented throughout the summer and fall of 2013 and winter 2013-2014 at a territory near the southwest boundary of the survey area (Figure 3). A golden eagle nest was identified on a transmission tower within this territory in 2013, but it was no longer present by spring of 2014. During observations of this territory during the 2014 breeding season, only the single adult (believed to be a female) was ever encountered, and no breeding attempt was documented. The aerial raptor nest survey of April 27 documented an inactive golden eagle nest on the high rimrock outside of the survey area boundary. This territory—previously unknown to OEF—has been designated the Sourdough Basin territory, #C1319.

5.7 Greater Sage-Grouse Surveys

Portions of the Permit Area and a large portion of the 2-mile buffer are designated by ODFW as low density greater sage-grouse habitat; this is based on the presence of a known lek to the west of this area. Based on actual habitat type and condition, however, little or none of this area constitutes high quality sage-grouse habitat. Much of it is annual grassland characterized by exotic grasses and weeds, and the remainder is rather poor-quality big sagebrush shrub-steppe with an understory of exotic grasses (see Section 3.1). Surveys were conducted in the most nearly suitable of this poor habitat.

Greater sage-grouse brood-rearing surveys were conducted on June 25, 2013 and July 25, 2013. Winter use surveys were conducted on December 20, 2013 and January 14–15, 2014; the latter were done under ideal conditions, clear days with a covering of snow on the ground. No sign of use of the survey area by greater sage-grouse was detected. No birds were encountered, nor were any feathers, tracks, or droppings found. No greater sage-grouse or their sign were encountered during any other surveys. Because droppings of this

species can persist for many months and even years, the lack of such sign is indicative of little or no use by this species in recent years.

No known greater sage-grouse leks are known to exist within the 2-mile buffer area of the Project (Milburn 2014). Because no sign of this species was found during any surveys prior to the April lekking season, there were no areas of potential concentration to be checked for leks. Listening for drumming males during the hour before and after sunset (on April 10 and April 28, 2014) yielded no detections of greater sage-grouse or their leks. No leks of this species currently exist within the Grassy Mountain Permit Area or the area within 2 miles of the Permit Area.

5.8 Leporid Surveys

No classic pygmy rabbit habitat was identified within the Permit Area or within the area within 0.5 miles of the Permit Area. Nonetheless, the most nearly suitable areas were surveyed on November 26, 2013 and May 30, 2014. No pygmy rabbits or their sign (droppings or burrows) were detected. No pygmy rabbits or their sign were detected during any of the other surveys conducted within 2 miles of the Permit Area. There were numerous detections of mountain cottontails and their sign, however (Figure 4). This similar species is much more of a generalist in its habitat requirements, and likely to be found in many habitats not supporting pygmy rabbits.

No high-quality white-tailed jackrabbit habitat was identified within the Permit Area or within the area within 0.5 miles of the Permit Area. Nonetheless, the most likely areas were surveyed on November 26, 2013 and May 30, 2014. No white-tailed jackrabbits were encountered, and all jackrabbit pellets found were in habitat more characteristic of the widespread congeneric black-tailed jackrabbit. No white-tailed jackrabbits were detected during any of the surveys conducted within 2 miles of the Permit area. There were numerous detections of black-tailed jackrabbits and their sign, however (Figure 4).

While the habitat at the Grassy Mountain Project and vicinity support populations of the more common mountain cottontail and black-tailed jackrabbit, comprehensive wildlife surveys found no indication within 2 miles of either of the leporid species of concern, pygmy rabbit or white-tailed jackrabbit.

5.9 Bat Species Investigation

Bat detectors were operational from before sunset to after sunrise at each of the five locations (Figure 1) during a total of 21 nights between June 24 and October 25, 2013 and between April 8 and May 30, 2014.

Ten species of bat were detected over the course of the study (Tables 6 and 7). Two species—western small-footed myotis and canyon bat—were detected at all five stations (Table 6; Figure 1). There were no detections of Townsend's big-eared bat, a BLM special status species and an ODFW sensitive-critical status species. Several detected species are designated by ODFW as sensitive vulnerable; these are hoary bat, silver-haired bat, pallid bat, and spotted bat (ODFW 2008). Spotted bat is also a BLM special status species (BLM 2001).

Silver-haired bat was detected at four locations, and pallid bat was detected at three locations. Two species—California myotis and Yuma myotis—were detected at two locations, and long-eared myotis, hoary bat, big brown bat, and spotted bat were each detected at one location. Six species were detected at each of two locations, #2 and #5; locations #3

and #4 each had five species detections, and location #1 had four species detections (Table 6).

Six bat species were detected in July, and five species each were detected in August and September (Table 7). The fewest species (three) were detected in April and October. Small-footed myotis was detected in April through September, with October being the only survey month in which it was not detected (Table 7). Two species were detected in five of the seven survey months; silver-haired bat was detected in all months except June and August, and canyon bat was detected in all months except June and October. Long-legged bat, big brown bat, and spotted bat were each represented by a single detection, and hoary bat was identified from five detections on a single night.

No caves or mine adits were found during these surveys, and no areas with potential to concentrate roosting or maternal colonies were identified within the Permit Area. Although these survey methods should not be used to estimate densities or number of individuals, these results do suggest some general conclusions. Small-footed myotis appears to be present in the vicinity of the proposed Project from at least April through September. Canyon bat and California myotis are also likely present through much of the survey season, with the latter having a slightly more protracted period of presence. Silver-haired bat appears to move through the area during spring and late summer migration with some regularity. The other species detected are uncommon or rare, with the possible exception of pallid bat, for which there were detections at three locations (Table 6) and on several nights in July and August (Table 7).

5.10 General Wildlife Encounters

A comprehensive list of all vertebrate wildlife species encountered during and between surveys is found as Appendix B. Notable avian species encountered outside of surveys are addressed in Section 3.2. This section addresses the amphibian, reptile, and mammal species documented during all surveys.

There was a single amphibian species, seven lizard species, and four snake species encountered during wildlife surveys (Figure 5; Appendix B). Pacific chorus frog was detected numerous times at the single pond within the larger survey area. Sagebrush lizard and western fence lizard were generally associated with small rock outcrops, like those at small avian plots 1-3. Long-nosed leopard lizard, Great Basin collared lizard, western whiptail, desert horned lizard, and pygmy short-horned lizard were encountered primarily in sagebrush shrub-steppe and in sandy soil types (Figure 5). The recorded distribution of these species is largely an artefact of the timing of transect surveys; these lizards are undoubtedly to be found on other parts of the survey area that were not walked during conditions appropriate for lizard activity.

Similarly, the four snake species encountered—western rattlesnake, gopher snake, racer, and striped whipsnake—were fortuitously encountered, either on Project area roads or in front of the walking surveyor. The distribution of detections (Figure 5) should not be understood as an accurate delineation of the full distribution of these species within the larger survey area.

None of the amphibian or reptile species encountered are federal or state special status species in the physiographic ecoregion and BLM district in which the Project lies (BLM 2001; ODFW 2008).

In addition to the leporid species (Section 3.8) and bat species (Section 3.9) already addressed, there were 12 other mammal species encountered during all wildlife surveys (Figure 6; Appendix B). Locations of some common rodents—Merriam's and Belding's ground squirrels, northern pocket gopher, deer mouse, and montane vole—are not displayed on Figure 6, and only actual Ord's kangaroo rats (not their burrows or sign) are displayed. Ground squirrels—especially Merriam's—were extremely abundant in large portions of the Permit Area and surroundings during their spring activity periods. They undoubtedly provide an important source of prey for the raptor species that breed in the area as well as for rough-legged hawks in the late winter months.

Both badger and coyote were present (Figure 6); these species prey on the abundant ground squirrels, create their own burrows and expand those of their prey, and provide potential burrows for burrowing owls and other wildlife. Bobcat was encountered on one occasion, and tracks were found during winter surveys. Other mammals found were bushy-tailed woodrat and common porcupine (Figure 6).

Two species of big game were detected within the larger survey area. Mule deer were found in small numbers, generally at the base of rimrocks at the highest elevations; they were never detected within the Permit Area. Pronghorn were observed on most survey days, including within the western portion of the Permit Area. Although numerous locations are displayed in Figure 6, most are undoubtedly of the same group of individuals. The largest number of pronghorn observed at a single time was 19; generally, the herd encountered contained between two and 11 individuals.

Except for some of the bat species (addressed in Section 3.9), none of the mammals encountered during comprehensive wildlife surveys at Grassy Mountain are federal or state special status species in the physiographic ecoregion and BLM district in which the Project lies (BLM 2001; ODFW 2008).

6 REFERENCES

Bureau of Land Management. 2001. Proposed Southeastern Oregon Resource Management Plan and Final Environmental Impact Statement. BLM, Vale District, Vale, Oregon. http://www.blm.gov/or/districts/vale/plans/files/seormp/SEORMP-FEIS-Vol1Txt.pdf

Cedar Creek Associates, Inc. 1991. Terrestrial wildlife technical memorandum.

Gerhardt, R., and B. Gritski. 2011. Wildlife and habitat investigations for Ella Butte Wind, Morrow County, Oregon. Prepared for 2Morrow Energy, LLC, Ione, Oregon. Prepared by Northwest Wildlife Consultants, Inc., Pendleton, Oregon.

Hagen, C.A. 2011. Greater sage-grouse conservation assessment and strategy for Oregon: a plan to maintain and enhance populations of habitat. Oregon Department of Fish and Wildlife, Salem, Oregon.

IMS, Inc. 1989. Final report: Soil, vegetation, and wildlife resources of Grassy Mountain project area.

Isaacs, F.B. 2012. Golden eagles (Aquila chrysaetos) nesting in Oregon, 2012. 2nd annual report. Oregon Eagle Foundation, Inc., Klamath Falls, Oregon.

Isaacs, F.B. 2013. Personal phone communication between F. Isaacs, Oregon Eagle Foundation, and R. Gerhardt, Northwest Wildlife Consultants, Inc., on August 3, 2013.

Milburn, P. 2014. Personal phone communication between P. Milburn, ODFW Malheur District wildlife biologist, and R. Gerhardt, Northwest Wildlife Consultants, Inc., on April 8, 2014.

Newmont Grassy Mountain Corporation. 1993. Oregon Department of Fish and Wildlife (ODFW). 2008. Oregon Department of Fish and Wildlife Sensitive species: frequently asked questions and sensitive species list, organized by category. Available online at: http://www.dfw.state.or.us/wildlife/diversity/species/docs/SSL_by_category.pdf

Northwest Wildlife Consultants, Inc. (NWC). 2010. Wildlife and habitat studies for Montague Wind Power Facility. Prepared for Iberdrola Renewables, Inc., Portland, Oregon.

Oregon Department of Fish and Wildlife (ODFW). 2008. Oregon Department of Fish and Wildlife Sensitive species: frequently asked questions and sensitive species list, organized by category. Available online at: http://www.dfw.state.or.us/wildlife/diversity/species/docs/SSL_by_category.pdf

Oregon Department of Fish and Wildlife (ODFW). 2013a. ODFW winter range for Eastern Oregon (deer and elk). Available online at: http://nrimp.dfw.state.or.us/DataClearinghouse/default.aspx?p=202&XMLname=885.xml

Oregon Department of Fish and Wildlife (ODFW). 2013b. ODFW's data clearinghouse: ODFW sage-grouse core areas. Publish date August 24, 2011. Available online at: http://nrimp.dfw.state.or.us/DataClearinghouse/default.aspx?p=202&XMLname=944.xml

Pagel, J.E., D.M. Whittington, and G.T. Allen. 2010. Interim golden eagle technical guidance: inventory and monitoring protocols; and other recommendations in support of eagle management and permit issuance. Division of Migratory Bird Management, U.S. Fish and Wildlife Service.

Ralph, C. J., G. R. Geupel, P. Pyle, T. E. Martin, and D. F. DeSante. 1993. Handbook of field methods for monitoring landbirds. USDA Forest Service, General Technical Report PSW-GTR-144. 41p.

Reynolds, R. T., J. M. Scott, and R. A. Nussbaum. 1980. A variable circular-plot method for estimating bird numbers. Condor 82:309–313.

Ulmschneider, H. 2004. Surveying for Pygmy Rabbits (*Brachylagus idahoensis*). Fourth Edition. Bureau of Land Management, Boise, Idaho District.

U.S. Department of Agriculture-Farm Service Agency (USDA-FSA). 2009. National Agriculture Imagery Program (NAIP), Malheur County, Oregon compressed county mosaic, 1-meter resolution. Created and distributed by the USDA Aerial Photography Field Office. Salt Lake City, Utah.

U.S. Department of Agriculture-Farm Service Agency (USDA-FSA). 2010. National Agriculture Imagery Program (NAIP), Malheur County, Oregon compressed county mosaic, 1-meter resolution. Created and distributed by the USDA Aerial Photography Field Office. Salt Lake City, Utah.

U.S. Department of Agriculture-Farm Service Agency (USDA-FSA). 2012. National Agriculture Imagery Program (NAIP), Malheur County, Oregon compressed county mosaic, 1-meter resolution. Created and distributed by the USDA Aerial Photography Field Office. Salt Lake City, Utah.

USDA, NRCS. 2013. The PLANTS Database (http://plants.usda.gov, June 13, 2013). National Plant Data Center, Baton Rouge, Louisiana.

Wallace, M. and C. Whittaker. 2013. Wildlife baseline study work plan, Calico Resources Grassy Mountain Project, Malheur County, Oregon.

Western Technologies, Inc. 1988. Environmental baseline work plan, Grassy Mountain Gold Mine, Malheur County, Oregon (vegetation resources; wildlife habitat; endangered, threatened and sensitive species).

7 TABLES

Table 1. General land cover and wildlife habitat types* within Permit Area of the Grassy Mountain Gold Project, Malheur County, Oregon.

General Land Cover Type	Specific Habitat Type	Specific Habitat Type Description*	Acres in Permit Area
Developed	**Road**	Compacted gravel or dirt roads devoid of vegetation and offering no value to wildlife.	6.45
Grassland Steppe dominated by native and/or non-native grasses (<20% shrub cover)	**Exotic Annual Grassland**	Dominated by exotic annuals, particularly cheatgrass and medusahead. Wildlife use predicated more on soil type and open landscape than on vegetation. Common breeder is horned lark. Also used by pronghorn, American badger, coyote, Merriam's and Belding's ground squirrels, and burrowing owl.	1,128.71
	Native Perennial Grassland	Dominated by native perennial bunchgrass. Shrubs, if present, are an inconspicuous component. Provides forage for Merriam's and Belding's ground squirrels, which in turn provide prey for ferruginous hawk, golden eagle, and other raptors, as well as American badger and coyote. Common breeding species include horned lark and western meadowlark. May support burrowing owl where soils are deep and sandy. Exotic annuals—especially cheatgrass—found between bunchgrasses. Due to low precipitation and cattle grazing, wildlife use limited primarily to spring.	72.58
Shrub-steppe Steppe dominated by shrubs (>20% shrub cover)	**Sagebrush Shrub-steppe**	Dominated by >20% cover of basin big sagebrush and green rabbitbrush. Offers high quality breeding habitat for shrub obligate species including loggerhead shrike, sage thrasher, Brewer's sparrow, sagebrush sparrow, black-throated sparrow. Also supports western meadowlark. lark sparrow, and mourning dove. In sandy or rocky soils, sagebrush lizard, desert horned lizard, Great Basin collared lizard, long-nosed leopard lizard, striped whipsnake, western rattlesnake, and other reptiles likely to be found. Exotic grasses—especially cheatgrass—found beneath and between shrub layer throughout Permit Area.	344.53
		Total Acres	**1,552.27**

* Refer to Section 3.2 of this report for more detailed descriptions of habitats and wildlife use.

Table 2. General land cover and wildlife habitat types within Permit Area of the Grassy Mountain Gold Project, Malheur County, Oregon.

Land Cover Type	Habitat Type	Category	Area–NWC
Developed	Road	6	6.5 ac
Grassland	Exotic Annual Grassland	4	1,129 ac
		2	0 ac
	Native Perennial Grassland	3	73 ac
		2	0 ac
Shrub-steppe	Sagebrush Shrub-steppe	3	345 ac
		2	0 ac

Table 3. Avian species observed within 800-meter study plots in the Grassy Mountain Wind avian use study during four seasons, 2013-2014.

Species	Summer[1]		Fall[2]		Winter[3]		Spring[4]	
	# Grp	# Ind	# Grp	# Ind	# Grp	# Ind	# Grp	# Ind
Waterfowl		**0**		**0**		**0**		**13**
Green-winged teal	0	0	0	0	0	0	1	13
Raptors		**0**		**0**		**0**		**2**
Buteos		*0*		*0*		*0*		*1*
Red-tailed hawk	0	0	0	0	0	0	1	1
Eagles		*0*		*0*		*0*		*1*
Golden eagle	0	0	0	0	0	0	1	1
Gamebirds		**1**		**0**		**0**		**0**
Chukar	1	1	0	0	0	0	0	0
Shorebirds		**0**		**0**		**0**		**1**
Long-billed curlew	0	0	0	0	0	0	1	1
Passerines		**26**		**116**		**27**		**155**
Songbirds		*25*		*115*		*21*		*150*
Western kingbird	0	0	0	0	0	0	1	1
Loggerhead shrike	3	3	0	0	0	0	2	2
Horned lark	8	16	14	110	6	19	13	95
Barn swallow	0	0	1	3	0	0	0	0
Rock wren	0	0	1	1	0	0	2	2
Sage thrasher	1	1	0	0	0	0	2	2
Brewer's sparrow	0	0	0	0	0	0	4	6
Vesper sparrow	1	1	0	0	0	0	0	0
Sagebrush sparrow	0	0	0	0	0	0	1	2
White-crowned sparrow	0	0	0	0	0	0	1	3
Western meadowlark	4	4	1	1	2	2	13	37
Corvids	*0*	*1*		*1*		*6*		*5*
Common raven	1	1	1	1	4	6	5	5
Totals	**19**	**27**	**18**	**116**	**12**	**27**	**48**	**171**

Survey dates:

[1] Summer: June 24 through August 14, 2013; 4 visits to 5 sites = 20 surveys
[2] Fall: September 4 through October 24, 2013; 4 visits to 5 sites = 20 surveys
[3] Winter: November 25, 2013 through February 26, 2014; 4 visits to 5 sites = 20 surveys
[4] Spring: March 19 through May 29, 2014; 4 visits to 5 sites = 20 surveys

Table 4. Avian species observed while in-transit during surveys at Grassy Mountain Wind Project, summer 2013 through spring 2014.

Species	Summer 2013	Fall 2013	Winter 2013-14	Spring 2014	Total
Canada goose	0	0	10	0	10
American wigeon	0	0	0	4	4
Mallard	2	0	0	0	2
Northern shoveler	1	0	0	0	1
Northern harrier	1	0	0	1	2
Red-tailed hawk	1	1	0	1	3
Ferruginous hawk	2	0	0	2	4
Rough-legged hawk	0	1	0	0	1
Golden eagle	2	3	9	3	17
Long-billed curlew	0	0	0	2	2
Long-eared owl	3	0	0	0	3
Short-eared owl	0	1	0	0	1
Burrowing owl	1	2	0	0	3
Prairie falcon	2	0	0	0	2
Total	**15**	**8**	**19**	**13**	**55**

Table 5. Avian species detected during small-plot surveys at Grassy Mountain Gold Project, June 2013 through May 2014.

species	Study Plots								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
Gadwall	0	0	0	0	0	4	0	0	**4**
American wigeon	0	0	0	0	0	2	0	0	**2**
Mallard	0	0	0	0	0	28	0	0	**28**
Northern pintail	0	0	0	0	0	4	0	0	**4**
Blue-winged teal	0	0	0	0	0	3	0	0	**3**
Green-winged teal	0	0	0	0	0	14	0	0	**14**
California quail	0	1	0	0	0	0	0	0	**1**
Northern harrier	0	0	0	0	0	4	0	0	**4**
Ferruginous hawk	0	0	0	0	0	0	1	0	**1**
American coot	0	0	0	0	0	3	0	0	**3**
Killdeer	0	0	0	0	1	6	0	0	**7**
Greater yellowlegs	0	0	0	0	0	1	0	0	**1**
Mourning dove	0	0	0	0	0	10	1	0	**11**
Long-eared owl	0	0	0	0	0	3	0	0	**3**
Common nighthawk	0	0	0	0	0	13	0	0	**13**
Northern flicker	0	0	0	0	0	1	0	0	**1**
Say's phoebe	0	1	0	3	0	1	0	0	**5**
Loggerhead shrike	0	1	0	1	0	0	2	0	**4**
Cassin's vireo	0	0	0	0	0	2	0	0	**2**
Common raven	0	5	0	0	0	0	0	0	**5**
Horned lark	29	11	17	0	79	2	82	100	**320**
Cliff swallow	0	0	0	0	0	20	0	0	**20**
Barn swallow	25	0	0	0	0	41	0	0	**66**
Mountain chickadee	0	0	0	0	0	4	0	0	**4**
Rock wren	0	5	7	4	0	0	0	0	**16**
Canyon wren	0	0	1	0	0	0	0	0	**1**
Ruby-crowned kinglet	0	0	0	0	0	2	0	0	**2**
Mountain bluebird	12	6	0	0	0	0	0	0	**18**
American robin	0	0	0	0	0	1	0	0	**1**
Sage thrasher	2	5	0	0	0	0	0	0	**7**
European starling	0	0	0	0	0	17	0	0	**17**
Brewer's sparrow	4	3	0	2	0	0	3	1	**13**
Lark sparrow	2	6	3	1	0	1	0	0	**13**
Black-throated sparrow	0	0	1	0	0	0	0	0	**1**
Sagebrush sparrow	3	0	3	0	0	0	0	0	**6**
Song sparrow	0	0	0	0	0	9	0	0	**9**
Swamp sparrow	0	0	0	0	0	2	0	0	**2**
White-crowned sparrow	0	0	0	5	0	0	0	0	**5**
Dark-eyed junco	0	0	0	1	0	0	0	0	**1**
Lazuli bunting	0	0	0	0	0	1	0	0	**1**
Red-winged blackbird	0	0	0	0	0	96	0	0	**96**
Tricolored blackbird	0	0	0	0	0	9	0	0	**9**
Western meadowlark	11	19	15	14	7	2	5	0	**73**
Brewer's blackbird	1	0	0	0	0	2	0	0	**3**
Brown-headed cowbird	0	0	0	0	0	3	0	0	**3**
House finch	0	0	0	0	0	0	6	0	**6**
Lesser goldfinch	0	0	0	0	0	4	0	0	**4**
total	**89**	**63**	**47**	**31**	**87**	**315**	**100**	**101**	**833**

Table 6. Bat species detected by survey station at Grassy Mountain Gold Project, June 2013 through May 2014.

Common Name	Scientific Name	Detector Location				
		1	2	3	4	5
California myotis	*Myotis californicus*		X	X		
Small-footed myotis	*Myotis ciliolabrum*	X	X	X	X	X
Long-eared myotis	*Myotis evotis*					X
Yuma myotis	*Myotis yumanensis*	X			X	
Hoary bat	*Lasiurus cinereus*			X		
Silver-haired bat	*Lasionycteris noctivagans*	X	X	X		X
Canyon bat	*Parastrellus hesperus*	X	X	X	X	X
Big brown bat	*Eptesicus fuscus*					X
Spotted bat	*Euderma maculatum*		X			
Pallid bat	*Antrozous pallidus*		X		X	X

Table 7. Bat species detected by month at Grassy Mountain Gold Project, June 2013 through May 2014.

Common Name	Scientific Name	Month						
		Apr	May	Jun	Jul	Aug	Sep	Oct
California myotis	*Myotis californicus*		X	X	X	X		
Small-footed myotis	*Myotis ciliolabrum*	X	X	X	X	X	X	
Long-eared myotis	*Myotis evotis*				X			
Yuma myotis	*Myotis yumanensis*			X	X		X	X
Hoary bat	*Lasiurus cinereus*						X	
Silver-haired bat	*Lasionycteris noctivagans*	X	X		X		X	X
Canyon bat	*Parastrellus hesperus*	X	X		X	X	X	
Big brown bat	*Eptesicus fuscus*					X		
Spotted bat	*Euderma maculatum*							X
Pallid bat	*Antrozous pallidus*				X	X		

8 FIGURES

Figure 1. Wildlife Analysis Area for the Grassy Mountain Gold Project, Malheur County, Oregon.

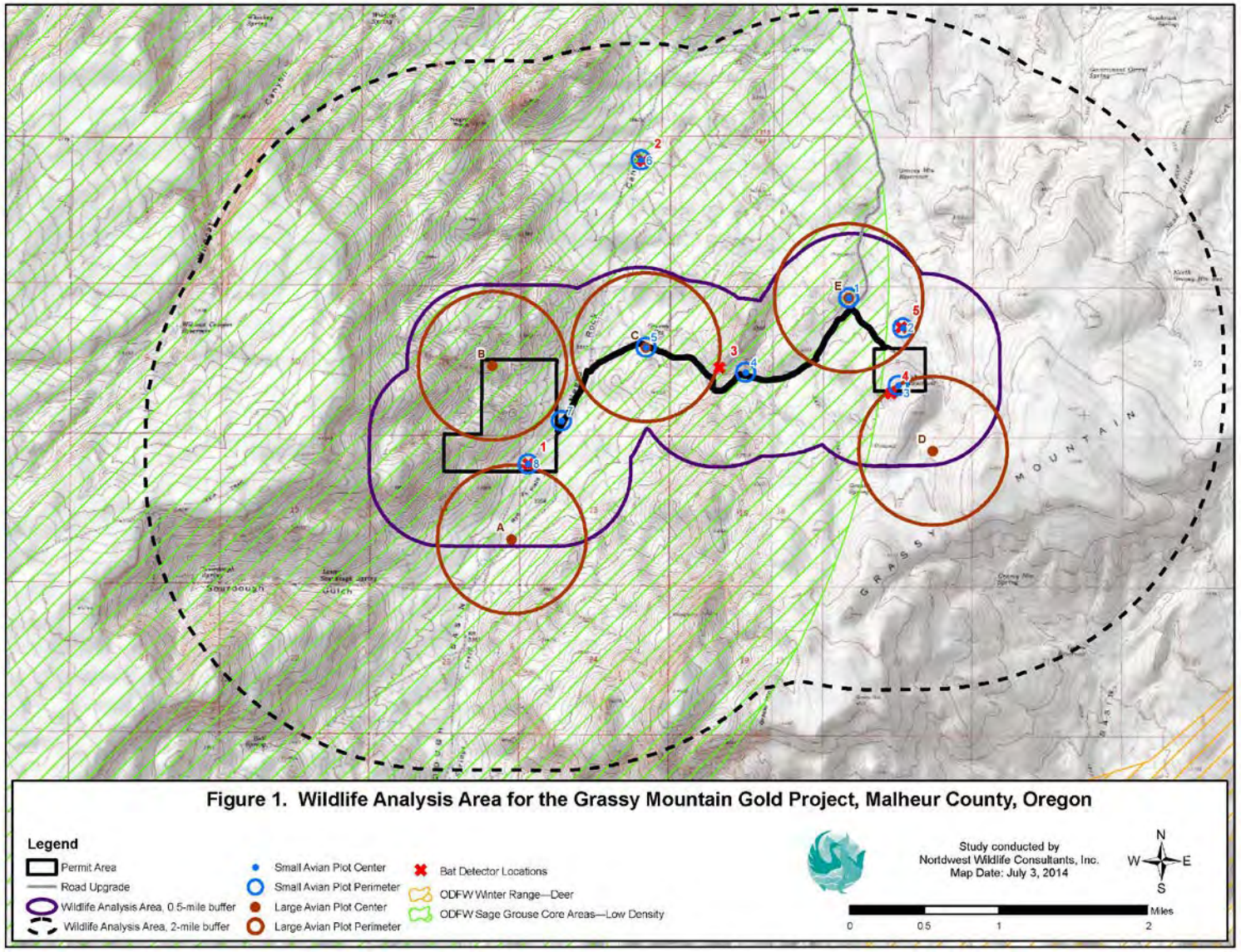


Figure 2. Wildlife Habitat Types at the Grassy Mountain Gold Project, Malheur County, Oregon.

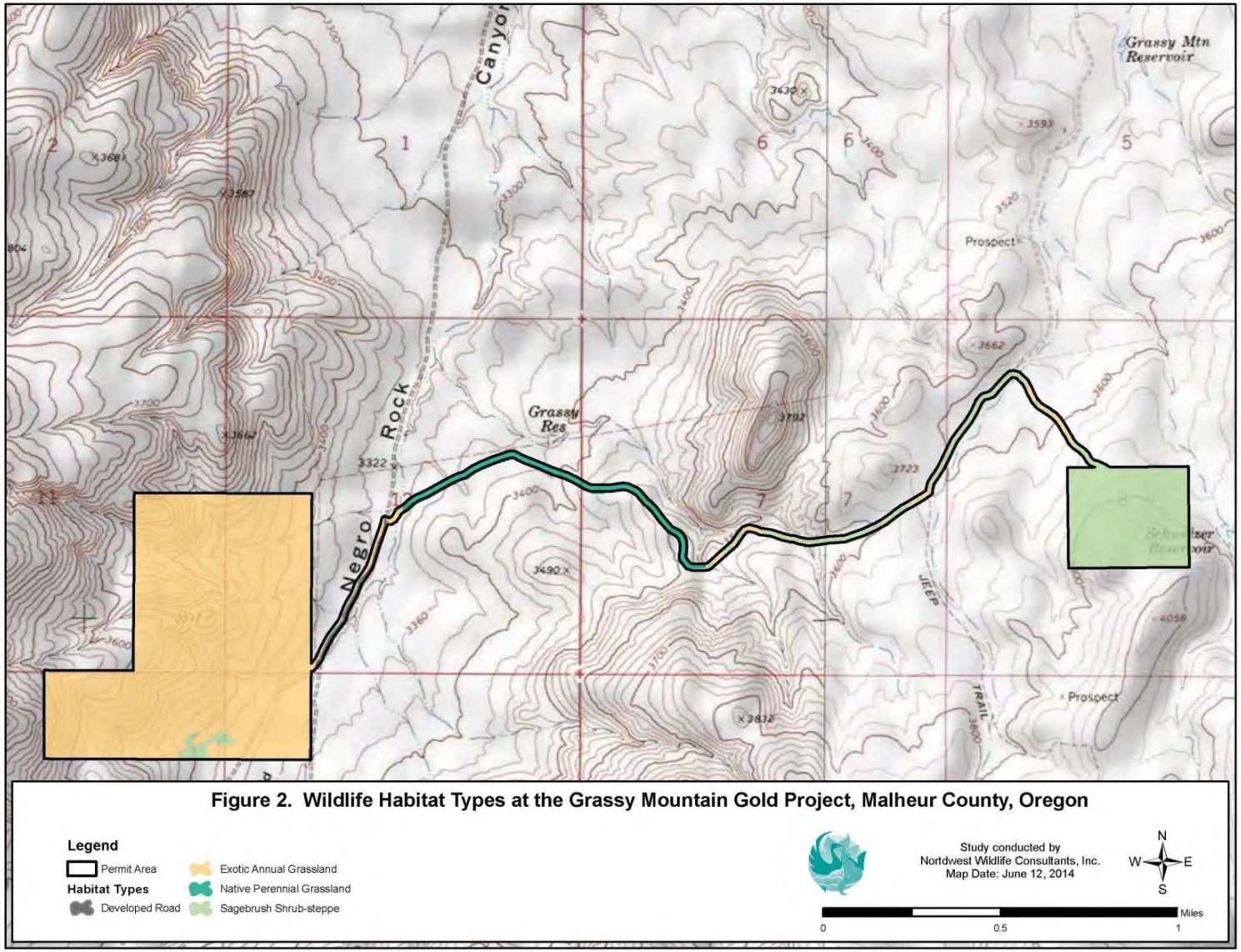


Figure 3. Nests of Raptors and Other Large Birds near the Grassy Mountain Gold Project, Malheur County, Oregon. (Confidential—submitted separately)

Figure 4. Detections of Leporids during Wildlife Surveys at Grassy Mountain Gold Project, Malheur County, Oregon.

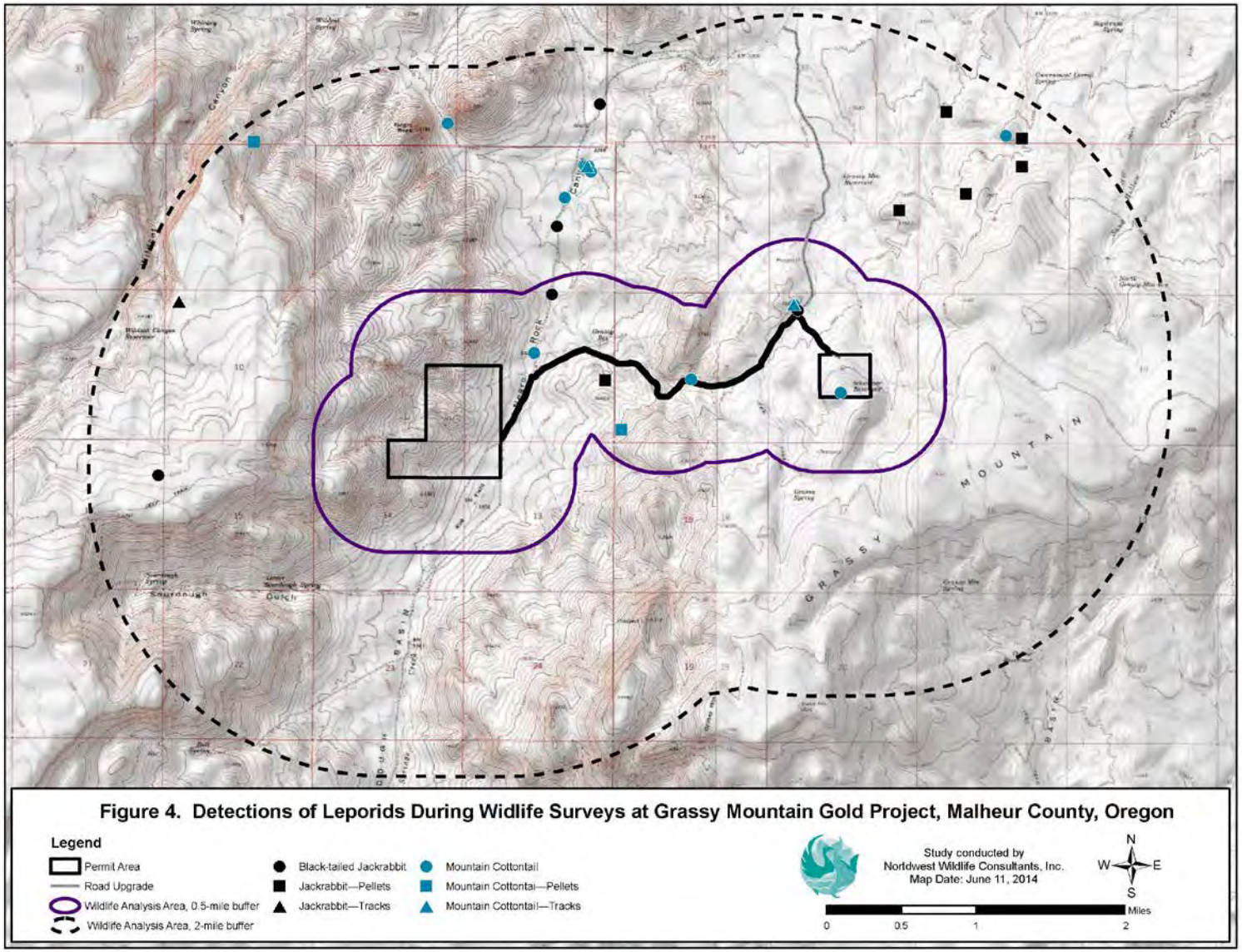


Figure 5. Detections of Reptiles and Amphibians during Wildlife Surveys at Grassy Mountain Gold Project, Malheur County, Oregon.

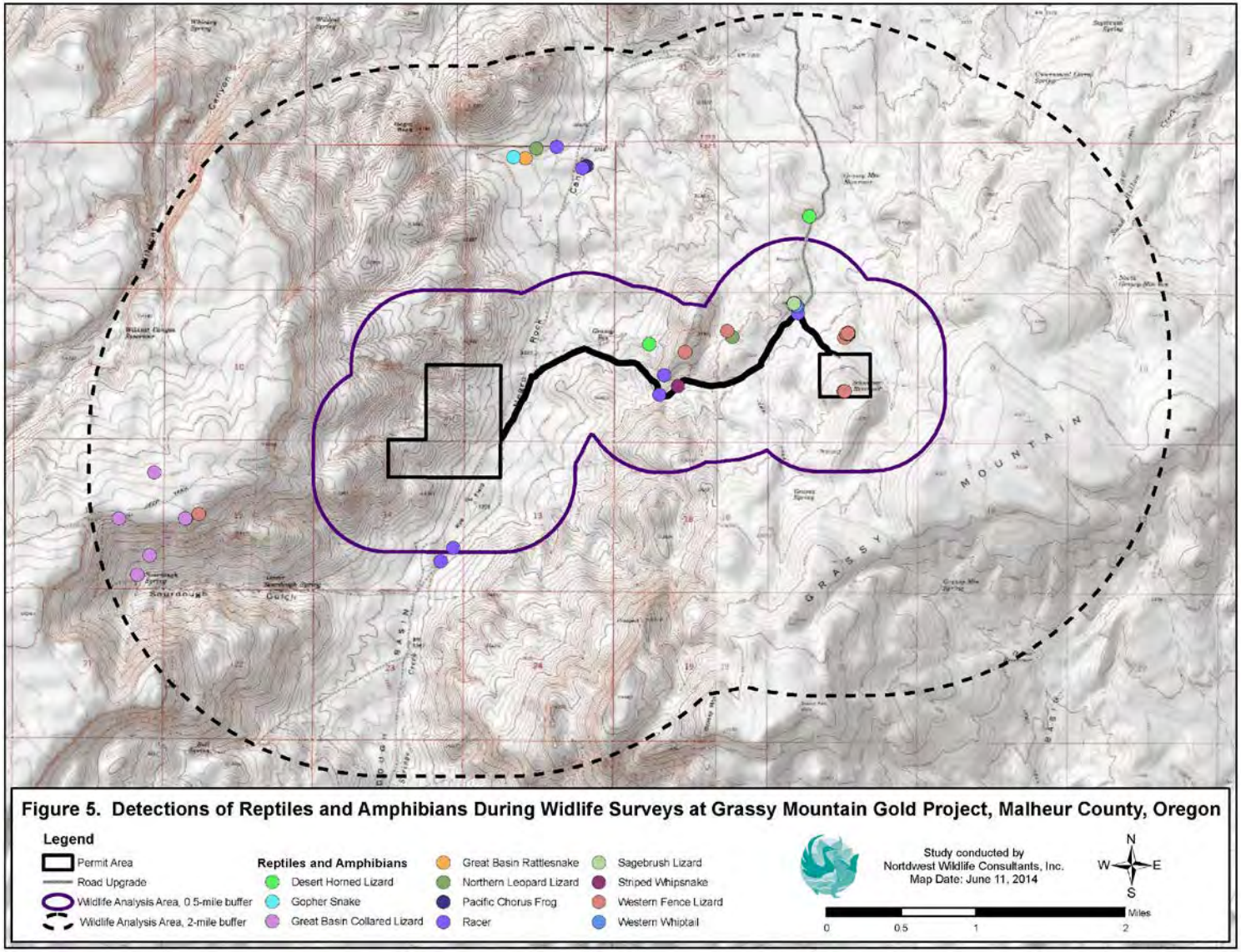
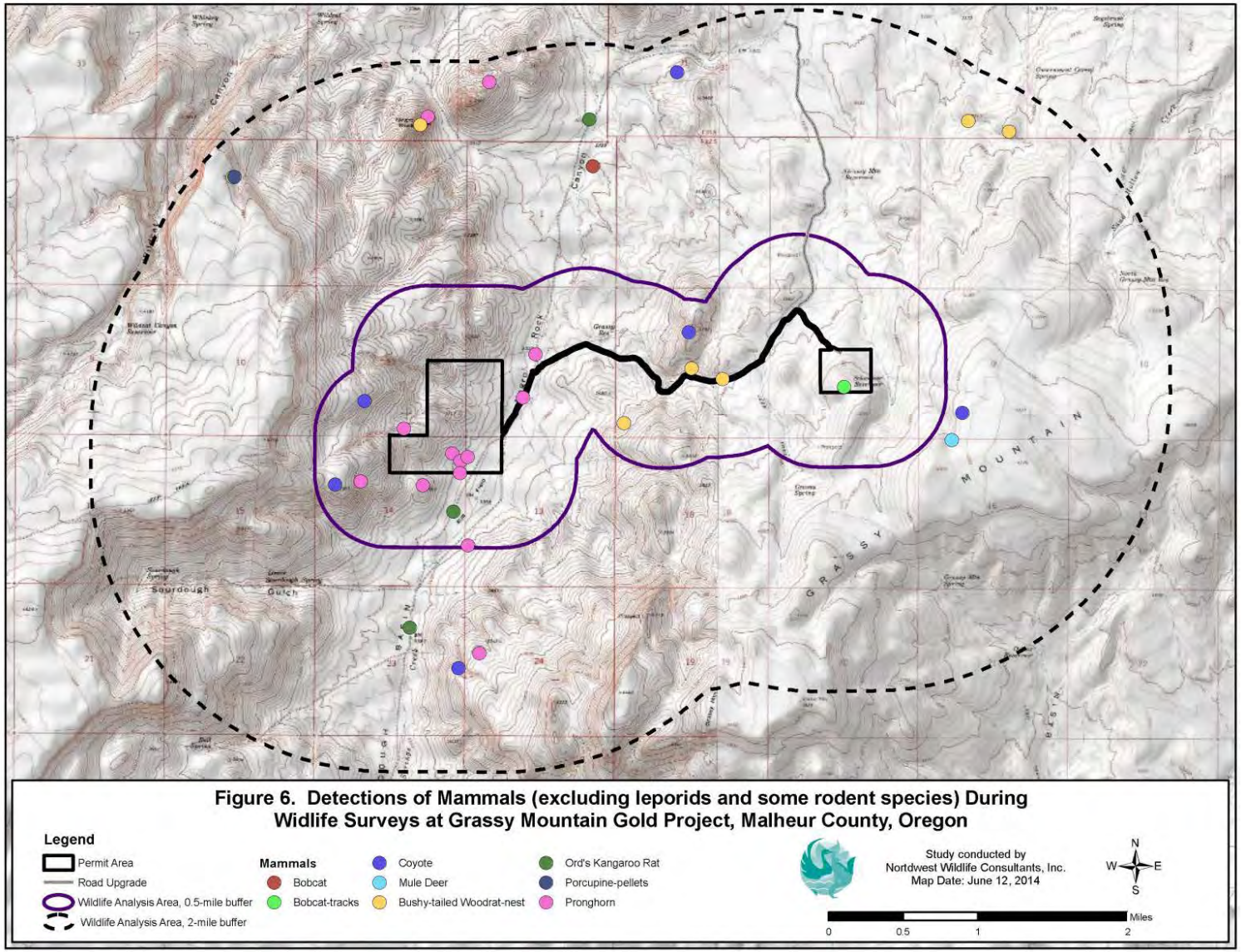


Figure 6. Detections of Mammals (excluding leporids and some rodent species) during Wildlife Surveys at Grassy Mountain Gold Project, Malheur County, Oregon.



9 APPENDICES

Appendix A. Special status vertebrate wildlife species occurrence in the Grassy Mountain area based on comprehensive wildlife surveys, June 2013–May 2014.

Common Name and Scientific Name	Federal Status	ODFW Status	Occurrence Within or Near Grassy Mountain D = Documented N = Not Documented
Mammals			
Hoary bat *Lasiurus cinereus*	–	SV	**D**—Detected at one bat detector location (Table 6) during one night in September (Table 7). Project area contains no suitable breeding habitat, which is forested lands, but this highly migratory species may pass through Project area during dispersal and migration.
Silver-haired bat *Lasionycteris noctivagans*	–	SV	**D**—Detected at four of five bat detector locations (Table 6) during April, May, July, September, and October (Table 7). Project area contains no suitable breeding habitat, which is forested lands, but this highly migratory species regularly passes through Project area during dispersal and migration.
Pallid bat *Antrozous pallidis*	SoC	SV	**D**—Detected at three bat detector locations (Table 6) during July and August (Table 7). Project area contains no suitable breeding habitat, which is tree cavities, mines, caves, and buildings; seasonality of detections suggests that presence on Project area is during migration.
Spotted bat *Euderma maculatum*	SEN	–	**D**—Detected at one bat detector location (Table 6) during one night in October (Table 7). Project area contains no suitable breeding habitat, which is rocky canyons, but this highly mobile species may occasionally pass through Project area.
Townsend's big-eared bat *Corynorhinus townsendii*	SEN	SC	**N**—No detections of this species during 105 station-nights of bat inventory studies at five locations between June and October 2013 and between April and May 2013. No caves or mine adits identified within 2 miles of Permit Area.
Pygmy rabbit *Brachylagus idahoensis*	SEN	SV	**N**—No individuals or their tracks or droppings detected during any wildlife surveys within 2 miles of Permit Area despite surveys targeted for this species. No suitable habitat identified within 2 miles of Permit Area.
White-tailed jackrabbit *Lepus townsendii*	–	SV	**N**—No individuals or their tracks or droppings detected during any wildlife surveys within 2 miles of Permit Area despite surveys targeted for this species. No suitable habitat identified within 2 miles of Permit Area.
Birds			
Ferruginous hawk *Buteo regalis*	SEN SoC BoCC	–	**D**—One active nest found within 0.5 miles of Permit Area (Figure 3). Individuals and pair detected during avian use surveys (Table 3) and while surveyor was in-transit between surveys (Table 4). Inactive nests indicate the possibility of a second breeding territory in the past..
Swainson's hawk *Buteo swainsoni*	SEN	SV	**N**—No suitable habitat or nest trees exist within 2 miles of Permit Area. Found associated with agriculture approximately 20 miles to north and northeast of Project, but not expected near Permit Area (except during migration).

Common Name and Scientific Name	Federal Status	ODFW Status	Occurrence Within or Near Grassy Mountain D = Documented N = Not Documented
Golden eagle *Aquila chrysaetos*	BGEPA BoCC	–	**D—**One active and two alternate nests (within the same breeding territory) found in northwestern portion of the 2-mile survey area (Figure 3). A second territory found at southwestern edge of 2-mile survey area; occupied by single female during 2014 breeding season, but no breeding attempt documented. Individuals and pairs observed during avian use surveys (Table 3) and while surveyor was travelling between surveys (Table 4).
Greater sage-grouse *Centrocercus urophasianus*	C	SV	**N**—No individuals, feathers, tracks, or droppings of this species detected despite extensive brood-rearing and winter use surveys and listening for drumming males during lekking season. Portion of Project designated as low-density habitat (ODFW, 2013b) based on known lek to west of survey area, but habitat generally not suitable within 2 miles of Permit Area.
Burrowing owl *Athene cunicularia*	SoC SEN	–	**D**—Active den identified during 2013 large-plot avian use surveys (Figure 3). Single bird observed on several occasions in 2013. Abundant burrows of badger, coyote, small mammals likely provide opportunities for breeding and use during other seasons.
Loggerhead shrike *Lanius ludovicianus*	SEN BoCC	–	**D**—Detected in sagebrush shrub-steppe habitats during avian use surveys (Tables 3 and 5). Likely breeder near Permit Area. Generally requires sizeable area of large sagebrush for breeding.

Status Key:

Federal:

T	Threatened	SoC	Species of Concern
E	Endangered	NW	Not Warranted; delisted
C	Candidate		

BGEPA Eagle Protection Act (16 U.S.C. 668-668d, June 8, 1940, as amended 1959, 1962, 1972, 1978)
BoCC USFWS Birds of Conservation Concern (Table 7 BCR 9, Great Basin Region).
SEN BLM Special Status Species (Sensitive; BLM, 2001)
Note: All migratory birds are protected by the Migratory Bird Treaty Act (MBTA).

Oregon:

T Threatened E Endangered

SC "Critical" sensitive species are those for which listing as Threatened or Endangered would be appropriate if immediate conservation actions were not taken. Some peripheral species which are at risk throughout their range and some disjunct populations (those that are geographically isolated from other populations) area also considered "Critical."

SV "Vulnerable" sensitive species are not in imminent danger of being listed as Threatened or Endangered, but could become sensitive-critical, Threatened, or Endangered with changes in populations, habitats or threats.

Appendix B. Comprehensive list of all vertebrate wildlife observed during avian use surveys, raptor nest surveys, greater sage-grouse surveys, leporid surveys, and bat species investigation, including incidental and in-transit sightings, Grassy Mountain Gold Project (listed taxonomically within classes).

Common Name	*Scientific Name*	Within Permit Area	Within 2-mile Buffer
	Birds		
Canada goose	*Branta canadensis*		X
Gadwall	*Anas strepera*		X
American wigeon	*Anas americana*		X
Mallard	*Anas platyrhynchos*		X
Northern pintail	*Anas acuta*		X
Blue-winged teal	*Anas discors*		X
Green-winged teal	*Anas crecca*		X
Northern shoveler	*Anas clypeata*		X
California quail	*Callipepla californica*		X
Chukar	*Alectoris chukar*		X
Northern harrier	*Circus cyaneus*	X	X
Red-tailed hawk	*Buteo jamaicensis*	X	X
Ferruginous hawk*	*Buteo regalis*	X	X
Rough-legged hawk	*Buteo lagopus*	X	X
Golden eagle*	*Aquila chrysaetos*	X	X
American coot	*Fulica americana*		X
Killdeer	*Charadrius vociferous*	X	X
Greater yellowlegs	*Tringa melanoleuca*		X
Long-billed curlew	*Numenius americanus*		X
Mourning dove	*Zenaida macroura*		X
Long-eared owl	*Asio otus*		X
Short-eared owl	*Asio flammeus*	X	X
Burrowing owl*	*Athene cunicularia hypugaea*	X	X
Common nighthawk	*Chordeiles minor*	X	X
Northern flicker	*Colaptes auratus*	X	X
American kestrel	*Falco sparverius*		X
Prairie falcon	*Falco mexicanus*	X	X
Say's phoebe	*Sayornis saya*	X	X
Western kingbird	*Tyrannus verticalis*		X
Loggerhead shrike*	*Lanius ludovicianus*	X	X
Cassin's vireo	*Vireo cassinii*		X
Common raven	*Corvus corax*	X	X
Horned lark	*Eremophila alpestris*	X	X
Cliff swallow	*Petrochelidon pyrrhonota*		X
Barn swallow	*Hirundo rustica*		X
Mountain chickadee	*Poecile gambeli*		X
Rock wren	*Salpinctes obsoletus*	X	X
Canyon wren	*Catherpes mexicanus*	X	X
Ruby-crowned kinglet	*Regulus calendula*		X
Mountain bluebird	*Sialia currucoides*	X	X

Common Name	*Scientific Name*	Within Permit Area	Within 2-mile Buffer
American robin	*Turdus migratorius*		X
Sage thrasher	*Oreoscoptes montanus*	X	X
European starling	*Sturnus vulgaris*		X
Brewer's sparrow	*Spizella breweri*	X	X
Vesper sparrow	*Pooecetes gramineus*	X	X
Lark sparrow	*Chondestes grammacus*	X	X
Black-throated sparrow	*Amphispiza bilineata*	X	X
Sagebrush sparrow	*Artemisiospiza nevadensis*	X	X
Song sparrow	*Melospiza melodia*		X
Swamp sparrow	*Melospiza georgiana*		X
White-crowned sparrow	*Zonotrichia leucophrys*		X
Dark-eyed junco	*Junco hyemalis*		X
Lazuli bunting	*Passerina cyanea*		X
Red-winged blackbird	*Agelaius phoeniceus*		X
Tricolored blackbird	*Agelaius tricolor*		X
Western meadowlark	*Sturnella neglecta*	X	X
Brewer's blackbird	*Euphagus cyanocephalus*		X
Brown-headed cowbird	*Molothrus ater*		X
House finch	*Carpodacus mexicanus*		X
Lesser goldfinch	*Carduelis psaltria*		X
American goldfinch	*Carduelis tristis*		X
Mammals			
California myotis	*Myotis californicus*	X	X
Small-footed myotis	*Myotis ciliolabrum*	X	X
Long-eared myotis	*Myotis evotis*	X	X
Yuma myotis	*Myotis yumanensis*		X
Hoary bat*	*Lasiurus cinereus*	X	X
Silver-haired bat*	*Lasionycteris noctivagans*	X	X
Canyon bat	*Parastrellus hesperus*	X	X
Big brown bat	*Eptesicus fuscus*	X	X
Spotted bat*	*Euderma maculatum*		X
Pallid bat*	*Antrozous pallidus*	X	X
Black-tailed jackrabbit	*Lepus americanus*	X	X
Mountain cottontail	*Sylvilagus nuttallii*	X	X
Belding's ground squirrel	*Urocitellus beldingi*	X	X
Merriam's ground squirrel	*Urocitellus canus*	X	X
Northern pocket gopher	*Thomomys talpoides*	X	X
Ord's kangaroo rat	*Dipodomys ordii*	X	X
Deer mouse	*Peromyscus maniculatus*	X	X
Bushy-tailed woodrat	*Neotoma cinerea*		X
Montane vole	*Microtus montanus*	X	X
Common porcupine	*Erethizon dorsatum*		X
Coyote	*Canis latrans*		X
American badger	*Taxidea taxus*	X	X
Bobcat	*Lynx rufus*		X

Common Name	*Scientific Name*	Within Permit Area	Within 2-mile Buffer
Mule deer	*Odocoileus hemionus*		X
Pronghorn	*Antilocarpa americana*	X	X
Amphibians and Reptiles			
Pacific chorus frog	*Pseudacris regilla*		X
Great Basin collared lizard	*Crotaphytus bicinctores*		X
Long-nosed leopard lizard	*Gambelia wislizenii*		X
Western fence lizard	*Sceloporus occidentalis*	X	X
Sagebrush lizard	*Sceloporus graciosus*	X	X
Desert horned lizard	*Phrynosoma platyrhinos*		X
Pygmy short-horned lizard	*Phyrnosoma douglasi*	X	X
Western whiptail	*Cnemidophorus tigris*	X	X
Racer	*Coluber constrictor*	X	X
Striped whipsnake	*Masticophis taeniatus*	X	X
Gopher snake	*Pituophis catenifer*	X	X
Western rattlesnake	*Crotalus viridis*	X	X

* denotes species is of state or federal special status.

Appendix C. Global Positioning System data for all wildlife and habitat studies at Grassy Mountain Gold Project, Malheur County, Oregon, June 2013–May 2014 (provided on accompanying CD).

Appendix D. Copies of all field data forms associated with wildlife and habitat studies at Grassy Mountain Gold Project, Malheur County, Oregon, June 2013–May 2014 (provided as digital scans on accompanying CD).

Appendix E. Copies of all QA forms associated with wildlife and habitat studies at Grassy Mountain Gold Project, Malheur County, Oregon, June 2013–May 2014 (provided as digital scans on accompanying CD).

APPENDIX D

Wetland Delineation Report

WETLAND DELINEATION / DETERMINATION REPORT COVER FORM

Fully completed and signed report cover forms and applicable fees are required before report review timelines are initiated by the Department of State Lands. Make checks payable to the Oregon Department of State Lands. To pay fees by credit card, go online at https://apps.oregon.gov/DSL/EPS/program?key=4.

Attach this completed and signed form to the front of an unbound report or include a hard copy with a digital version (single PDF file of the report cover form and report, minimum 300 dpi resolution) and submit to: **Oregon Department of State Lands, 775 Summer Street NE, Suite 100, Salem, OR 97301-1279.** A single PDF of the completed cover from and report may be e-mailed to **Wetland_Delineation@dsl.state.or.us**. For submittal of PDF files larger than 10 MB, e-mail DSL instructions on how to access the file from your ftp or other file sharing website.

Contact and Authorization Information

☒ Applicant ☐ Owner Name, Firm and Address:

Calico Resources USA Corp.
665 Anderson Street
Winnemucca, Nevada 89445

Business phone # (775) 625-3600
Mobile phone # (optional) (775) 770-4615
E-mail: nancy@paramountnevada.com

☒ Authorized Legal Agent, Name and Address (if different):

Same as Above
Attention: Nancy J Wolverson

Business phone #
Mobile phone # (optional) (775) 770-4615
E-mail: nancy@paramountnevada.com

I either own the property described below or I have legal authority to allow access to the property. I authorize the Department to access the property for the purpose of confirming the information in the report, after prior notification to the primary contact.

Typed/Printed Name: Nancy J Wolverson **Signature:** _____

Date: 03/01/2018 Special instructions regarding site access: _____

Project and Site Information

Project Name: Grassy Mountain Mine Project

Latitude: 43.729922 Longitude: -117.337827
decimal degree - centroid of site or start & end points of linear project

Proposed Use: hard rock mining

Tax Map # Tax lots: 100, 300, 400, 600, and 900
Tax Lot(s)

Tax Map #
Tax Lot(s)

Project Street Address (or other descriptive location):

Malheur County, Oregon, approximately 22 miles south-southwest of Vale

Township 22S Range 44E Section see atta QQ
Use separate sheet for additional tax and location information

City: n/a County: Malheur

Waterway: Malheur River River Mile: n/a

Wetland Delineation Information

Wetland Consultant Name, Firm and Address:

Sarah M. Harrelson of EM Strategies, Inc.
1650 Meadow Wood Lane
Reno, NV 89502

Phone # (775) 826-8822
Mobile phone # (if applicable)
E-mail: sarah@emstrats.com

The information and conclusions on this form and in the attached report are true and correct to the best of my knowledge.

Consultant Signature: Date:

Primary Contact for report review and site access is ☐ Consultant ☐ Applicant/Owner ☒ Authorized Agent

Wetland/Waters Present? ☒ Yes ☐ No Study Area size: 1,762 acres Total Wetland Acreage: 0

Check Applicable Boxes Below

☐ R-F permit application submitted
☐ Mitigation bank site
☐ Industrial Land Certification Program Site
☐ Wetland restoration/enhancement project (not mitigation)
☒ Previous delineation/application on parcel
If known, previous DSL # WD2015-0432

☒ Fee payment submitted **$** $ 437
☐ Fee ($100) for resubmittal of rejected report
☐ Request for Reissuance. See eligibility criteria. (no fee)
DSL # _____ Expiration date _____
☐ LWI shows wetlands or waters on parcel
Wetland ID code _____

For Office Use Only

DSL Reviewer: _____ Fee Paid Date: ____/____/____ DSL WD # _____

Date Delineation Received: ___/___/___ Scanned: ☐ Electronic: ☐ DSL App.# _____

Project and Site Information:

Township and Range Location:

The Wetland Study Area is located in all or portions of: Sections 5 through 8, Township 22 South, Range 44 East (T22S, R44E); Sections 3, 10, 11, 14, 15, 21 through 23, 28, 29, and 32, T21S, R44E; Sections 1, 12 through 14, 23, 26, 27, and 34; T20S, R44E; and Sections 22, 23, 26, 35, and 36, T19S, R44E, Willamette Meridian.

CALICO RESOURCES USA CORPORATION

GRASSY MOUNTAIN MINE PROJECT
MALHEUR COUNTY, OREGON

DRAFT WETLAND DELINEATION REPORT

February 2018

Prepared for:

Calico Resources USA Corp.
665 Anderson Street
Winnemucca, Nevada 89445

Prepared by:

Reno:
1650 Meadow Wood Lane
Reno, Nevada 89502
Phone: (775) 826-8822 | Fax: (775) 826-8857

Elko:
835 Railroad Street
Elko, Nevada 89801
Phone: (775) 753-9496 | Fax: (775) 826-8857

CALICO RESOURCES USA CORPORATION
GRASSY MOUNTAIN MINE PROJECT
DRAFT WETLAND DELINATION REPORT

TABLE OF CONTENTS

		Page
A.	LANDSCAPE SETTING AND LAND USE	1
	Purpose	1
	Project Location	1
	Project Background	1
	Vegetation	1
	Topography	2
	Geology and Soils	2
	Land Use	2
B.	SITE ALTERATIONS	2
C.	PRECIPITATION DATA AND ANALYSIS	2
D.	METHODS	3
E.	DESCRIPTION OF ALL WETLANDS AND OTHER NON-WETLAND WATERS	3
F.	DEVIATION FROM LOCAL WETLANDS INVENTORY OR NATIONAL WETLANDS INVENTORY	5
G.	MAPPING METHOD	6
H.	ADDITIONAL INFORMATION	6
I.	RESULTS AND CONCLUSIONS	6
J.	DISCLAIMER	7
K.	REFERENCES	8

TABLES

Table 1.	Summary of Precipitation Data at Owyhee Dam	2
Table 2.	Summary of Non-Wetland Waters	5

APPENDICES

Appendix A: Figures
Appendix B: Wetland and SDAM Data Forms
Appendix C: Site Photographs

A. LANDSCAPE SETTING AND LAND USE

Purpose

The purpose of this wetland delineation report is to characterize existing conditions prior to the start of proposed mining operations at the Calico Resources USA Corporation (Calico) Grassy Mountain Mine Project (Project), located in Malheur County, Oregon. In addition, this report delineates wetlands within and adjacent to the wetland study area.

Project Location

The Project is located approximately 22 miles south-southwest of Vale (Appendix A, Figure 1), and is approximately 1,762 acres in size (Wetland Study Area) (Appendix A, Figure 2).

The Wetland Study Area is located in all or portions of: Sections 5 through 8, Township 22 South, Range 44 East (T22S, R44E) Willamette Meridian (WM); Sections 3, 10, 11, 14, 15, 21 through 23, 28, 29, and 32, T21S, R44E; Sections 1, 6, 7, 12 through 14, 23, 26, 27, and 34; T20S, R44E; and Sections 22, 23, 26, 35, and 36, T19S, R44E, WM, on lands administered by the Bureau of Land Management, Vale District Office (BLM), and private land controlled by others.

Project Background

A portion of the Wetland Study Area was surveyed for wetlands and non-wetland waters by HDR Engineering, Inc. (HDR) in 2012, identified as Tax Lot 101 on Figure 2 in Appendix A. HDR did not identify any surface waters within the 2012 survey area (HDR 2012). HDR conducted an additional survey of a second portion of the Wetland Study Area in 2015 (Appendix A, Figure 2), which identified three ephemeral drainages and one pond (Schweizer Reservoir). Results of the 2015 survey are discussed in detail in Section E of this report. The remainder of the Wetland Study Area was surveyed by EM Strategies (EMS) in 2017 (Appendix A, Figure 2).

Vegetation

With the exception of 0.3 mile of the northern portion of the Wetland Study Area which is active agriculture row crops, most of the vegetation within the Wetland Study Area is a desert-rangeland type with sagebrush and grasses as the dominant species (HDR 2015, EMS 2017). The area has been extensively grazed, and portions of the Wetland Study Area were re-seeded after a wildfire with a crested wheatgrass (*Agropyron cristatum*)-dominated seed mix. Five vegetation community types were identified within the Wetland Study Area during the 2015 and 2017 surveys:

1. Mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*)/crested wheatgrass community;
2. Crested wheatgrass seeding community;
3. Bluebunch wheatgrass (*Pseudoroegneria spicata* ssp. *spicata*)/cheatgrass (*Bromus tectorum*)/annual community;
4. Mountain big sagebrush/bluebunch wheatgrass community; and

5. Burned yellow rabbitbrush (*Chrysothamnus viscidiflorus*)/bluebunch wheatgrass community.

Topography

Topography within the Wetland Study Area consists of large rolling hills and open valleys. Elevations range from 2,320 feet to 3,800 feet above mean sea level. Generally, slopes range from two to 15 percent.

Geology and Soils

Geology in the Wetland Study Area consists primarily of a thick sequence of arkosic sandstone, clayey siltstone, and reworked tuffs that are locally capped by olivine basalt flows (ACZ Inc. 1993). A Natural Resources Conservation Service (NRCS) soil survey was not available for the Wetland Study Area. Field investigations conducted by HDR in 2012 and 2015, and by EMS in 2017, determined that soils generally consist of rocky sandy loams. There are smaller areas of sandy clay soils.

Land Use

Past and current activities within the vicinity of the Wetland Study Area include mineral exploration, livestock grazing, and recreation.

B. SITE ALTERATIONS

Site alterations within the Wetland Study Area include agricultural fields and heavy livestock grazing. Additional site alterations within the vicinity of the Wetland Study Area include many cut and fill roads used for vehicle access to various sites, and surface disturbance due to drill pads from past exploration activities which occurred between 1986 and 2017.

C. PRECIPITATION DATA AND ANALYSIS

The nearest weather station is at the Owyhee Dam, station number 356405, located approximately 5.3 miles southeast of the Wetland Study Area. Although there was no precipitation during the May 18 through 21, 2017, site investigation, 0.43 inch was recorded for May 17, 2017 (NRCS 2017). The total amount of precipitation recorded for May 4 through 17 was 0.75 inch. Table 1 summarizes the percent of normal precipitation for the water year to date and the monthly percent of normal for each of the three months preceding the field investigation.

Table 1. Summary of Precipitation Data at Owyhee Dam

Category	Feb	March	April	May	Water Year-to-Date (Jan-May)
Monthly Total Precipitation 2017 (inches)[1]	0.91	1.67	1.34	0.76	8.17
Monthly Normal 1981-2010 (inches)[1]	0.76	0.89	0.96	1.16	4.69
Percent of Normal	120%	188%	140%	66%	174%

[1]NRCS (2017)

D. METHODS

This wetland delineation was performed according to the standards set forth in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and *Final Arid West Supplement* (Environmental Laboratory 2008). EMS reviewed existing literature, including United States Geological Survey (USGS) topographic maps, aerial imagery, NRCS soils data (not available for the Wetland Study Area), National Wetland Inventory (NWI) maps, and National Hydrography Dataset (NHD) hydrology data to evaluate the physical features of the Wetland Study Area. The data review facilitated the identification of potential wetland areas and prioritization of field survey areas. Stream channels were evaluated for flow duration and presence of an ordinary high-water mark (OHWM) using the methods outlined in the *Streamflow Duration Assessment Method for Oregon* (SDAM) (Nadeau 2011).

EMS conducted wetland field surveys May 18 through 21, 2017; HDR conducted wetland field surveys July 5, 2012, and April 7, 2015. Paired soil pits were used to evaluate the soils, vegetation, and hydrology of potential wetlands. Wetland and stream boundaries were mapped using a handheld Trimble GeoExplorer XH6000 global positioning system (GPS) unit. Photographs were taken at each soil pit and of the surrounding environment. GPS coordinates of each feature were recorded. United States Army Corps of Engineers (USACE) wetland delineation data forms were completed to record vegetation, soil, and hydrology conditions at each site. Data from the 2015 and 2017 surveys (no data from the 2012 survey were collected within the current Wetland Study Area) are included in the following appendices: wetland delineation data forms and SDAM forms are presented in Appendix B; and photos are presented in Appendix C.

E. DESCRIPTION OF ALL WETLANDS AND OTHER NON-WETLAND WATERS

A total of two wetlands, two springs, one pond, one artificial waterway, and ten tributary drainages occur within the Wetland Study Area (Figures 4a through 4h). EMS identified two wetlands, two springs, one artificial waterway (J-H Canal) and ten tributary drainages within the 2017 survey area. HDR identified three tributary drainages and one pond (Schweizer Reservoir) within the 2015 survey area (HDR 2015). The three tributary drainages surveyed by HDR are contiguous with drainages surveyed by EMS. Both survey areas are shown on Figure 2 in Appendix A. Each of these waters is discussed in detail in the appropriate sections below and are illustrated on Figures 4a through 4h.

NWI Mapping

NWI mapping (United States Fish and Wildlife Service [USFWS] 1983) indicated the presence of two emergent wetlands and three ponds within or partially within the Wetland Study Area (Appendix A, Figures 3a through 3h). The NWI describes the wetlands as PEM1Ch (palustrine, emergent, persistent, seasonally flooded, diked/impounded) and PEM1B (palustrine, emergent, persistent, saturated). The ponds are described as PUBH (palustrine, unconsolidated bottom, permanently flooded), PUSCx (palustrine, unconsolidated shore, excavated), and PUSCh (palustrine, unconsolidated shore, seasonally flooded, diked/impounded). The third pond, designated PUSCh, corresponds to Schweizer Reservoir on USGS maps. Two palustrine emergent

wetlands (Wetlands 1 and 2), two springs (Springs 1 and 2), and one impounded area (Schweitzer Reservoir) were identified during the 2017 and 2015 field investigations.

Wetland 1

Wetland 1, shown on Figure 4g (Appendix A), covers approximately 0.25 acre (0.09 acre extends outside of the Wetland Study Area), and is mapped by the NWI as PEM1B (palustrine, emergent, persistent, and saturated; USFWS 1983). Vegetation in Wetland 1 consisted primarily of cheatgrass and Great Basin wild rye (*Leymus cinereus*); other species observed included Baltic rush (*Juncus balticus*), cursed buttercup (*Ranunculus sceleratus*), and bulbous bluegrass (*Poa bulbosa*). Wetland soil colors were dark and consisted of sandy clay with small amounts of muck and displayed the redox dark surface hydric soil indicator. Hydrology within Wetland 1 appeared to be associated with a small, unmapped spring complex and consisted of one inch of surface water, and a high water table within two inches of the surface within the soil pit.

Wetland 2

Wetland 2, shown on Figure 4g (Appendix A), covers approximately 0.04 acre occurring entirely within the Wetland Study Area, and is not mapped by the NWI (USFWS 1983). Vegetation in Wetland 2 consisted primarily of Great Basin wild rye and bulbous bluegrass; other species observed included fowl bluegrass (*Poa palustris*) and meadow barley (*Hordeum brachyantherum*). Wetland soil colors were dark and consisted of sandy loam and displayed the redox dark surface hydric soil indicator. Hydrology within Wetland 2 appeared to be associated with a small, unmapped spring complex and consisted of two inches of surface water, and a high water table within three inches of the surface within the soil pit.

Springs 1 and 2

At springs one and two, also shown on Figure 4g (Appendix A), bubbling water was observed at the surface. Neither of the springs are indicated on USGS maps. Spring 1 comes to the surface along the side of Twin Springs Road approximately 35 feet to the south of Wetland 2. Water was observed flowing along the surface of the ground along the side of the road for approximately 285 feet before sinking into the surrounding soil. The soil was mostly bare in the area of Spring 1, and no wetland vegetation was observed. Spring 2 is located within Wetland 2, and water was observed bubbling from Spring 2 and flowing into Wetland 2.

Non-wetland Waters

Schweizer Reservoir

The boundary of Schweizer Reservoir and the top of the embankment were delineated (Appendix A, Figure 4h). An upland soil pit (Soil Pit #8A-2015) was dug at the low point to confirm that the area did not meet wetland criteria (HDR 2015).

Tributary Drainages

Ten un-named tributary drainages and one artificial waterway (J-H Canal) occur within the Wetland Study Area. Each drainage was mapped using a GPS unit, assessed using SDAM, and upstream/downstream photos were taken. SDAM survey results of the drainages (Table 2) indicate that the ten drainages displayed characteristics of an ephemeral channel; a portion of Tributary 2 (Tributary 2b) showed characteristics of an intermittent channel; and the J-H Canal was found to be an artificial waterway created for the purposes of crop irrigation. SDAM forms for each drainage and upstream/downstream reach photographs are included in Appendix B and Appendix C, respectively.

The J-H Canal crosses the proposed Access Road approximately 0.4 mile from the northern boundary of the Wetland Study Area (Appendix A, Figures 3a and 4a). This waterway is used for irrigation of the adjacent agricultural fields and is approximately five percent vegetated (Appendix D, photos 71 and 72). An earthen berm, approximately ten feet in height, occurs on the right bank of the canal, and a water control structure was observed on the left bank. Historically, the canal appears on both the 1952 General Land Office Survey Plat map where it is labeled as "Ditch," and on the 1967 Vale West, Oregon USGS 7.5"-Series Topographic Quadrangle, where it is labeled as "J-H Canal." Currently, NWI classifies the canal as a riverine wetland (Appendix A, Figure 3a).

Table 2. Summary of Non-Wetland Waters

Drainage Name	SDAM Determination	Channel Width (feet)	Map Sheet Number	Photo Number
Tributary 1	Ephemeral	2-5	4h	1 and 2
Tributary 2a[1]	Ephemeral	2-4	4h	5-8 and 10
Tributary 2b	Intermittent	6-21	4h	3 and 4
Tributary 3[2]	Ephemeral	2-12	4g and 4h	13-18 and 29-30
Tributary 4[2]	Ephemeral	1-4	4h	19-23
Tributary 5	Ephemeral	5-8	4h	24 and 25
Tributary 6	Ephemeral	4-14	4g	31 and 32
Tributary 7	Ephemeral	3-8	4f	46 and 47
Tributary 8	Ephemeral	2-6	4f	48-51
Tributary 9	Ephemeral	3-7	4d	57-60
Tributary 10	Ephemeral	2-20	4a and 4b	65-70
J-H Canal	Artificial Water Body	13-30	4a	71 and 72

[1] Tributary 2a was assessed by HDR during the 2015 survey.
[2] Portions of Tributaries 3 and 4 were assessed by HDR during the 2015 survey.

F. DEVIATION FROM LOCAL WETLANDS INVENTORY OR NATIONAL WETLANDS INVENTORY

Local Wetlands Inventory mapping was not available for the Wetland Study Area; NWI maps are included in Figures 3a-3h (Appendix A). NWI mapping indicated the presence of two emergent wetlands within or partially within the Wetland Study Area. One of these wetlands was confirmed as being Wetland 1, delineated as part of this study (Appendix A, Figures 3g and 4g). However, data from soil pit DP1 (Appendix B) indicate that the second mapped emergent wetland

(Appendix A, Figures 3h and 4h), does not meet wetland criteria. In addition, the presence of Wetland 2, a spring-fed emergent wetland delineated during this study (DP4 and DP5, Appendix B), was not shown on NWI mapping (Appendix A, Figures 3g and 4g).

NWI mapping shows two freshwater ponds within the northern portion of the Wetland Study Area (Appendix A, Figure 3g and 3e). One of these features did not contain water at the time of investigation and appeared to be a small, bermed area that was used to capture water from seeps that feed Wetland 1, but had since been abandoned (Appendix A, Figure 3g). Vegetation in this area consisted of upland species such as cheatgrass and bulbous bluegrass. The second feature is an existing stock water pond that is located outside of the Wetland Study Area, and not inside as indicated by NWI mapping (Appendix A, Figure 3e). Photos of these features are included in Appendix D (photos 43 and 54).

NWI maps indicate numerous intermittent, temporarily flooded streambeds within the Wetland Study Area that, in general, flow from south to north. Based on the results of this study, these areas are ephemeral stream channels, not riverine wetlands. Ten ephemeral tributary drainages, one intermittent drainage, and one artificial water body (J-H Canal) that correspond with NWI mapping were delineated within the Wetland Study Area (Section E).

G. MAPPING METHOD

The 2017 mapping has been prepared using wetland and stream boundaries that were recorded using a handheld GPS unit (Trimble GeoExplorer XH6000). For the 2017 field work, approximately 60 percent of positions were captured having a horizontal accuracy of less than 0.5 meter, and 91.5 percent of positions were captured having a horizontal accuracy of less than one meter after post-processing. For the 2013 field work, 93.8 percent of positions were captured having a horizontal accuracy of less than 0.5 meter after post-processing, and for the 2015 field work, 84.9 percent of positions were captured having a horizontal accuracy of less than 0.5 meter after post-processing.

H. ADDITIONAL INFORMATION

Oregon Department of Fish and Wildlife (ODFW) data were analyzed to determine if there was a fish presence at any of the drainages within the Wetland Study Area. The nearest fish habitat to the Wetland Study Area was for redband (*Oncorhynchus mykiss*), located approximately 0.5 mile north of the north end of the Wetland Study Area (ODFW 2017). Given that all drainages observed within the Wetland Study Area are ephemeral or intermittent, it is unlikely that fish are present within any of the drainages within the Wetland Study Area. No fish were observed within the canal during field studies. A county soil survey map was not available for this location.

I. RESULTS AND CONCLUSIONS

A total of two wetlands, two springs, one pond, one artificial waterway, and ten tributary drainages occur within the Wetland Study Area (Figures 4a through 4h). EMS identified two wetlands, two springs, one artificial waterway (J-H Canal) and ten tributary drainages within the 2017 survey area. HDR identified three tributary drainages and one pond (Schweizer Reservoir)

within the 2015 survey area (HDR 2015). The three tributary drainages surveyed by HDR are contiguous with drainages surveyed by EMS.

Two PEM wetlands, totaling 0.29 acre (0.09 acre of which occur outside of the Wetland Study Area), were delineated in the Wetland Study Area by EMS during the May 18 through 21, 2017, field surveys using methods recommended in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region*. Wetlands 1 and 2 are located within the Sagebrush Gulch drainage, which crosses a small portion of the Wetland Study Area (Appendix A, Figure 4g). The wetlands are associated with ground water seeps/springs located in the immediate area, but do not appear to be connected to any downstream waters. A total of ten drainages were identified within the Wetland Study Area by HDR and EMS during the 2015 and 2017 surveys. A portion of one of the drainages, Tributary 2b, has been determined to be intermittent. All other tributary channels are considered ephemeral. One artificial water body, the J-H Canal, was identified in the northern portion of the Wetland Study Area.

Wetlands in the Wetland Study Area do not have USACE jurisdictional status because they do not demonstrate a significant nexus to a traditional navigable water of the United States. A desktop analysis of drainages within the Wetland Study Area indicated that, in general, all the drainages flow north, eventually leading into the J-H Canal, which empties into the Malheur River approximately 5.5 miles northeast of the Wetland Study Area. The Malheur River flows into the Snake River, eventually feeding into the Columbia River. All ten drainages identified during the wetland study may be considered jurisdictional by the USACE if the connection to the Malheur River is confirmed via additional field studies.

The Oregon Department of State Lands (DSL), typically requires a permit for the placing of fill into "waters of the state." Waters of the state that meet jurisdictional requirements within the Wetland Study Area include Wetlands 1 and 2, and Tributary 2b. Ephemeral tributary drainages 1, 2a, and 3 through 10 do not meet DSL jurisdictional status because they have been determined to be ephemeral drainages.

J. DISCLAIMER

This wetland delineation and report documents the best professional judgment and conclusions of the EMS wetland investigation team. This report should be considered a draft until it is reviewed and approved in writing by the Oregon DSL in accordance with Oregon Administrative Rules 141-090-0005 through 141-090-0055.

K. REFERENCES

ACZ Inc. 1993. Workplan for Baseline Hydrologic Studies, Prepared for: Newmont Grassy Mountain Corporation. 32 pp.

EM Strategies, Inc. (EMS). 2017. In progress. *Draft Terrestrial Vegetation Baseline Study, Grassy Mountain Exploration Project.*

Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1. U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

_____. 2008. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region. ERDC/ Technical Report-06-16. U.S Army Engineer Research and Development Center, Vicksburg, MS.

HDR Engineering, Inc. (HDR). 2012. *Draft Wetland Delineation Report, Grassy Mountain Project*. August 2012.

_____. 2015. *Wetland Delineation and Stream Assessment Report, Grassy Mountain Exploration Project*. September 2015.

Nadeau, T.L. 2011. *Streamflow Duration Assessment Method for Oregon*, U.S. Environmental Protection Agency, Region 10, Document No. EPA 910-R-11-002.

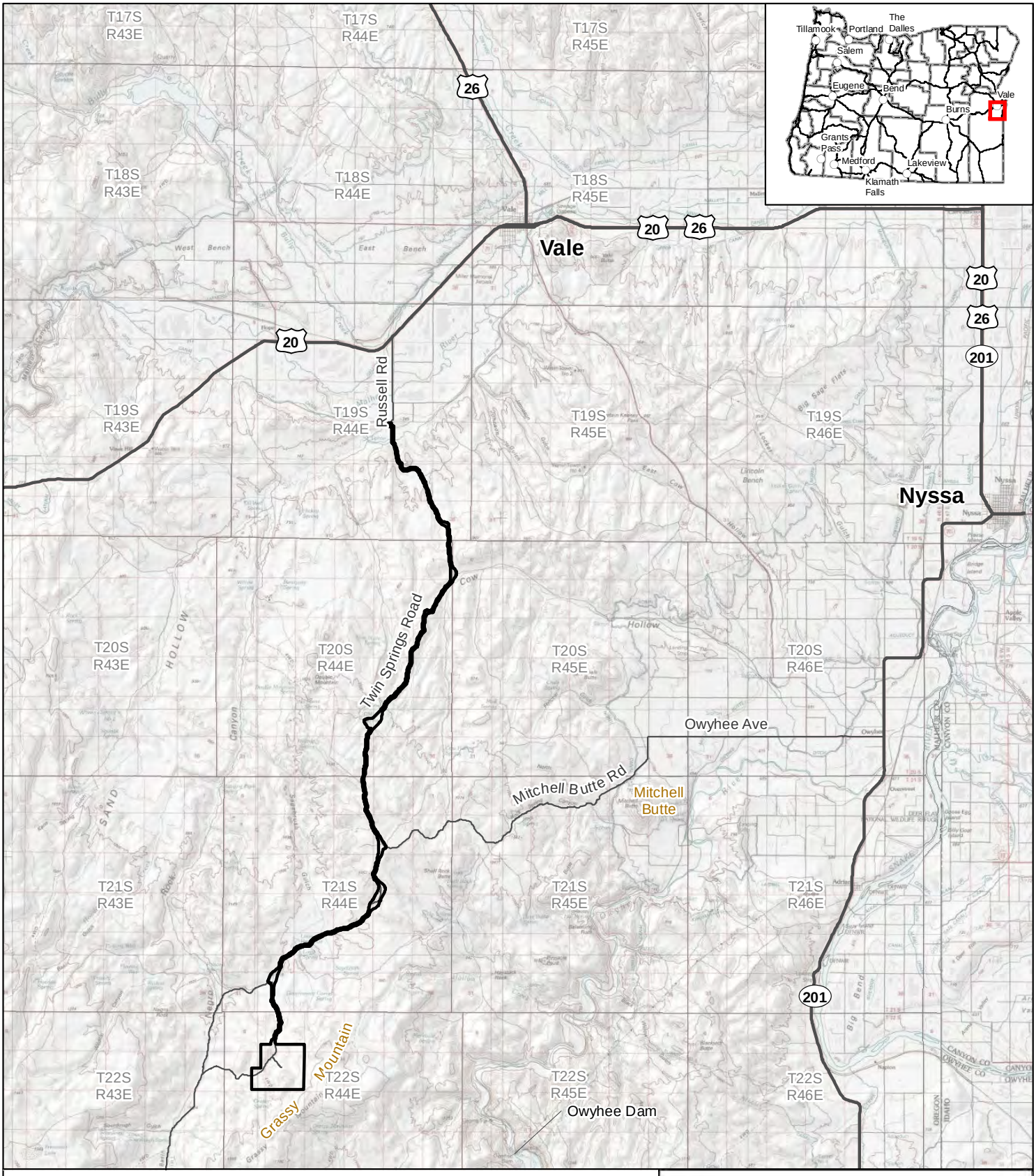
Natural Resources Conservation Service (NRCS). 2017. National Water and Climate Center. Available online at: https://www.wcc.nrcs.usda.gov/climate/wets_doc.html. Accessed November 10, 2017.

Oregon Department of Fish and Wildlife (ODFW). 2017. Natural Resources Information Management Program. Available online at: https://nrimp.dfw.state.or.us/nrimp/default.aspx?pn=fishdistdata. Accessed November 13, 2017.

United States Fish and Wildlife Service (USFWS). 1983. National Wetlands Inventory website. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. http://www.fws.gov/wetlands/

APPENDIX A

FIGURES



Explanation

- Wetland Study Area
- Existing Road

Sources:
PLSS: BLM
Roads: US Census Bureau
Basemap: Copyright:© 2013 National Geographic Society, i-cubed

0 5,000 10,000 15,000 20,000 Feet
0 1 2 3 4 Miles

N

Projection: UTM Zone 11 North, NAD83, meters

CALICO RESOURCES USA CORP.

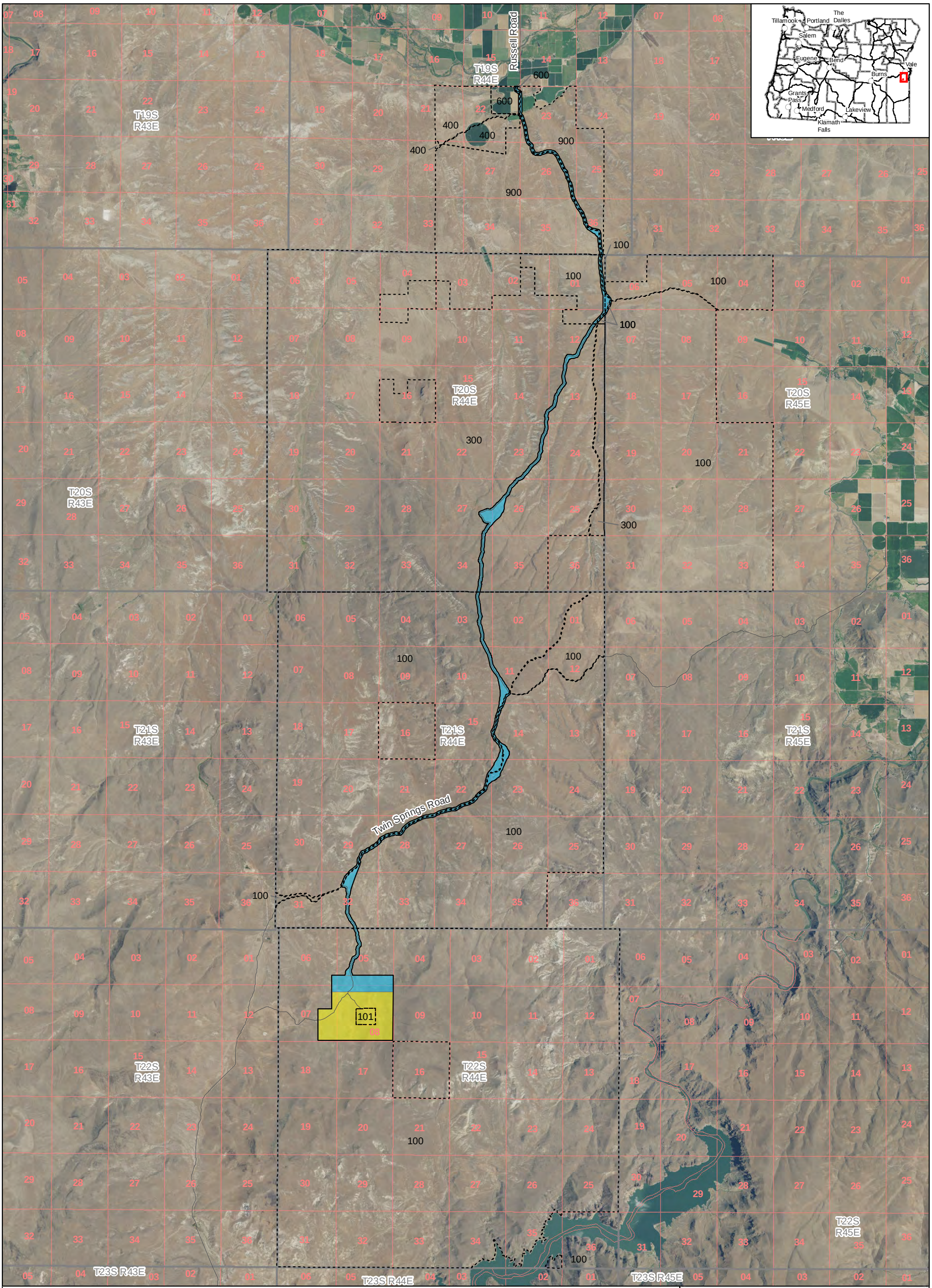
GRASSY MOUNTAIN MINE PROJECT

Location Map

Figure 1

Date:	01/19/2018	Drawn By:	JDB
Revised:		Project No.:	3678
Base Map:	USGS 100K quads: Boise, Brogan, Vale, Weiser		
File Name:	3678G_GrassyMtn_BL_WD_Fig01_Location.mxd		

EM STRATEGIES



Explanation

- Wetland Study Area
- Tax Lot
- Wetland Study Area (2017)
- HDR Wetland Study Area (2015)
- Existing Road

Projection: UTM Zone 11 North, NAD83, meters

Sources:
PLSS: BLM
Roads: US Census Bureau
Tax Lots: Malheur County, OR Dept of Revenue
Basemap: NRCS/USDA Digital Gateway

0 5,000 10,000 15,000 20,000 Feet
0 1 2 3 4 Miles

N

CALICO RESOURCES USA CORP.

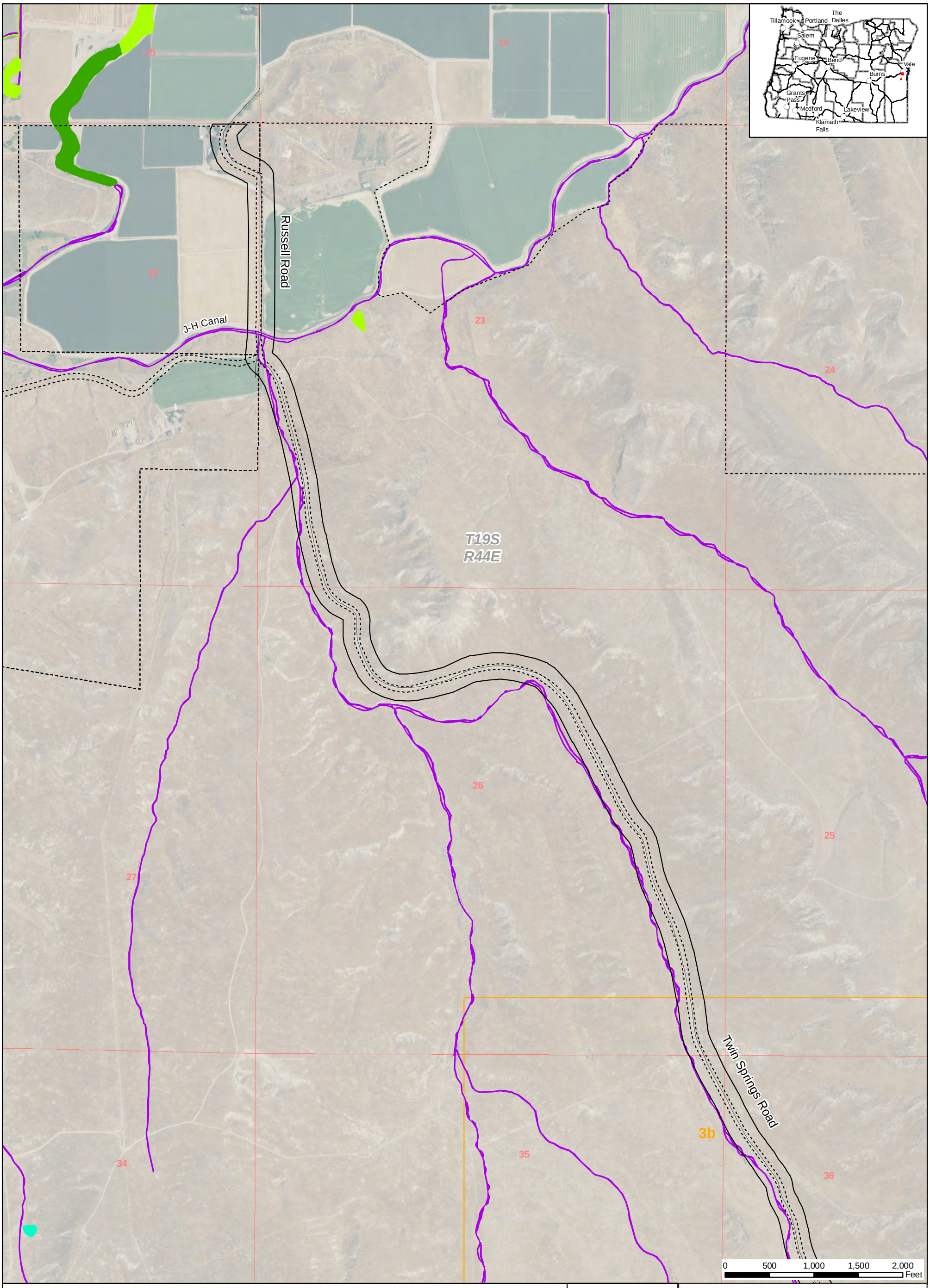
GRASSY MOUNTAIN MINE PROJECT

Wetland Study Areas and Tax Lots

Figure 2

Date:	01/19/2018	Drawn By:	JDB
Revised:		Project No.:	3678
Base Map:	2016 NAIP 1 meter resolution		
File Name:	3678G_GrassyMtn_BL_WD_Fig02_StudyAreas.mxd		

EM STRATEGIES



Explanation

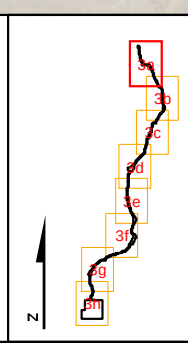
- Wetland Study Area
- Tax Lot
- Map Extent
- Existing Road

National Wetlands Inventory (NWI)

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Riverine

Sources:
NWI: U.S. Fish & Wildlife Service
PLSS: BLM
Roads: US Census Bureau
Tax Lots: Malheur County, OR Dept of Revenue
Basemap: NRCS/USDA Digital Gateway

Projection: UTM Zone 11 North, NAD83, meters



CALICO RESOURCES USA CORP.

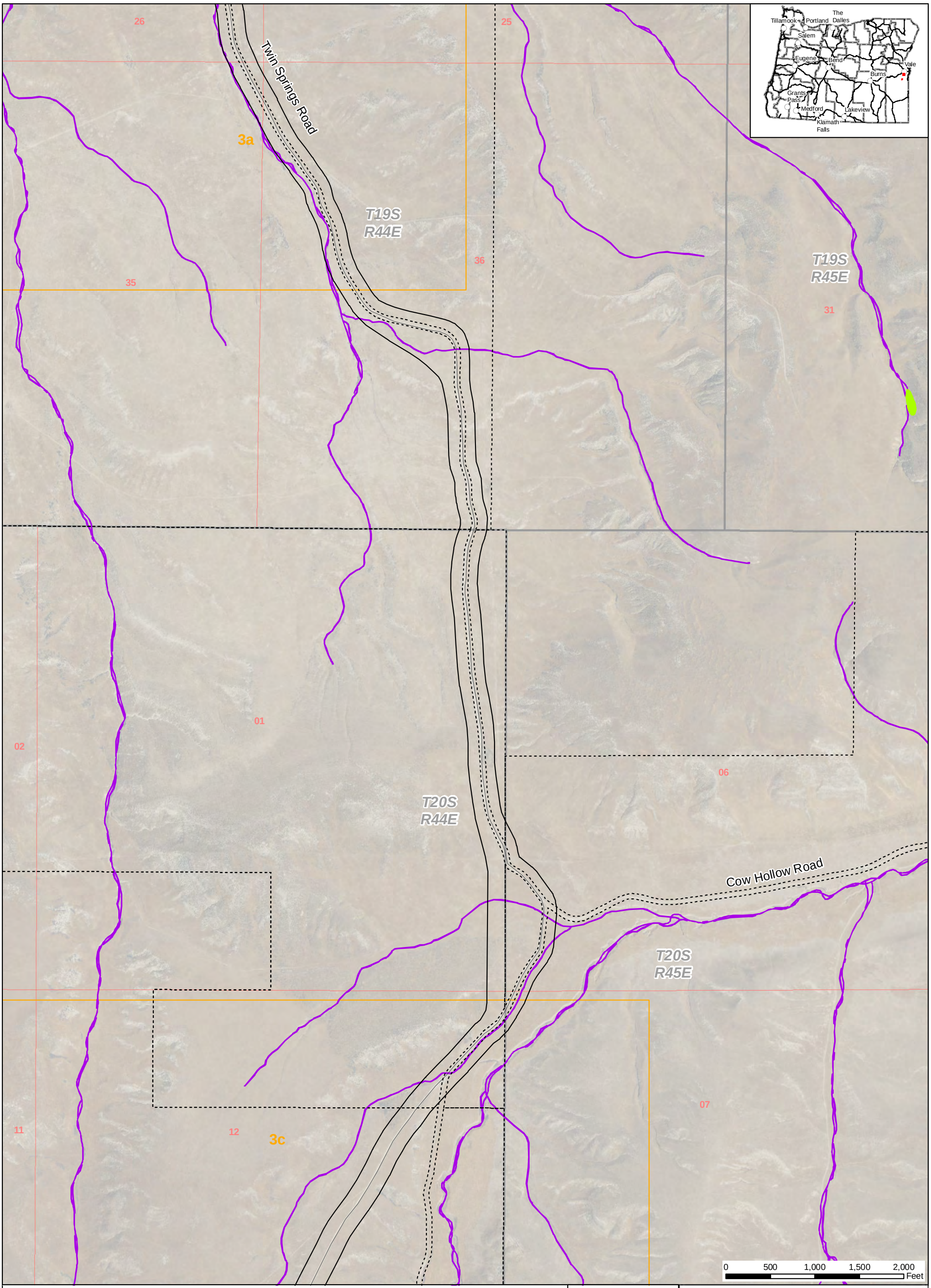
GRASSY MOUNTAIN MINE PROJECT

National Wetlands Inventory (NWI)

Figure 3a

Date:	01/19/2018	Drawn By:	JDB
Revised:		Project No.:	3678
Base Map:	2016 NAIP 1 meter resolution		
File Name:	3678G_GrassyMtn_BL_WD_Fig03_NWI12k.mxd		

EM STRATEGIES



Explanation

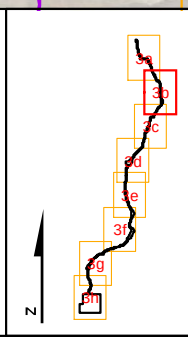
- Wetland Study Area
- Tax Lot
- Map Extent
- Existing Road

National Wetlands Inventory (NWI)

- Freshwater Emergent Wetland
- Riverine

Sources:
NWI: U.S. Fish & Wildlife Service
PLSS: BLM
Roads: US Census Bureau
Tax Lots: Malheur County, OR Dept of Revenue
Basemap: NRCS/USDA Digital Gateway

Projection: UTM Zone 11 North, NAD83, meters



CALICO RESOURCES USA CORP.

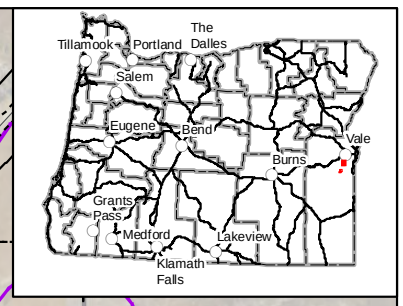
GRASSY MOUNTAIN MINE PROJECT

National Wetlands Inventory (NWI)

Figure 3b

Date:	01/19/2018	Drawn By:	JDB
Revised:		Project No.:	3678
Base Map:	2016 NAIP 1 meter resolution		
File Name:	3678G_GrassyMtn_BL_WD_Fig03_NWI12k.mxd		

EM STRATEGIES



3b

11

12

13

14

18

19

23

24

3d

T20S
R44E

T20S
R45E

Twin Springs Road

0 500 1,000 1,500 2,000 Feet

Explanation

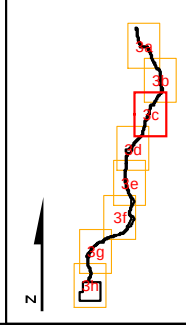
- Wetland Study Area
- Tax Lot
- Map Extent
- Existing Road

National Wetlands Inventory (NWI)

- Freshwater Emergent Wetland
- Riverine

Sources:
NWI: U.S. Fish & Wildlife Service
PLSS: BLM
Roads: US Census Bureau
Tax Lots: Malheur County, OR Dept of Revenue
Basemap: NRCS/USDA Digital Gateway

Projection: UTM Zone 11 North, NAD83, meters



CALICO RESOURCES USA CORP.

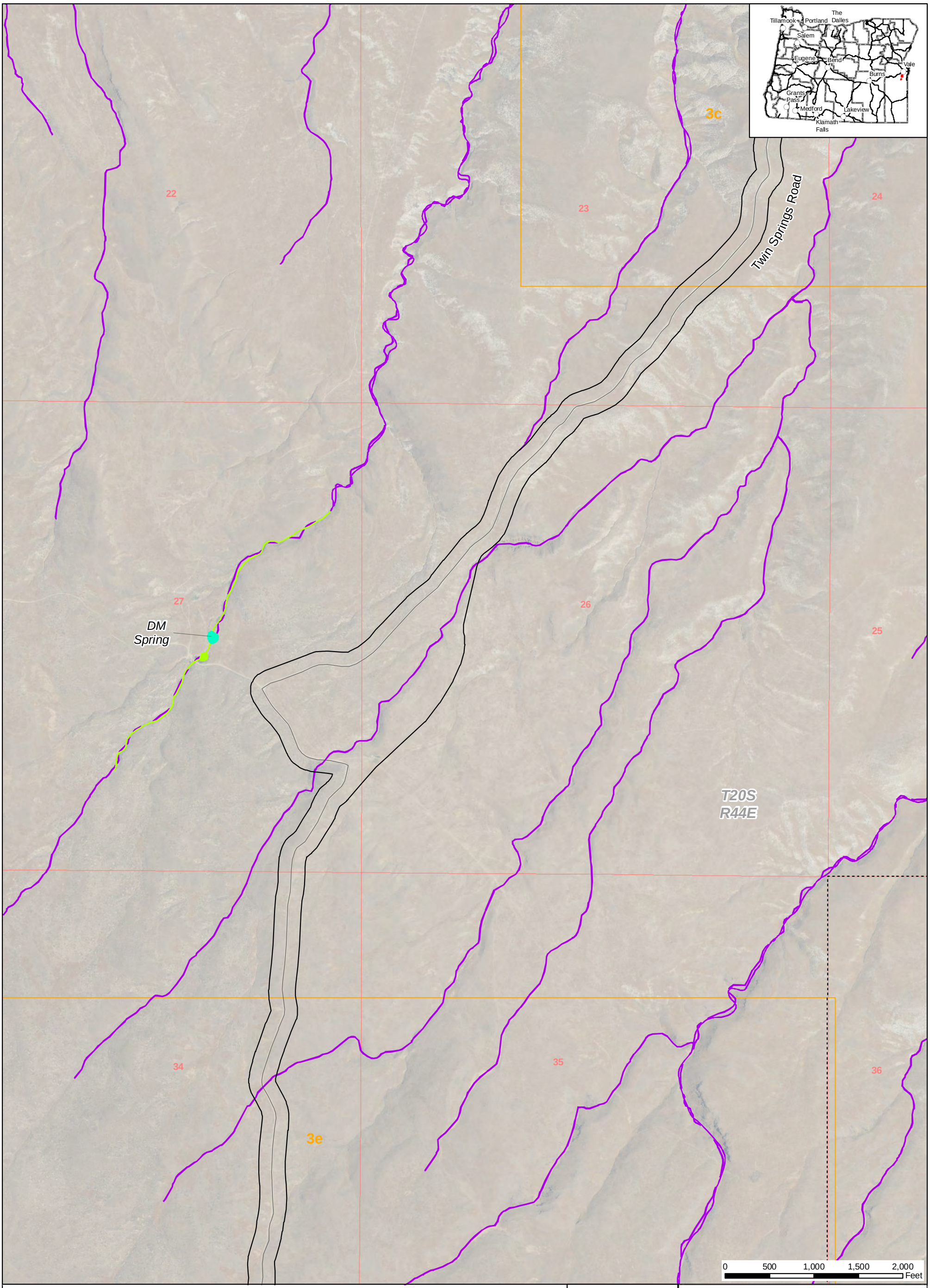
GRASSY MOUNTAIN MINE PROJECT

National Wetlands Inventory (NWI)

Figure 3c

Date:	01/19/2018	Drawn By:	JDB
Revised:		Project No.:	3678
Base Map:	2016 NAIP 1 meter resolution		
File Name:	3678G_GrassyMtn_BL_WD_Fig03_NWI12k.mxd		

EM STRATEGIES



Explanation

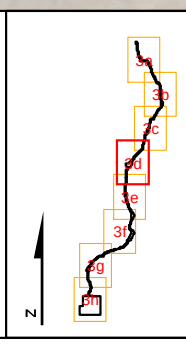
- Wetland Study Area
- Tax Lot
- Map Extent
- Existing Road

National Wetlands Inventory (NWI)

- Freshwater Emergent Wetland
- Freshwater Pond
- Riverine

Sources:
NWI: U.S. Fish & Wildlife Service
PLSS: BLM
Roads: US Census Bureau
Tax Lots: Malheur County, OR Dept of Revenue
Basemap: NRCS/USDA Digital Gateway

Projection: UTM Zone 11 North, NAD83, meters



CALICO RESOURCES USA CORP.

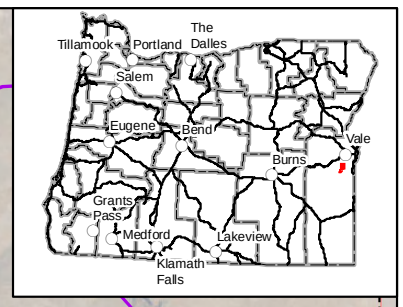
GRASSY MOUNTAIN MINE PROJECT

National Wetlands Inventory (NWI)

Figure 3d

Date:	01/19/2018	Drawn By:	JDB
Revised:		Project No.:	3678
Base Map:	2016 NAIP 1 meter resolution		
File Name:	3678G_GrassyMtn_BL_WD_Fig03_NWI12k.mxd		

EM STRATEGIES



34
35
3d
T20S
R44E
03
02
01
T21S
R44E
Twin Springs Road
12
10
11
3f
15
14
Mitchell Butte Road

0 500 1,000 1,500 2,000 Feet

Explanation

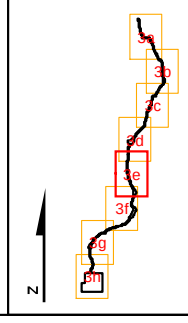
- Wetland Study Area
- Tax Lot
- Map Extent
- Existing Road

National Wetlands Inventory (NWI)

- Freshwater Pond
- Riverine

Sources:
NWI: U.S. Fish & Wildlife Service
PLSS: BLM
Roads: US Census Bureau
Tax Lots: Malheur County, OR Dept of Revenue
Basemap: NRCS/USDA Digital Gateway

Projection: UTM Zone 11 North, NAD83, meters



CALICO RESOURCES USA CORP.

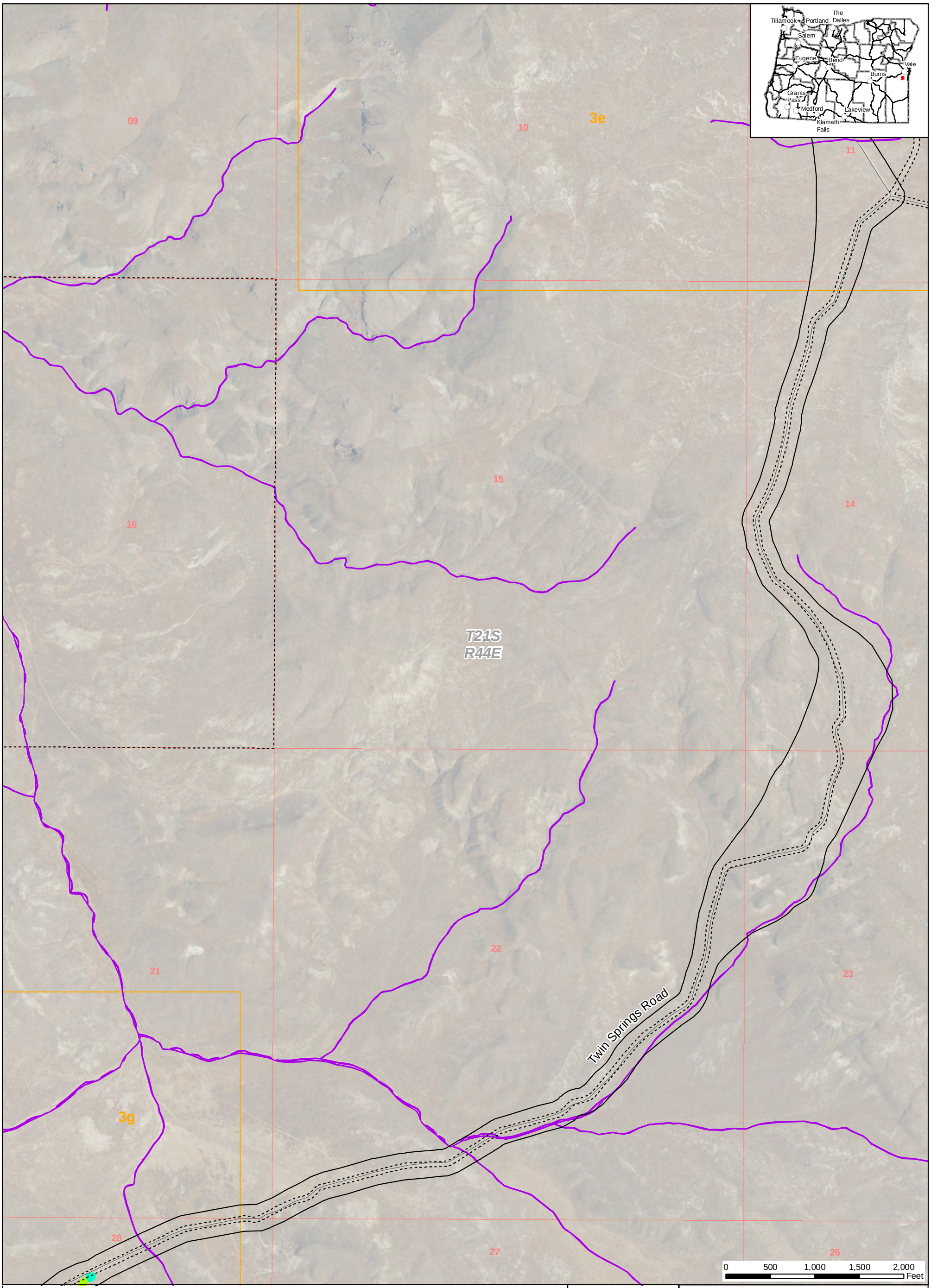
GRASSY MOUNTAIN MINE PROJECT

National Wetlands Inventory (NWI)

Figure 3e

Date:	01/19/2018	Drawn By:	JDB
Revised:		Project No.:	3678
Base Map:	2016 NAIP 1 meter resolution		
File Name:	3678G_GrassyMtn_BL_WD_Fig03_NWI12k.mxd		

EM STRATEGIES



Explanation

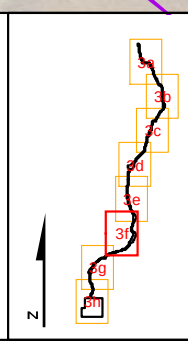
- Wetland Study Area
- Tax Lot
- Map Extent
- Existing Road

National Wetlands Inventory (NWI)

- Freshwater Emergent Wetland
- Freshwater Pond
- Riverine

Sources:
NWI: U.S. Fish & Wildlife Service
PLSS: BLM
Roads: US Census Bureau
Tax Lots: Malheur County, OR Dept of Revenue
Basemap: NRCS/USDA Digital Gateway

Projection: UTM Zone 11 North, NAD83, meters



CALICO RESOURCES USA CORP.

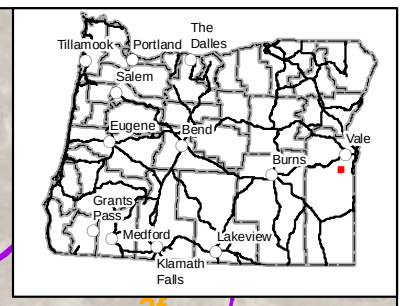
GRASSY MOUNTAIN MINE PROJECT

National Wetlands Inventory (NWI)

Figure 3f

Date:	01/19/2018	Drawn By:	JDB
Revised:		Project No.:	3678
Base Map:	2016 NAIP 1 meter resolution		
File Name:	3678G_GrassyMtn_BL_WD_Fig03_NWI12k.mxd		

EM STRATEGIES



19
20
21
29
28
30
31
32
33
05
06
04

3f
3h

Lowe Reservoir

Lowe Spring

T21S R44E

T22S R44E

Twin Springs Road

Access Road

0 500 1,000 1,500 2,000 Feet

Explanation

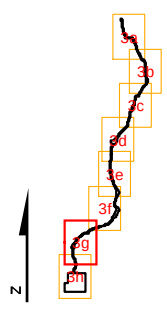
- Wetland Study Area
- Tax Lot
- Map Extent
- Existing Road

National Wetlands Inventory (NWI)

- Freshwater Emergent Wetland
- Freshwater Pond
- Riverine

Sources:
NWI: U.S. Fish & Wildlife Service
PLSS: BLM
Roads: US Census Bureau
Tax Lots: Malheur County, OR Dept of Revenue
Basemap: NRCS/USDA Digital Gateway

Projection: UTM Zone 11 North, NAD83, meters



CALICO RESOURCES USA CORP.

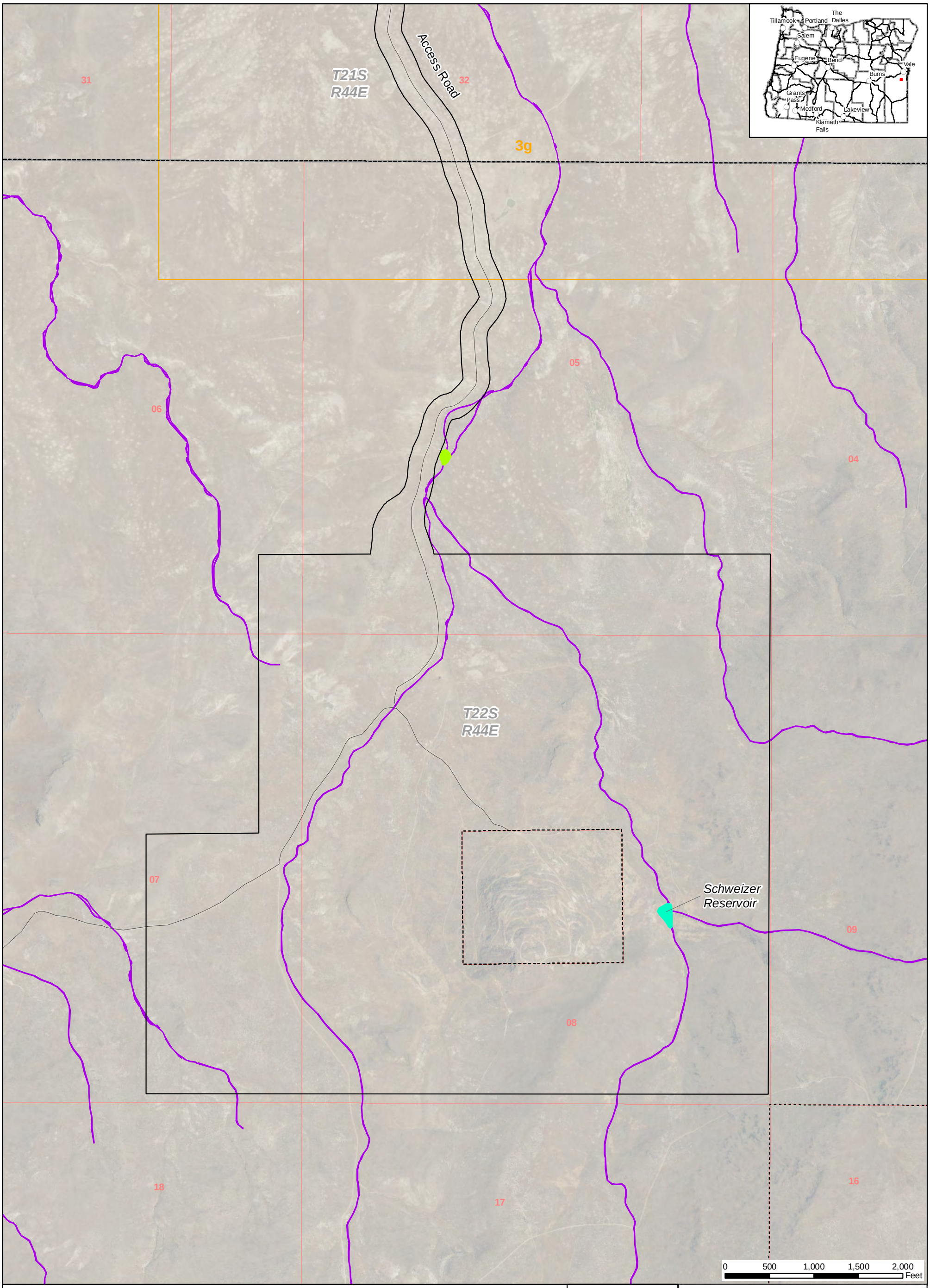
GRASSY MOUNTAIN MINE PROJECT

National Wetlands Inventory (NWI)

Figure 3g

Date:	01/19/2018	Drawn By:	JDB
Revised:		Project No.:	3678
Base Map:	2016 NAIP 1 meter resolution		
File Name:	3678G_GrassyMtn_BL_WD_Fig03_NWI12k.mxd		

EM STRATEGIES



Explanation

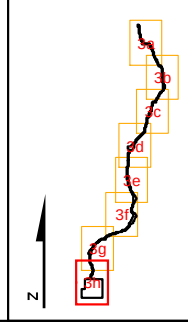
- Wetland Study Area
- Tax Lot
- Map Extent
- Existing Road

National Wetlands Inventory (NWI)

- Freshwater Emergent Wetland
- Freshwater Pond
- Riverine

Projection: UTM Zone 11 North, NAD83, meters

Sources:
NWI: U.S. Fish & Wildlife Service
PLSS: BLM
Roads: US Census Bureau
Tax Lots: Malheur County, OR Dept of Revenue
Basemap: NRCS/USDA Digital Gateway



CALICO RESOURCES USA CORP.

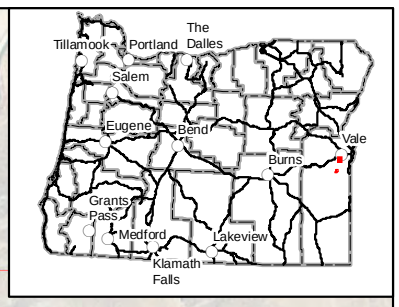
GRASSY MOUNTAIN MINE PROJECT

National Wetlands Inventory (NWI)

Figure 3h

Date:	01/19/2018	Drawn By:	JDB
Revised:		Project No.:	3678
Base Map:	2016 NAIP 1 meter resolution		
File Name:	3678G_GrassyMtn_BL_WD_Fig03_NWI12k.mxd		

EM STRATEGIES



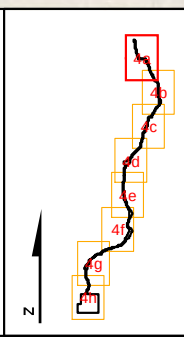
15
14
600
600
Russell Road
71
72
23
400
22
24
End of defined channel
70
69
400
Tributary 10 re-enters study area
T19S
R44E
900
Tributary 10 leaves study area
26
25
27
900
68
67
Twin Springs Road
4b
35
36
34
0 500 1,000 1,500 2,000 Feet

Explanation
- Wetland Study Area
- Tax Lot
- Map Extent
- Existing Road
- Photo Point
- Ephemeral Drainage
- Artificial Water Body (J-H Canal)

Projection: UTM Zone 11 North, NAD83, meters

Sources:
PLSS: BLM
Roads: US Census Bureau
Tax Lots: Malheur County, OR Dept of Revenue
Basemap: NRCS/USDA Digital Gateway

Accuracy (EMS):
Wetlands survey fieldwork completed May 7, 2013. Locations captured using sub-meter resource grade GPS units with 93.8% of positions captured having a horizontal accuracy of less than 1/2 meter after post-processing Survey field work completed April 7, 2015. Locations captured using sub-meter resource grade equipment with 84.9% of positions captured having a horizontal accuracy of less than 1/2 meter after post-processing.
Wetlands survey fieldwork conducted May 18-21, 2017. Locations captured using sub-meter resource grade GPS unit with 60.3% of positions captured having a horizontal accuracy of less than 1/2 meter and 91.5% of positions captured having a horizontal accuracy of less than 1 meter after post-processing.



CALICO RESOURCES USA CORP.

GRASSY MOUNTAIN MINE PROJECT

Wetland Map Book

Figure 4a

Date:	01/23/2018	Drawn By:	JDB
Revised:		Project No.:	3678
Base Map:	2016 NAIP 1 meter resolution		
File Name:	3678G_GrassyMtn_BL_WD_Fig04_Results12k.mxd		

EM STRATEGIES

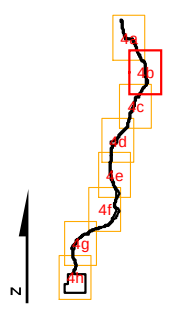
Explanation

- Wetland Study Area
- Tax Lot
- Map Extent
- Existing Road
- Photo Point
- Ephemeral Drainage

Projection: UTM Zone 11 North, NAD83, meters

Sources:
PLSS: BLM
Roads: US Census Bureau
Tax Lots: Malheur County, OR Dept of Revenue
Basemap: NRCS/USDA Digital Gateway

Accuracy (EMS):
Wetlands survey fieldwork completed May 7, 2013. Locations captured using sub-meter resource grade GPS units with 93.8% of positions captured having a horizontal accuracy of less than 1/2 meter after post-processing Survey field work completed April 7, 2015. Locations captured using sub-meter resource grade equipment with 84.9% of positions captured having a horizontal accuracy of less than 1/2 meter after post-processing.
Wetlands survey fieldwork conducted May 18-21, 2017. Locations captured using sub-meter resource grade GPS unit with 60.3% of positions captured having a horizontal accuracy of less than 1/2 meter and 91.5% of positions captured having a horizontal accuracy of less than 1 meter after post-processing.



CALICO RESOURCES USA CORP.

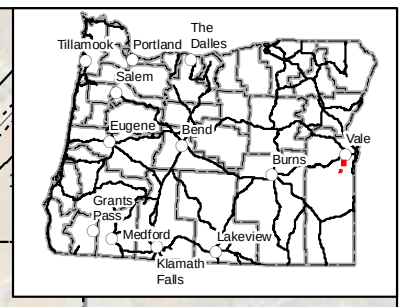
GRASSY MOUNTAIN MINE PROJECT

Wetland Map Book

Figure 4b

Date: 01/23/2018	Drawn By: JDB
Revised:	Project No.: 3678
Base Map: 2016 NAIP 1 meter resolution	
File Name: 3678G_GrassyMtn_BL_WD_Fig04_Results12k.mxd	

EM STRATEGIES



100

4b

12

11

300

13

14

T20S
R44E

300

T20S
R45E

100

18

24

19

23

4d

Twin Springs Road

0 500 1,000 1,500 2,000 Feet

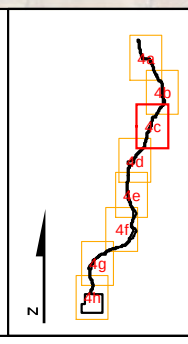
Explanation

- Wetland Study Area
- Tax Lot
- Map Extent
- Existing Road

Projection: UTM Zone 11 North, NAD83, meters

Sources:
PLSS: BLM
Roads: US Census Bureau
Tax Lots: Malheur County, OR Dept of Revenue
Basemap: NRCS/USDA Digital Gateway

Accuracy (EMS):
Wetlands survey fieldwork completed May 7, 2013. Locations captured using sub-meter resource grade GPS units with 93.8% of positions captured having a horizontal accuracy of less than 1/2 meter after post-processing Survey field work completed April 7, 2015. Locations captured using sub-meter resource grade equipment with 84.9% of positions captured having a horizontal accuracy of less than 1/2 meter after post-processing.
Wetlands survey fieldwork conducted May 18-21, 2017. Locations captured using sub-meter resource grade GPS unit with 60.3% of positions captured having a horizontal accuracy of less than 1/2 meter and 91.5% of positions captured having a horizontal accuracy of less than 1 meter after post-processing.



CALICO RESOURCES USA CORP.

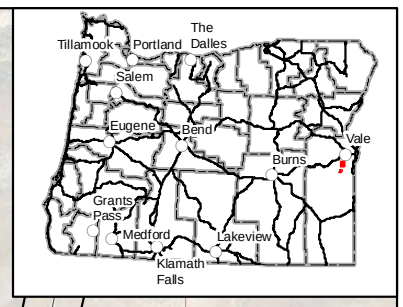
GRASSY MOUNTAIN MINE PROJECT

Wetland Map Book

Figure 4c

Date:	01/23/2018	Drawn By:	JDB
Revised:		Project No.:	3678
Base Map:	2016 NAIP 1 meter resolution		
File Name:	3678G_GrassyMtn_BL_WD_Fig04_Results12k.mxd		

EM STRATEGIES



4c

22

23

24

T20S
R44E

Twin Springs Road

Tributary 9 leaves study area

60

59

300

27

26

25

Tributary 9

58

Begin defined channel

57

34

55

56

35

36

4e

0 500 1,000 1,500 2,000 Feet

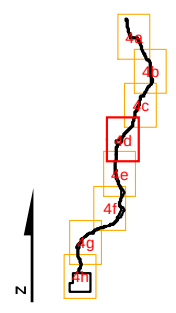
Explanation

- Wetland Study Area
- Tax Lot
- Map Extent
- Existing Road
- Photo Point
- Ephemeral Drainage

Projection: UTM Zone 11 North, NAD83, meters

Sources:
PLSS: BLM
Roads: US Census Bureau
Tax Lots: Malheur County, OR Dept of Revenue
Basemap: NRCS/USDA Digital Gateway

Accuracy (EMS):
Wetlands survey fieldwork completed May 7, 2013. Locations captured using sub-meter resource grade GPS units with 93.8% of positions captured having a horizontal accuracy of less than 1/2 meter after post-processing Survey field work completed April 7, 2015. Locations captured using sub-meter resource grade equipment with 84.9% of positions captured having a horizontal accuracy of less than 1/2 meter after post-processing.
Wetlands survey fieldwork conducted May 18-21, 2017. Locations captured using sub-meter resource grade GPS unit with 60.3% of positions captured having a horizontal accuracy of less than 1/2 meter and 91.5% of positions captured having a horizontal accuracy of less than 1 meter after post-processing.



CALICO RESOURCES USA CORP.

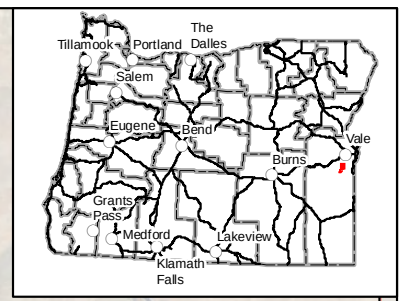
GRASSY MOUNTAIN MINE PROJECT

Wetland Map Book

Figure 4d

Date:	01/23/2018	Drawn By:	JDB
Revised:		Project No.:	3678
Base Map:	2016 NAIP 1 meter resolution		
File Name:	3678G_GrassyMtn_BL_WD_Fig04_Results12k.mxd		

EM STRATEGIES



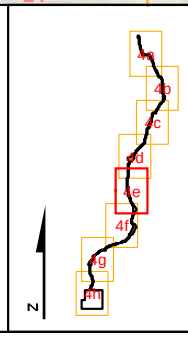
55
56
4d
34
T20S
R44E
300
35
36
03
02
01
54
T21S
R44E
100
Twin Springs Road
10
11
100
4f
52
53
Mitchell Butte Road
12
100
15
14
0 500 1,000 1,500 2,000 Feet

Explanation
- Wetland Study Area
- Tax Lot
- Map Extent
- Existing Road
- Photo Point

Projection: UTM Zone 11 North, NAD83, meters

Sources:
PLSS: BLM
Roads: US Census Bureau
Tax Lots: Malheur County, OR Dept of Revenue
Basemap: NRCS/USDA Digital Gateway

Accuracy (EMS):
Wetlands survey fieldwork completed May 7, 2013. Locations captured using sub-meter resource grade GPS units with 93.8% of positions captured having a horizontal accuracy of less than 1/2 meter after post-processing Survey field work completed April 7, 2015. Locations captured using sub-meter resource grade equipment with 84.9% of positions captured having a horizontal accuracy of less than 1/2 meter after post-processing.
Wetlands survey fieldwork conducted May 18-21, 2017. Locations captured using sub-meter resource grade GPS unit with 60.3% of positions captured having a horizontal accuracy of less than 1/2 meter and 91.5% of positions captured having a horizontal accuracy of less than 1 meter after post-processing.



CALICO RESOURCES USA CORP.

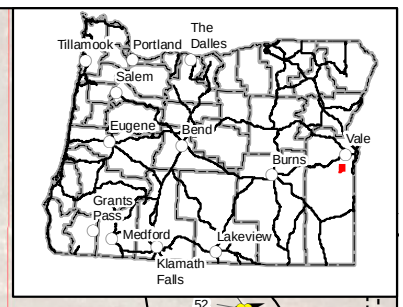
GRASSY MOUNTAIN MINE PROJECT

Wetland Map Book

Figure 4e

Date:	01/23/2018	Drawn By:	JDB
Revised:		Project No.:	3678
Base Map:	2016 NAIP 1 meter resolution		
File Name:	3678G_GrassyMtn_BL_WD_Fig04_Results12k.mxd		

EM STRATEGIES



09
10
11
4e
15
14
16
21
22
23
T21S
R44E
100
4g
28
27
26
52
53
100
Tributary 8 enters study area
Tributary 8
50
51
Tributary 8 leaves study area
Twin Springs Road
Tributary 8 leaves study area
Tributary 8
48
49
47
46
Tributary 8 begin defined channel
45
44
DP3
Photo 42
DP2
Photo 41
40
39
0 500 1,000 1,500 2,000 Feet

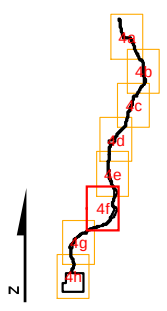
Explanation

- Wetland Study Area
- Tax Lot
- Map Extent
- Existing Road
- Photo Point
- Spring
- Soil Pit
- Wetland
- Ephemeral Drainage

Projection: UTM Zone 11 North, NAD83, meters

Sources:
PLSS: BLM
Roads: US Census Bureau
Tax Lots: Malheur County, OR Dept of Revenue
Basemap: NRCS/USDA Digital Gateway

Accuracy (EMS):
Wetlands survey fieldwork completed May 7, 2013. Locations captured using sub-meter resource grade GPS units with 93.8% of positions captured having a horizontal accuracy of less than 1/2 meter after post-processing Survey field work completed April 7, 2015. Locations captured using sub-meter resource grade equipment with 84.9% of positions captured having a horizontal accuracy of less than 1/2 meter after post-processing.
Wetlands survey fieldwork conducted May 18-21, 2017. Locations captured using sub-meter resource grade GPS unit with 60.3% of positions captured having a horizontal accuracy of less than 1/2 meter and 91.5% of positions captured having a horizontal accuracy of less than 1 meter after post-processing.



CALICO RESOURCES USA CORP.

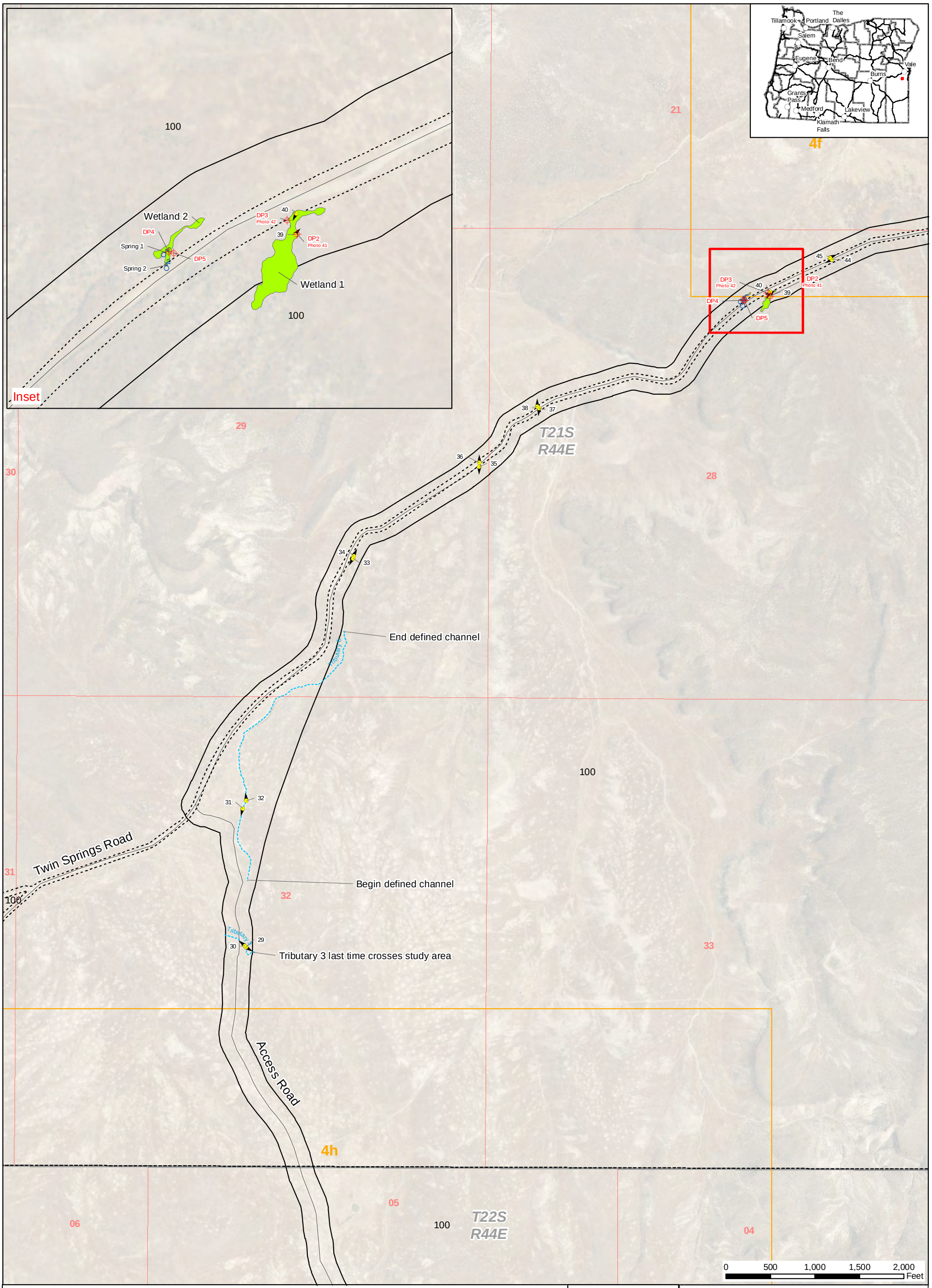
GRASSY MOUNTAIN MINE PROJECT

Wetland Map Book

Figure 4f

Date:	01/23/2018	Drawn By:	JDB
Revised:		Project No.:	3678
Base Map:	2016 NAIP 1 meter resolution		
File Name:	3678G_GrassyMtn_BL_WD_Fig04_Results12k.mxd		

EM STRATEGIES



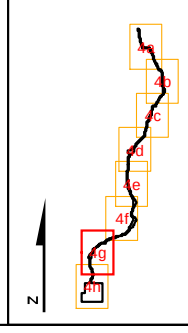
Explanation

- Wetland Study Area
- Tax Lot
- Map Extent
- Existing Road
- Photo Point
- Spring
- Soil Pit
- Wetland
- Ephemeral Drainage

Projection: UTM Zone 11 North, NAD83, meters

Sources:
PLSS: BLM
Roads: US Census Bureau
Tax Lots: Malheur County, OR Dept of Revenue
Basemap: NRCS/USDA Digital Gateway

Accuracy (EMS):
Wetlands survey fieldwork completed May 7, 2013. Locations captured using sub-meter resource grade GPS units with 93.8% of positions captured having a horizontal accuracy of less than 1/2 meter after post-processing Survey field work completed April 7, 2015. Locations captured using sub-meter resource grade equipment with 84.9% of positions captured having a horizontal accuracy of less than 1/2 meter after post-processing.
Wetlands survey fieldwork conducted May 18-21, 2017. Locations captured using sub-meter resource grade GPS unit with 60.3% of positions captured having a horizontal accuracy of less than 1/2 meter and 91.5% of positions captured having a horizontal accuracy of less than 1 meter after post-processing.



CALICO RESOURCES USA CORP.

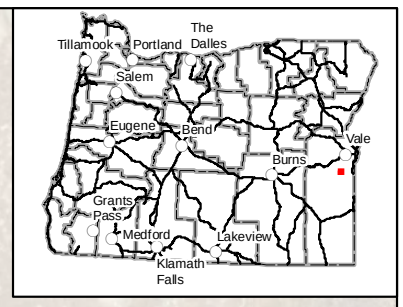
GRASSY MOUNTAIN MINE PROJECT

Wetland Map Book

Figure 4g

Date:	01/23/2018	Drawn By:	JDB
Revised:		Project No.:	3678
Base Map:	2016 NAIP 1 meter resolution		
File Name:	3678G_GrassyMtn_BL_WD_Fig04_Results12k.mxd		

EM STRATEGIES



Access Road

T21S R44E

T22S R44E

31 32 05 06 04 07 09 08 18 17 16

100

4g

Tributary 3 re-enters & leaves study area

Tributary 3 leaves study area

Tributary 2 leaves study area

Tributary 5 leaves study area

Begin defined channel

Begin defined channel (EMS)

End of defined channel (HDR)

101

Schweizer Reservoir

DP1
Photo 26

8A
Photo 9 & 10

Tributary 1
Tributary 2a
Tributary 2b
Tributary 3
Tributary 4
Tributary 5

1 2 3 4 5 6 7 8 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

0 500 1,000 1,500 2,000 Feet

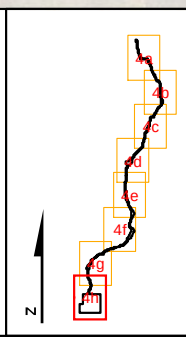
Explanation

- Wetland Study Area
- Tax Lot
- Map Extent
- Existing Road
- Photo Point
- Soil Pit
- Schweizer Reservoir
- Ephemeral Drainage
- Intermittent Drainage
- Embankment

Projection: UTM Zone 11 North, NAD83, meters

Sources:
PLSS: BLM
Roads: US Census Bureau
Tax Lots: Malheur County, OR Dept of Revenue
Basemap: NRCS/USDA Digital Gateway

Accuracy (EMS):
Wetlands survey fieldwork completed May 7, 2013. Locations captured using sub-meter resource grade GPS units with 93.8% of positions captured having a horizontal accuracy of less than 1/2 meter after post-processing Survey field work completed April 7, 2015. Locations captured using sub-meter resource grade equipment with 84.9% of positions captured having a horizontal accuracy of less than 1/2 meter after post-processing.
Wetlands survey fieldwork conducted May 18-21, 2017. Locations captured using sub-meter resource grade GPS unit with 60.3% of positions captured having a horizontal accuracy of less than 1/2 meter and 91.5% of positions captured having a horizontal accuracy of less than 1 meter after post-processing.



CALICO RESOURCES USA CORP.

GRASSY MOUNTAIN MINE PROJECT

Wetland Map Book

Figure 4h

Date:	01/23/2018	Drawn By:	JDB
Revised:		Project No.:	3678
Base Map:	2016 NAIP 1 meter resolution		
File Name:	3678G_GrassyMtn_BL_WD_Fig04_Results12k.mxd		

EM STRATEGIES

APPENDIX B

WETLAND AND SDAM DATA FORMS

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Grassy Mtn City/County: Malheur Sampling Date: 5/18/17
Applicant/Owner: Calico Resources Inc State: OR Sampling Point: DP1
Investigator(s): S.M. Harrelson (EMS) Section, Township, Range:
Landform (hillslope, terrace, etc.): Plain Local relief (concave, convex, none): concave Slope (%): 1
Subregion (LRR): Northwestern Wheat & Range Lat: 4836882 Long: 470730.9 Datum: NAD83
Soil Map Unit Name: not available NWI classification: PEMICh
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ____ No X
Hydric Soil Present? Yes ____ No X
Wetland Hydrology Present? Yes ____ No X

Is the Sampled Area within a Wetland? Yes ____ No X

Remarks:
Precipitation higher than average

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1. None			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1. Artemisia tridentata	15	Y	n/a
2. Chrysothamnus viscidiflorus	1		n/a
3.			
4.			
5.			
	16 = Total Cover		
Herb Stratum (Plot size: 5')			
1. Poa bulbosa	10		FACU
2. Bromus tectorum	50	Y	n/a
3. Ceratocephala testiculata	2		n/a
4.			
5.			
6.			
7.			
8.			
	62 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1. None			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:
___ Dominance Test is >50%
___ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

SOIL

Sampling Point: DP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-10	10YR 3/3	100					clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR C)**
- ___ 1 cm Muck (A9) **(LRR D)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR C)**
- ___ 2 cm Muck (A10) **(LRR B)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: hardpan

Depth (inches): 10

Hydric Soil Present? Yes ____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) **(Riverine)**
- ___ Sediment Deposits (B2) **(Riverine)**
- ___ Drift Deposits (B3) **(Riverine)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ____ Depth (inches): ____

Water Table Present? Yes ____ No ____ Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ____ No ____ Depth (inches): ____

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

DP2 Wetland 1

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Grassy Mtn 3678 City/County: Malheur Sampling Date: 5/19/17

Applicant/Owner: Calico Resources Inc State: OR Sampling Point: DP2

Investigator(s): S.M. Harrelson Section, Township, Range:

Landform (hillslope, terrace, etc.): toeslope Local relief (concave, convex, none): none Slope (%): 1

Subregion (LRR): Columbia/Snake River Plateau Lat: 4940871 Long: 472381.8 Datum: NAD83

Soil Map Unit Name: Not available NWI classification: PEMIB

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	Is the Sampled Area within a Wetland? Yes X No ____
Hydric Soil Present?	Yes X No ____	
Wetland Hydrology Present?	Yes X No ____	

Remarks:
Precipitation higher than average

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1. None			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1. None			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: 5')			
1. Bromus tectorum	50	Y	N/L
2. Leymus cinereus	50	Y	FAC
3. Juncus balticus	5		FACW
4. Poa bulbosa	3		FACU
5.			
6.			
7.			
8.			
	108 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	5	x 2 =	10
FAC species	50	x 3 =	150
FACU species	3	x 4 =	12
UPL species	0	x 5 =	0
Column Totals:	58 (A)		172 (B)

Prevalence Index = B/A = 2.9

Hydrophytic Vegetation Indicators:

__ Dominance Test is >50%

X Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: DP2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 3/1	98	10YR 3/6	2	C	M	Sandy loam	w/ some muck (5%)
2-12	10YR 3/3	100	—	—	—	—	Sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- X Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks:

Very dark surface layer w/some redox features evident & presence of muck

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 2

Water Table Present? Yes X No ___ Depth (inches): 3

Saturation Present? (includes capillary fringe) Yes ___ No ___ Depth (inches): ___

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Ground water seep w/the presence of water flowing along the surface; standing water in hole to w/in 2" of surface

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Grassy Mtn City/County: Malheur Sampling Date: 5/21/17
Applicant/Owner: Calico Resources Inc State: OR Sampling Point: DP3
Investigator(s): S.M. Harrelson (EMS) Section, Township, Range:
Landform (hillslope, terrace, etc.): toeslope Local relief (concave, convex, none): convex Slope (%): 1
Subregion (LRR): Northwestern Wheat & Range Lat: 4840881 Long: 472374.5 Datum: NAD83
Soil Map Unit Name: Not available NWI classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No X (If no, explain in Remarks.)
Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____ No X	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____ No X	
Wetland Hydrology Present?	Yes _____ No X	

Remarks:
Precipitation higher than average this year

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. none			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1. none			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5')			
1. Bromus hordeaceus	70	Y	n/a
2. Leymus cinereus	30	Y	FAC
3. Chorispora tenella	2		n/a
4.			
5.			
6.			
7.			
8.			
	102 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1. none			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum _____ % Cover of Biotic Crust _____

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:
___ Dominance Test is >50%
___ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No X

Remarks:

SOIL

Sampling Point: DP3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-14	10YR 3/3	100					sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR C)**
- ___ 1 cm Muck (A9) **(LRR D)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR C)**
- ___ 2 cm Muck (A10) **(LRR B)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) **(Riverine)**
- ___ Sediment Deposits (B2) **(Riverine)**
- ___ Drift Deposits (B3) **(Riverine)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No _____ Depth (inches): _____

Water Table Present? Yes _____ No _____ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No _____ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Wetland 2

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Grassy Mtn City/County: Malheur Sampling Date: 5/21/17
Applicant/Owner: Calico Resources Inc State: OR Sampling Point: DP4
Investigator(s): S.M. Harrelson (EMS) Section, Township, Range:
Landform (hillslope, terrace, etc.): Plain Local relief (concave, convex, none): concave Slope (%): 1
Subregion (LRR): B Lat: 4640858 Long: 472290 Datum: NAD83
Soil Map Unit Name: not available NWI classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	**Is the Sampled Area within a Wetland?** Yes X No ____
Hydric Soil Present?	Yes X No ____	
Wetland Hydrology Present?	Yes X No ____	

Remarks:
Precipitation higher than average

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1. none			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1. none			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: ____)			
1. Hordeum brachyantherum	10		FACW
2. Poa bulbosa	25	Y	FACU
3. Poa palustris	20	Y	FAC
4. Leymus cinereus	30	Y	FAC
5. Juncus bufonius	3		FACW
6.			
7.			
8.			
	88 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1. none			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 67 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:
X Dominance Test is >50%
__ Prevalence Index is ≤3.0[1]
__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: DP4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10"	10YR 3/1	58	10YR 3/6	2	C	M	Sandy loam	
	10YR 3/2	40						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR C)**
- ___ 1 cm Muck (A9) **(LRR D)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR C)**
- ___ 2 cm Muck (A10) **(LRR B)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) **(Riverine)**
- ___ Sediment Deposits (B2) **(Riverine)**
- ___ Drift Deposits (B3) **(Riverine)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 2

Water Table Present? Yes X No ___ Depth (inches): 3

Saturation Present? (includes capillary fringe) Yes ___ No ___ Depth (inches): _____

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

standing water in hole to w/in 3" of the surface

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Grassy Mtn City/County: Malheur Sampling Date: 5/21/17

Applicant/Owner: Calico Resources Inc State: OR Sampling Point: DP5

Investigator(s): S.M. Harrelson (EMS) Section, Township, Range:

Landform (hillslope, terrace, etc.): Plain Local relief (concave, convex, none): none Slope (%): 1

Subregion (LRR): B Lat: 4840858 Long: 472293.7 Datum: NAD83

Soil Map Unit Name: not available NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Precipitation higher than average

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1. none			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1. none			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: ____)			
1. Bromus tectorum	35	Y	n/a
2. Pascopyrum smithii	50	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	85 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species ____	x 1 =	____
FACW species ____	x 2 =	____
FAC species ____	x 3 =	____
FACU species ____	x 4 =	____
UPL species ____	x 5 =	____
Column Totals: ____ (A)		____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

__ Dominance Test is >50%

__ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

SOIL

Sampling Point: DPS

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-14"	10YR 3/3	100					sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No _____ Depth (inches): _____

Water Table Present? Yes _____ No _____ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No _____ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

no hydrology observed

WETLAND DETERMINATION DATA FORM - ARID WEST REGION

Project Site:	Calico Resources	**Landform:**	Reservoir	**Slope(%):**	0-2
City/County:	Malheur **State:** Oregon	**Local Relief:**	Depression	**Sub-Region (LRR):**	B
Sampling Date:	5/7/2015	**Section:**	8	**Lat:**	43.67038217
Applicant/Owner:	Calico Resources	**Township:**	22S	**Long:**	-117.353740069
Sampling Point:	8A (2015)	**Range:**	44E	**Datum:**	NAD 83
Investigator 1:	R. Waldher			**Soil Map Unit Name:**	N/A
Investigator 2:	J. Tatum			**NWI Classification:**	PUSCH

Are climatic / hydrologic conditions on the site typical for this time of year? ☑ Yes ☐ No **(If No Explain in Remarks)**

Are Vegetation ☐ **Soil** ☐ **Hydrology** ☐ **Significantly Disturbed?** **Are normal Conditions present?** ☑ Yes ☐ No

Are Vegetation ☐ **Soil** ☐ **Hydrology** ☐ **Naturally Problematic?**

SUMMARY OF FINDING - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	☐ Yes	☑ No	
Hydric Soil Present?	☐ Yes	☑ No	**Is the Sampled Area within a Wetland?** ☐ Yes ☑ No
Wetland Hydrology Present?	☐ Yes	☑ No	

Summary Remarks: Soil pit taken at low point in Schweitzer Reservoir. Tributary channel T-11 (ephemeral) terminates into reservoir. An embankment is present at the north end of the reservoir. The ephemeral drainage continues downslope from the reservoir embankment. Green areas show up on aerial but vegetation was determined to be upland.

VEGETATION (Use Scientific Names)

herb	% Cover	Dominant Species	Indicator Status
Onopordum acanthium	8		UPL
Ceratocephala testiculata	35	Y	UPL
Bromus tectorum	40	Y	UPL

Dominance Test Worksheet:

Number of Dominant Species that are OBL, FACW, or FAC:	0 (A)
Total Number of Dominant Species Across all Strata:	2 (B)
Percent of Dominant species that are OBL, FACW, or FAC:	0.00% (A/B)

Prevalence Index Worksheet

	(A)		(B)
OBL:	0	x1	0
FACW:	0	x2	0
FAC:	0	x3	0
FACU:	0	x4	0
UPL:	83	x5	415
	83		415

Prevalence Index = B/A 5.00

Hydrophytic Vegetation Indicators:

- ☐ Dominance Test > 50%
- ☐ Prevalence Index <= 3.0
- ☐ Morphological Adaptations
- ☐ Problematic Hydrophytic Vegetation

% Bare Ground in Herb Stratum:	17	**Tree Percentage:**	0	**Hydrophytic Vegetation Present?**	☐ Yes ☑ No
% Cover of Biotic Crust:		**Shrub Percentage:**	0		
		Herb Percentage:	83		

Vegetation Remarks: Vegetation dominated by weedy upland species.

WETLAND DETERMINATION DATA FORM - ARID WEST REGION

SOIL- Profile Description: (Describe to the Depth needed to Document the Indicator or Confirm the Absense of Indicators.)

	Matrix				Redox Features					
Depth (in)	H	V	C	%	Color (moist)	%	Type	Loc	Texture	Remarks
0	4	10YR	4	2	100				sandy loam	1/2" pebbles throughout
4	20	10YR	4	4	100				sandy loam	Rocks up to 2" diameter

SOIL-Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratfied Layers (A5) (LRR C)
- ☐ 1cm Muck (A9) (LRR D)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils:

- ☐ 1 cm Muck (A9) (LRR C)
- ☐ 2 cm Muck (A10) (LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

☐ Restrictive Layer Present?

Type:

Depth (inches):

Hydric Soil Present? ☐ Yes ☑ No

Soil Remarks: No hydric soil indicators present.

HYDROLOGY-Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (Riverine)
- ☐ Sediment Deposits (B2) (Riverine)
- ☐ Drift Deposits (B3) (Riverine)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

- ☐ Surface Water Present? Depth (inches):
- ☐ Water Table Present? Depth (inches):
- ☐ Saturation Present? Depth (inches):

Wetland Hydrology Present? ☐ Yes ☑ No

Hydrology Remarks:

Soil was damp at approx 12 inches but no saturation was present. No wetland hyldrology indicators at this location.

Appendix B: Streamflow Duration Field Assessment Form

Project # / Name 3678 / Grassy Mtn		Assessor HARRELSON	
Address		Date 5/18/17	
Waterway Name Trib 2		Coordinates at downstream end (ddd.mm.ss)	Lat. 43°40'40.95" N
Reach Boundaries See Fig. 5			Long. 117°22'15.92" W
Precipitation w/in 48 hours (cm) 0.8	Channel Width (m) 0.94	☐ Disturbed Site / Difficult Situation (Describe in "Notes")	

Observed Hydrology

% of reach w/observed surface flow Ø

% of reach w/any flow (surface or hyporheic) Ø

# of pools observed Ø

Observations

Observed Wetland Plants (and indicator status):

None

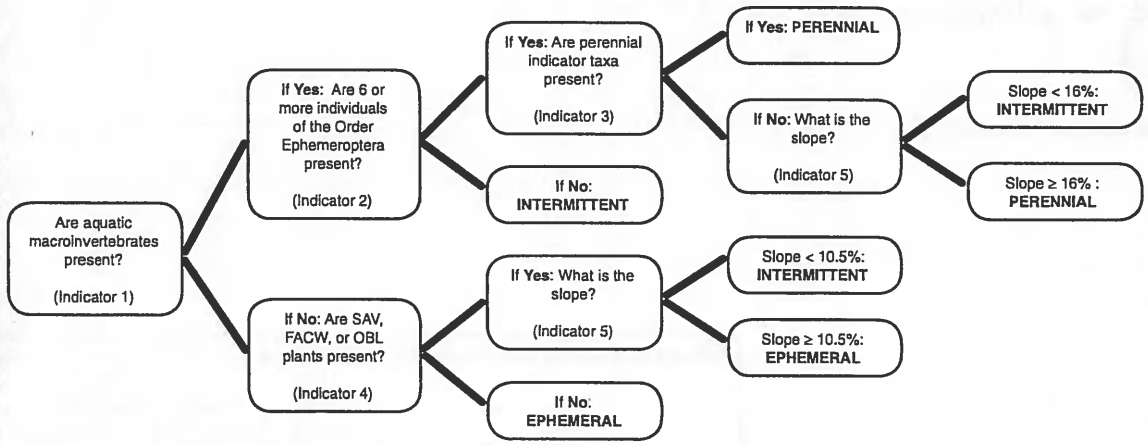
Observed Macroinvertebrates:

Taxon	Indicator Status	Ephemer-optera?	# of Individuals
None			

Indicators

1. Are aquatic macroinvertebrates present?	☐ Yes	☒ No
2. Are 6 or more individuals of the Order Ephemeroptera present?	☐ Yes	☒ No
3. Are perennial indicator taxa present? (refer to Table 1)	☐ Yes	☒ No
4. Are FACW, OBL, or SAV plants present? (Within ½ channel width)	☐ Yes	☒ No
5. What is the slope? (In percent, measured for the valley, not the stream)	9 %	

Conclusions



Single Indicators:
☐ Fish
☐ Amphibians

Finding:
☒ Ephemeral
☐ Intermittent
☐ Perennial

Trib 2

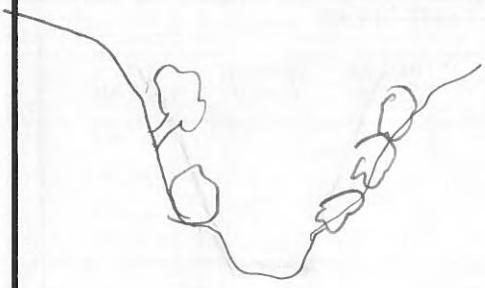
Notes: single indicator conclusions, description of disturbances or modifications that may interfere with indicators, etc.)

Difficult Situation:

Describe situation. For disturbed streams, note extent, type, and history of disturbance.

- ☐ Prolonged Abnormal Rainfall / Snowpack
  - ☐ Below Average
  - ☐ Above Average
- ☐ Natural or Anthropogenic Disturbance
- ☐ Other: _____

Additional Notes: (sketch of site, description of photos, comments on hydrological observations, etc.) Attach additional sheets as necessary.



- no water at time of evaluation
- substrate - cobble, gravel, sand/silt
- run-off from surrounding hillsides

shrubs
sagebrush*
bitter brush

cheatgrass*

Ancillary Information:

- ☐ Riparian Corridor no
- ☐ Erosion and Deposition - very minor
- ☐ Floodplain Connectivity - no fldpln present

Observed Amphibians, Snake, and Fish:

Taxa	Life History Stage	Location Observed	Number of Individuals Observed
None			

Streamflow Duration Field Assessment Form

Project # / Name Calico Resources		Assessor R. Waldher	
Address	Trib 2a (2017)	Date 5/8/15	
Waterway Name Tributary 11 (2015)		Coordinates at downstream end (ddd.mm.ss)	Lat. 46.672165003 N
Reach Boundaries ~1000' downstream of embankment			Long. -117.3549443 W
Precipitation w/in 48 hours (cm) Ø	Channel Width (m) 2ft - 4ft	☐ Disturbed Site / Difficult Situation (Describe in "Notes")	

Observed Hydrology

% of reach w/observed surface flow Ø

% of reach w/any flow (surface or hyporheic) Ø

# of pools observed Ø

Observations

Observed Wetland Plants (and indicator status): None

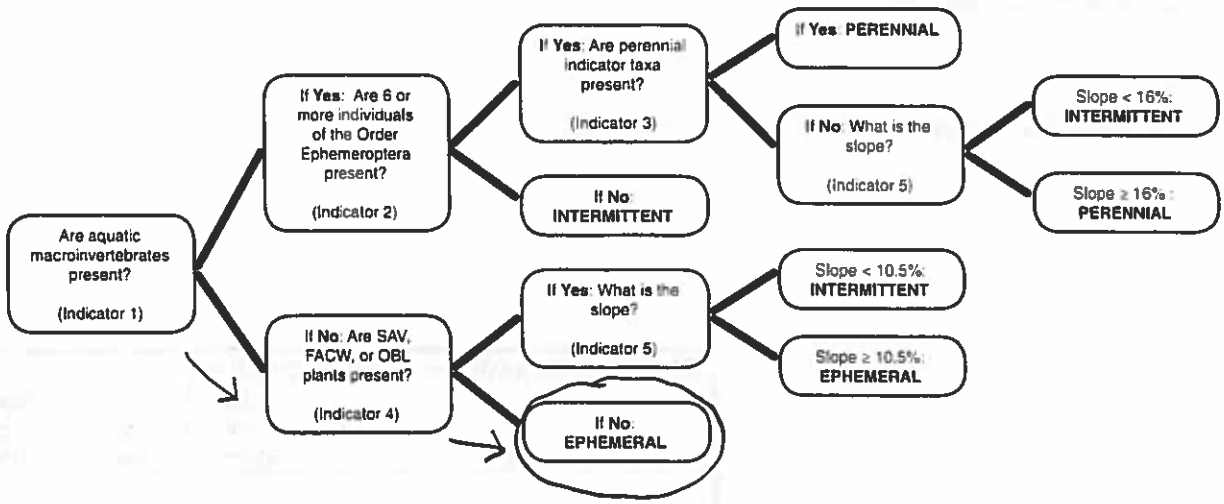
Observed Macroinvertebrates: None

Taxon	Indicator Status	Ephemer-optera?	# of Individuals

Indicators

1. Are aquatic macroinvertebrates present?	☐ Yes	☒ No
2. Are 6 or more individuals of the Order Ephemeroptera present?	☐ Yes	☒ No
3. Are perennial indicator taxa present? (refer to Table 1)	☐ Yes	☒ No
4. Are FACW, OBL, or SAV plants present? (Within ½ channel width)	☐ Yes	☒ No
5. What is the slope? (In percent, measured for the valley, not the stream)	8-10 %	

Conclusions



Single Indicators: None
☐ Fish
☐ Amphibians

Finding:
☒ Ephemeral
☐ Intermittent
☐ Perennial

Trib 2a (2017)

Streamflow Duration Field Assessment Form T-11 (2015)

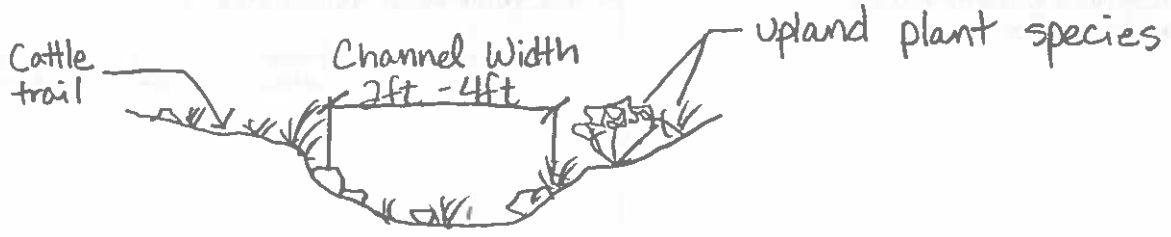
Notes: single indicator conclusions, description of disturbances or modifications that may interfere with indicators, etc.)

Difficult Situation:

Describe situation. For disturbed streams, note extent, type, and history of disturbance.

- ☐ Prolonged Abnormal Rainfall / Snowpack
  - ☐ Below Average
  - ☐ Above Average
- ☐ Natural or Anthropogenic Disturbance
- ☐ Other: _____

Additional Notes: (sketch of site, description of photos, comments on hydrological observations, etc.) Attach additional sheets as necessary.



- Drainage terminates @ schweitzer reservoir (upland conditions)
- Poorly defined OHWM (flow path approx. 2.5ft wide)
- upland vegetation throughout, rocks / boulders present
- Drainage poorly defined below reservoir

Ancillary Information:

- ☐ Riparian Corridor
- ☐ Erosion and Deposition
- ☐ Floodplain Connectivity

Observed Amphibians, Snake, and Fish:

Taxa	Life History Stage	Location Observed	Number of Individuals Observed

Appendix B: Streamflow Duration Field Assessment Form

2176.83'

308.25

Project # / Name 3678 / Grassy Mt.		Assessor S.M. Harrelson	
Address		Date 5/18/17	
Waterway Name Trib 2B	Coordinates at downstream end (ddd.mm.ss)	Lat. 43° 40' 52.89 N	
Reach Boundaries See Fig 5		Long. 117° 21' 43.77 W	
Precipitation w/in 48 hours (cm) 0.8	Channel Width (m) 6	☐ Disturbed Site / Difficult Situation (Describe in "Notes")	

Observed Hydrology

% of reach w/observed surface flow 1%

% of reach w/any flow (surface or hyporheic) 1%

# of pools observed 2

Observations

Observed Wetland Plants (and indicator status):

Juncus sp. FACW/OBL
Eleocharis acicularis OBL
Ranunculus cymbalaria OBL
R. sceleratus OBL

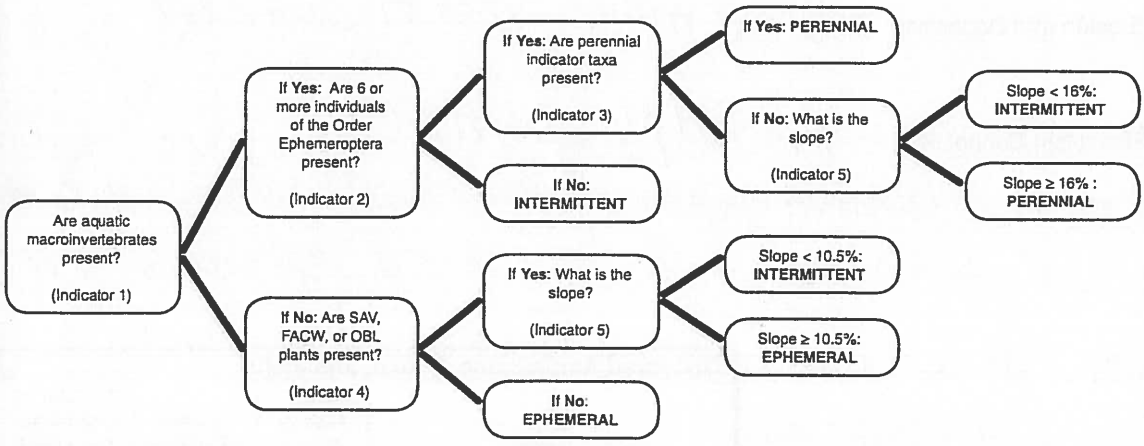
Observed Macroinvertebrates:

Taxon	Indicator Status	Ephemer-optera?	# of Individuals
water slider			2

Indicators

1. Are aquatic macroinvertebrates present?	☒ Yes	☐ No
2. Are 6 or more individuals of the Order Ephemeroptera present?	☐ Yes	☒ No
3. Are perennial indicator taxa present? (refer to Table 1)	☐ Yes	☒ No
4. Are FACW, OBL, or SAV plants present? (Within ½ channel width)	☒ Yes	☐ No
5. What is the slope? (In percent, measured for the valley, not the stream)	6 %	

Conclusions



Single Indicators:
☐ Fish
☐ Amphibians

Finding:
☐ Ephemeral
☒ Intermittent
☐ Perennial

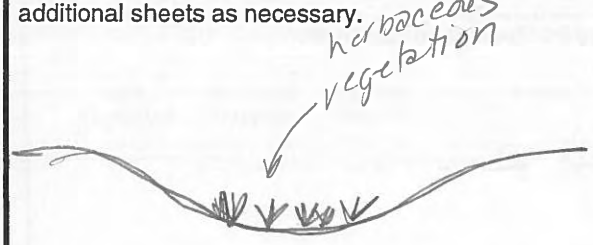
Trib 2B

Notes: single indicator conclusions, description of disturbances or modifications that may interfere with indicators, etc.)

Difficult Situation: Describe situation. For disturbed streams, note extent, type, and history of disturbance.

- ☐ Prolonged Abnormal Rainfall / Snowpack
  - ☐ Below Average
  - ☐ Above Average
- ☐ Natural or Anthropogenic Disturbance
- ☐ Other: _____

Additional Notes: (sketch of site, description of photos, comments on hydrological observations, etc.) Attach additional sheets as necessary.



- very limited areas w/ hydrophytic veg
- no hydric soils observed

OHWM = line on bank
Substrate sorting

Ancillary Information:

- ☐ Riparian Corridor – none present
- ☐ Erosion and Deposition – some minor erosion observed
- ☐ Floodplain Connectivity – no fldpln observed

* In the southern portion of the study area, this tributary has shifted to the west, leaving 2 old ephemeral cut-off channels. These channels no longer have a connection to the main channel & do not flow any where.

Observed Amphibians, Snake, and Fish:

Taxa	Life History Stage	Location Observed	Number of Individuals Observed
None			

Streamflow Duration Field Assessment Form

Project # / Name	Calico Resources	Assessor	R. Waldher
Address			Date 5/8/15
Waterway Name	Tributary 9 (2015) Trib 3 (2017)	Coordinates at downstream end (ddd.mm.ss)	Lat. 43.068 75324 N
Reach Boundaries	~500' from southern study boundary		Long. -117.369 7958 W
Precipitation w/in 48 hours (cm)	Ø	Channel Width (m) (ft)	2ft - 3ft
☐ Disturbed Site / Difficult Situation (Describe in "Notes")			

Observed Hydrology

% of reach w/observed surface flow Ø

% of reach w/any flow (surface or hyporheic) Ø

# of pools observed Ø

Observations

Observed Wetland Plants (and indicator status): None

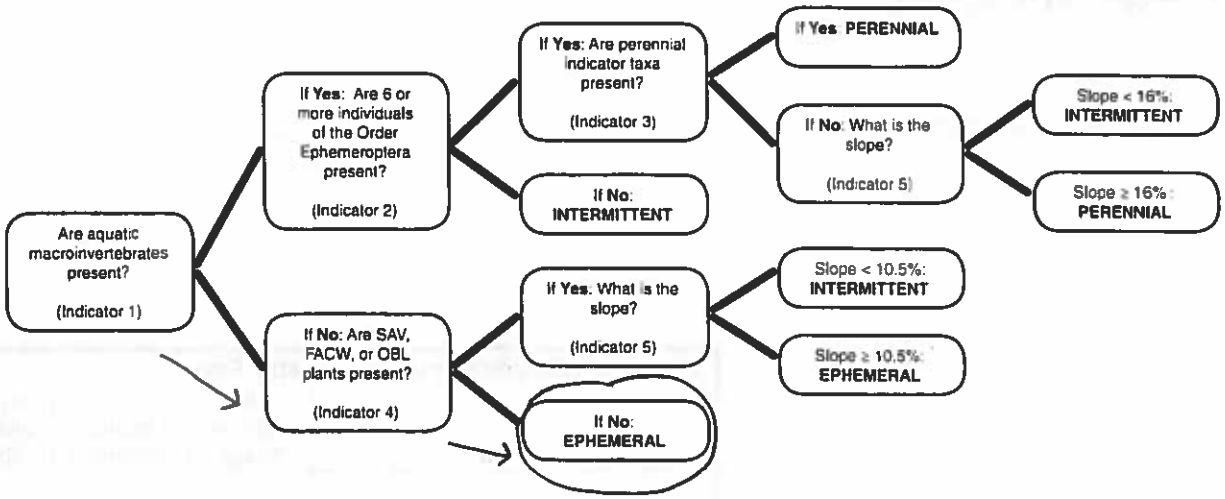
Observed Macroinvertebrates: None

Taxon	Indicator Status	Ephemer-optera?	# of Individuals

Indicators

1. Are aquatic macroinvertebrates present?	☐ Yes	☒ No
2. Are 6 or more individuals of the Order Ephemeroptera present?	☐ Yes	☒ No
3. Are perennial indicator taxa present? (refer to Table 1)	☐ Yes	☒ No
4. Are FACW, OBL, or SAV plants present? (Within ½ channel width)	☐ Yes	☒ No
5. What is the slope? (In percent, measured for the valley, not the stream)	8-10 %	

Conclusions



Single Indicators: None
☐ Fish
☐ Amphibians

Finding:
☒ Ephemeral
☐ Intermittent
☐ Perennial

Trib 3 (2017)

Streamflow Duration Field Assessment Form

Tributary 9 (2015)

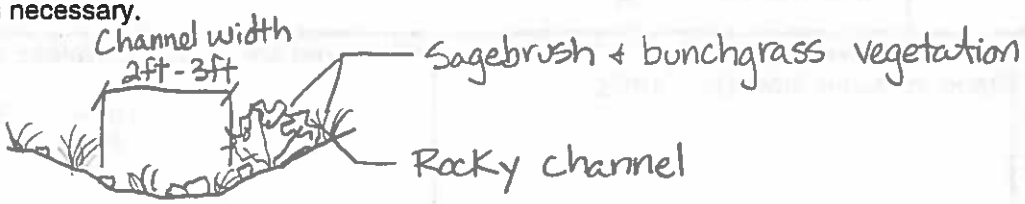
Notes: single indicator conclusions, description of disturbances or modifications that may interfere with indicators, etc.)

Difficult Situation:

Describe situation. For disturbed streams, note extent, type, and history of disturbance.

- ☐ Prolonged Abnormal Rainfall / Snowpack
  - ☐ Below Average
  - ☐ Above Average
- ☐ Natural or Anthropogenic Disturbance
- ☐ Other: _____

Additional Notes: (sketch of site, description of photos, comments on hydrological observations, etc.) Attach additional sheets as necessary.



- OHWM poorly defined along channel (Flow path approx. 2.5 ft wide)
- Delineated same channel in 2013 near road
- Upland vegetation, rocky soils

Ancillary Information:

- ☐ Riparian Corridor
- ☐ Erosion and Deposition
- ☐ Floodplain Connectivity

Observed Amphibians, Snake, and Fish:

Taxa	Life History Stage	Location Observed	Number of Individuals Observed

Trib3

Appendix B: Streamflow Duration Field Assessment Form

Project # / Name 3678/Grassy Mtn	Assessor S.M. Harrelson	
Address	Date 5/18/17	
Waterway Name Trib3	Coordinates at downstream end (ddd.mm.ss) Lat. 43°41'10.63" N	
Reach Boundaries see Fig 5	Long. 117°21'41.15 W	
Precipitation w/in 48 hours (cm) 0.8	Channel Width (m) 3	☐ Disturbed Site / Difficult Situation (Describe in "Notes")

Observed Hydrology

% of reach w/observed surface flow Ø

% of reach w/any flow (surface or hyporheic) Ø

# of pools observed Ø

Observations

Observed Wetland Plants (and indicator status):

None

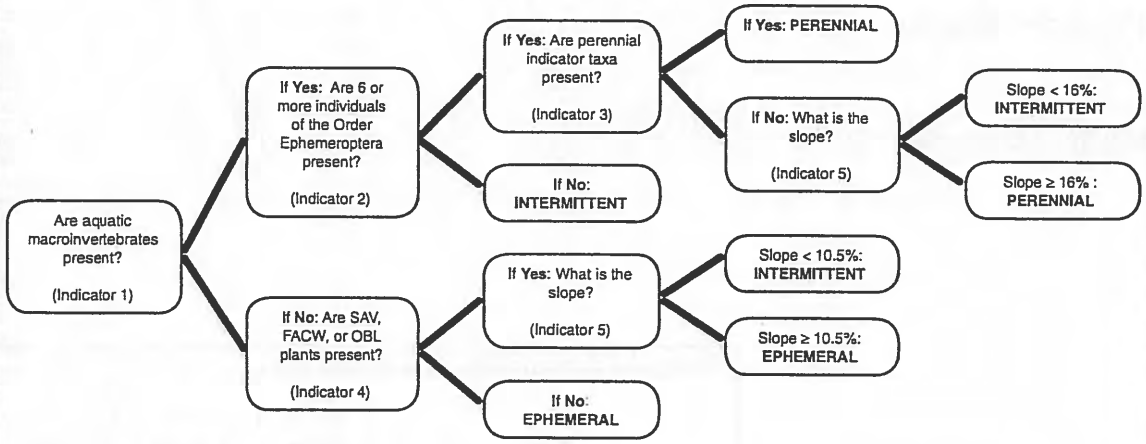
Observed Macroinvertebrates:

Taxon	Indicator Status	Ephemer-optera?	# of Individuals
None			

Indicators

1. Are aquatic macroinvertebrates present?	☐ Yes	☒ No
2. Are 6 or more individuals of the Order Ephemeroptera present?	☐ Yes	☒ No
3. Are perennial indicator taxa present? (refer to Table 1)	☐ Yes	☒ No
4. Are FACW, OBL, or SAV plants present? (Within ½ channel width)	☐ Yes	☒ No
5. What is the slope? (In percent, measured for the valley, not the stream)	5 %	

Conclusions



Single Indicators:
☐ Fish
☐ Amphibians

Finding:
☒ Ephemeral
☐ Intermittent
☐ Perennial

Trib3

Notes: single indicator conclusions, description of disturbances or modifications that may interfere with indicators, etc.)

Difficult Situation:

Describe situation. For disturbed streams, note extent, type, and history of disturbance.

- ☐ Prolonged Abnormal Rainfall / Snowpack
  - ☐ Below Average
  - ☐ Above Average
- ☒ Natural or Anthropogenic Disturbance
- ☐ Other: _____

channel appears to have been bermed in the past to create a pond. Berm no longer functional, pond gone, creating a break in the channel. NWI portion of the channel no longer there.

Additional Notes: (sketch of site, description of photos, comments on hydrological observations, etc.) Attach additional sheets as necessary.

- dry channel w/in sagebrush
- some cobble
- see photos

Ancillary Information:

- ☐ Riparian Corridor – none observed
- ☐ Erosion and Deposition – very little
- ☐ Floodplain Connectivity none observed

Observed Amphibians, Snake, and Fish:

Taxa	Life History Stage	Location Observed	Number of Individuals Observed
None			

Streamflow Duration Field Assessment Form

Project # / Name Calico Resources		Assessor R. Waldher	
Address			Date 5/8/15
Waterway Name Tributary 10 (2015) Trib 4 (2017)		Coordinates at downstream end (ddd.mm.ss)	Lat. 43.66879619 N
Reach Boundaries ~500' from southern study boundary			Long. -117.363504 W
Precipitation w/in 48 hours (cm) Ø	Channel Width (m) 3ft-4ft	☐ Disturbed Site / Difficult Situation (Describe in "Notes")	

Observed Hydrology

% of reach w/observed surface flow Ø

% of reach w/any flow (surface or hyporheic) Ø

# of pools observed Ø

Observations

Observed Wetland Plants (and indicator status): None

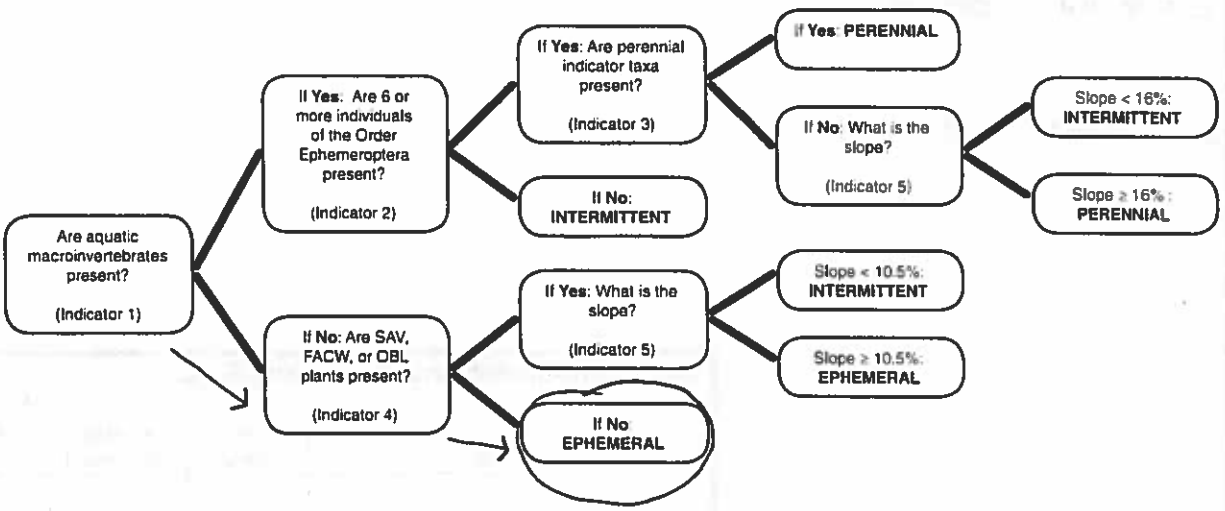
Observed Macroinvertebrates: None

Taxon	Indicator Status	Ephemer-optera?	# of Individuals

Indicators

1. Are aquatic macroinvertebrates present?	☐ Yes	☒ No
2. Are 6 or more individuals of the Order Ephemeroptera present?	☐ Yes	☒ No
3. Are perennial indicator taxa present? (refer to Table 1)	☐ Yes	☒ No
4. Are FACW, OBL, or SAV plants present? (Within ½ channel width)	☐ Yes	☒ No
5. What is the slope? (In percent, measured for the valley, not the stream)	6-10 %	

Conclusions



Single Indicators: None
☐ Fish
☐ Amphibians

Finding:
☒ Ephemeral
☐ Intermittent
☐ Perennial

Trib 4 (2017)

Streamflow Duration Field Assessment Form T-10(2015)

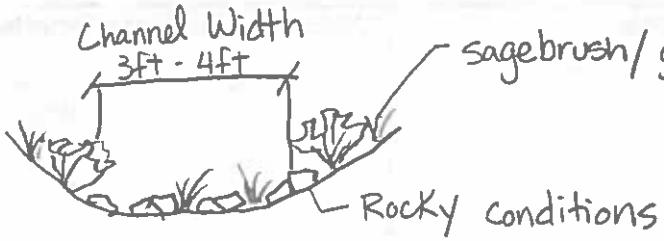
Notes: single indicator conclusions, description of disturbances or modifications that may interfere with indicators, etc.)

Difficult Situation:

Describe situation. For disturbed streams, note extent, type, and history of disturbance.

- ☐ Prolonged Abnormal Rainfall / Snowpack
  - ☐ Below Average
  - ☐ Above Average
- ☐ Natural or Anthropogenic Disturbance
- ☐ Other: _____

Additional Notes: (sketch of site, description of photos, comments on hydrological observations, etc.) Attach additional sheets as necessary.



- Sparse upland vegetation
- Very rocky drainage
- Poorly defined OHWM (Flow path approx. 3 ft wide)

Ancillary Information:

- ☐ Riparian Corridor
- ☐ Erosion and Deposition
- ☐ Floodplain Connectivity

Observed Amphibians, Snake, and Fish:

Taxa	Life History Stage	Location Observed	Number of Individuals Observed

Trib 4

Appendix B: Streamflow Duration Field Assessment Form

Project # / Name 3678/Grassy Mtn.		Assessor S. M. Harrelson	
Address		Date 5/18/17	
Waterway Name Trib 4		Coordinates at downstream end (ddd.mm.ss)	Lat. 43°40'42.02" N
Reach Boundaries see Fig 5			Long. 117°21'47.81 W
Precipitation w/in 48 hours (cm) 0.8	Channel Width (m) 1.3	☐ Disturbed Site / Difficult Situation (Describe in "Notes")	

Observed Hydrology

% of reach w/observed surface flow Ø

% of reach w/any flow (surface or hyporheic) Ø

# of pools observed Ø

Observations

Observed Wetland Plants (and indicator status):

None

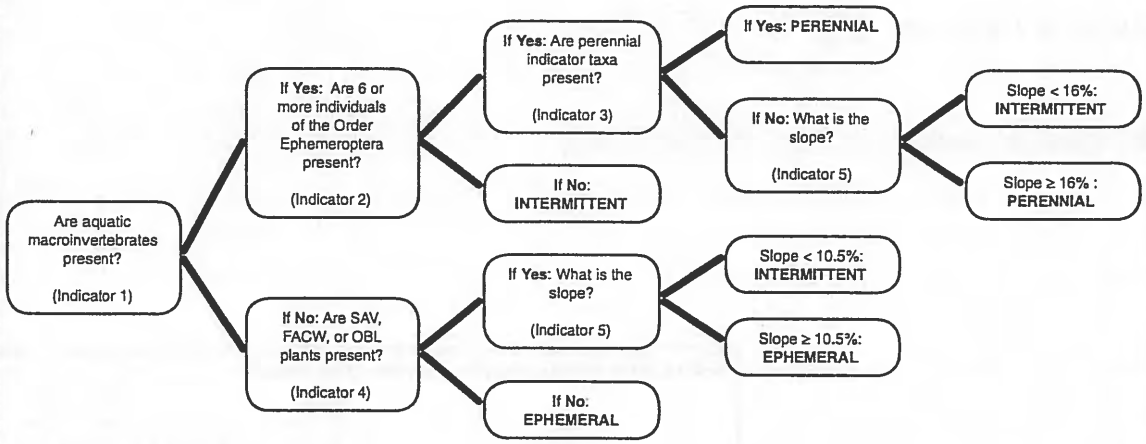
Observed Macroinvertebrates:

Taxon	Indicator Status	Ephemer-optera?	# of Individuals
None			

Indicators

1. Are aquatic macroinvertebrates present?	☐ Yes	☒ No
2. Are 6 or more individuals of the Order Ephemeroptera present?	☐ Yes	☒ No
3. Are perennial indicator taxa present? (refer to Table 1)	☐ Yes	☒ No
4. Are FACW, OBL, or SAV plants present? (Within ½ channel width)	☐ Yes	☒ No
5. What is the slope? (In percent, measured for the valley, not the stream)	4-6 %	

Conclusions



Single Indicators:
☐ Fish
☐ Amphibians

Finding:
☒ Ephemeral
☐ Intermittent
☐ Perennial

Trib 4

Notes: single indicator conclusions, description of disturbances or modifications that may interfere with indicators, etc.)

Difficult Situation: Describe situation. For disturbed streams, note extent, type, and history of disturbance.

- ☐ Prolonged Abnormal Rainfall / Snowpack
  - ☐ Below Average
  - ☐ Above Average
- ☐ Natural or Anthropogenic Disturbance
- ☐ Other: _____

Additional Notes: (sketch of site, description of photos, comments on hydrological observations, etc.) Attach additional sheets as necessary.

- small Trib of Trib 3
- dry channel w/in sagebrush
- cattle grazing

OHWM = line on bank
substrate sorting

Ancillary Information:

- ☐ Riparian Corridor none observed
- ☐ Erosion and Deposition very little
- ☐ Floodplain Connectivity ~~has access~~ no fldpln observed

Observed Amphibians, Snake, and Fish:

Taxa	Life History Stage	Location Observed	Number of Individuals Observed
None			

Appendix B: Streamflow Duration Field Assessment Form

Project # / Name 3678 / Grassy Mt.	Assessor S. M. Harrelson	
Address	Date 5/18/17	
Waterway Name Trib 5	Coordinates at downstream end (ddd.mm.ss) Lat. 43°40'53.79" N	
Reach Boundaries see Fig 5	Long. 117°21'07.86" W	
Precipitation w/in 48 hours (cm) 0.8	Channel Width (m) 1.89	☐ Disturbed Site / Difficult Situation (Describe in "Notes")

Observed Hydrology

% of reach w/observed surface flow 0

% of reach w/any flow (surface or hyporheic) 0

# of pools observed 0

Observations

Observed Wetland Plants (and indicator status):

None

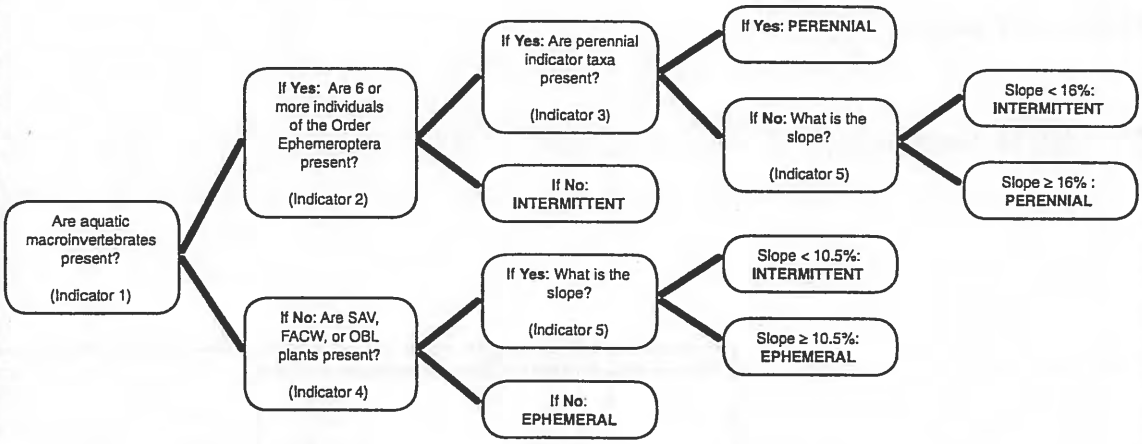
Observed Macroinvertebrates:

Taxon	Indicator Status	Ephemer-optera?	# of Individuals
None			

Indicators

1. Are aquatic macroinvertebrates present?	☐ Yes	☒ No
2. Are 6 or more individuals of the Order Ephemeroptera present?	☐ Yes	☒ No
3. Are perennial indicator taxa present? (refer to Table 1)	☐ Yes	☒ No
4. Are FACW, OBL, or SAV plants present? (Within ½ channel width)	☐ Yes	☒ No
5. What is the slope? (In percent, measured for the valley, not the stream)	10-15 %	

Conclusions



Single Indicators:
☐ Fish
☐ Amphibians

Finding:
☒ Ephemeral
☐ Intermittent
☐ Perennial

Trib 5

Notes: single indicator conclusions, description of disturbances or modifications that may interfere with indicators, etc.)

Difficult Situation: Describe situation. For disturbed streams, note extent, type, and history of disturbance.

- ☐ Prolonged Abnormal Rainfall / Snowpack
  - ☐ Below Average
  - ☐ Above Average
- ☐ Natural or Anthropogenic Disturbance
- ☐ Other: _____

Additional Notes: (sketch of site, description of photos, comments on hydrological observations, etc.) Attach additional sheets as necessary.

- dry channel, steeper slope than others
- w/in sagebrush
- some lrg cobble

Ancillary Information:

- ☐ Riparian Corridor none observed
- ☐ Erosion and Deposition none
- ☐ Floodplain Connectivity no fldpln observed

Observed Amphibians, Snake, and Fish:

Taxa	Life History Stage	Location Observed	Number of Individuals Observed
None			

Appendix B: Streamflow Duration Field Assessment Form

Project # / Name 3678/Grassy Mt.	Assessor S.M. Harrelson	
Address	Date 5/19/17	
Waterway Name Tribb	Coordinates at downstream end (ddd.mm.ss)	Lat. 43°42'35.96" N
Reach Boundaries see Figs		Long. 117°21'39.43" W
Precipitation w/in 48 hours (cm) 0.8	Channel Width (m) 2.36	☐ Disturbed Site / Difficult Situation (Describe in "Notes")

Observed Hydrology

% of reach w/observed surface flow Ø

% of reach w/any flow (surface or hyporheic) Ø

# of pools observed Ø

Observations

Observed Wetland Plants (and indicator status):

None

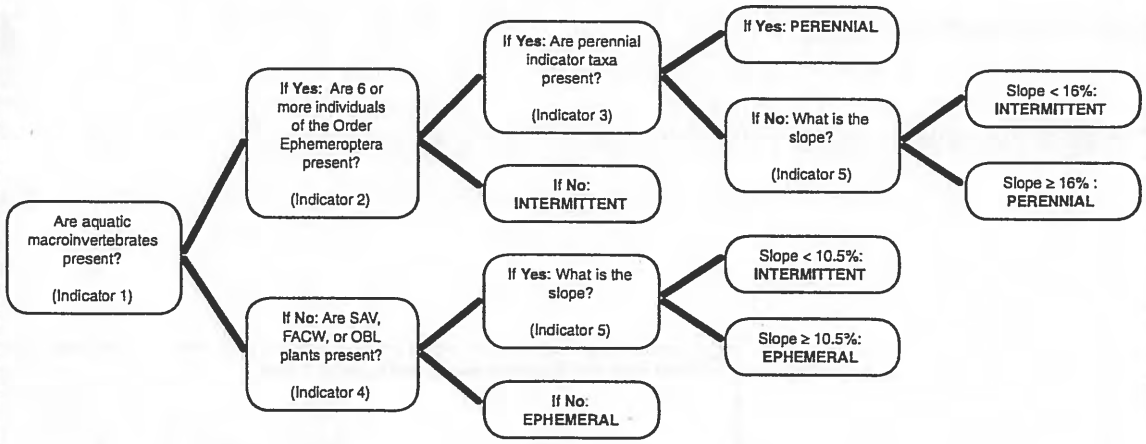
Observed Macroinvertebrates:

Taxon	Indicator Status	Ephemer-optera?	# of Individuals
None			

Indicators

1. Are aquatic macroinvertebrates present?	☐ Yes	☒ No
2. Are 6 or more individuals of the Order Ephemeroptera present?	☐ Yes	☒ No
3. Are perennial indicator taxa present? (refer to Table 1)	☐ Yes	☒ No
4. Are FACW, OBL, or SAV plants present? (Within ½ channel width)	☐ Yes	☒ No
5. What is the slope? (In percent, measured for the valley, not the stream)	2-4 %	

Conclusions



Single Indicators:
☐ Fish
☐ Amphibians

Finding:
☒ Ephemeral
☐ Intermittent
☐ Perennial

Trib 6

Notes: single indicator conclusions, description of disturbances or modifications that may interfere with indicators, etc.)

Difficult Situation:

Describe situation. For disturbed streams, note extent, type, and history of disturbance.

- ☐ Prolonged Abnormal Rainfall / Snowpack
  - ☐ Below Average
  - ☐ Above Average
- ☐ Natural or Anthropogenic Disturbance
- ☐ Other: _____

Additional Notes: (sketch of site, description of photos, comments on hydrological observations, etc.) Attach additional sheets as necessary.

- presence of bed/banks begins & ends where indicated w/ gps
- heavily traveled by cattle
- some moderate erosion in N portion of trib = scouring, line on bank

Ancillary Information:

- ☐ Riparian Corridor none observed
- ☐ Erosion and Deposition moderate ~20% of length
- ☐ Floodplain Connectivity no fldpln observed

Observed Amphibians, Snake, and Fish:

Taxa	Life History Stage	Location Observed	Number of Individuals Observed
None			

Appendix B: Streamflow Duration Field Assessment Form

Project # / Name 3678/Grassy mt.	Assessor S.M. Harrelson	
Address	Date 5/19/17	
Waterway Name Trib 7	Coordinates at downstream end (ddd.mm.ss) Lat. 43°43'29.05" N	
Reach Boundaries See Fig 5	Long. 117°19'38.08" W	
Precipitation w/in 48 hours (cm) 0.8	Channel Width (m) 1.52	☐ Disturbed Site / Difficult Situation (Describe in "Notes")

Observed Hydrology

% of reach w/observed surface flow Ø

% of reach w/any flow (surface or hyporheic) Ø

# of pools observed Ø

Observations

Observed Wetland Plants (and indicator status):

None

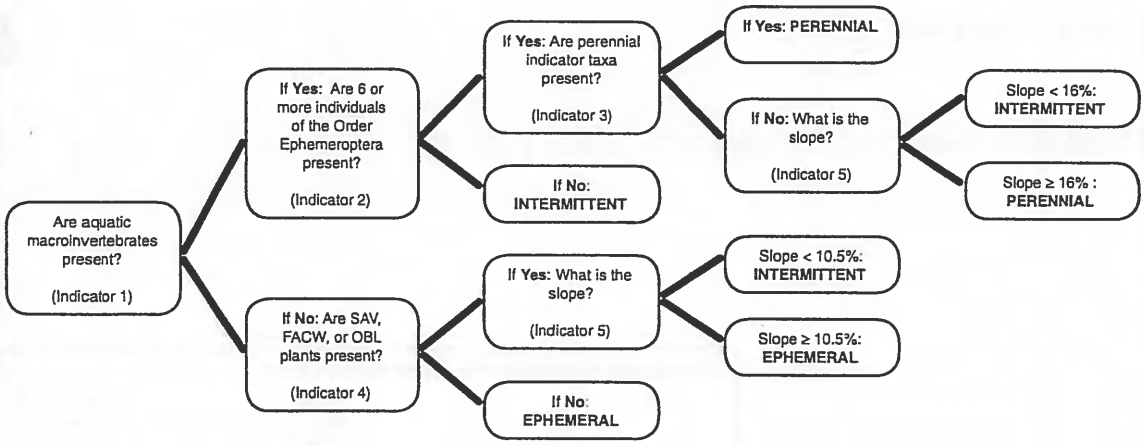
Observed Macroinvertebrates:

Taxon	Indicator Status	Ephemer-optera?	# of Individuals
None			

Indicators

1. Are aquatic macroinvertebrates present?	☐ Yes	☒ No
2. Are 6 or more individuals of the Order Ephemeroptera present?	☐ Yes	☒ No
3. Are perennial indicator taxa present? (refer to Table 1)	☐ Yes	☒ No
4. Are FACW, OBL, or SAV plants present? (Within ½ channel width)	☐ Yes	☒ No
5. What is the slope? (In percent, measured for the valley, not the stream)	1-2 %	

Conclusions



Single Indicators:
☐ Fish
☐ Amphibians

Finding:
☒ Ephemeral
☐ Intermittent
☐ Perennial

Trib 7

Notes: single indicator conclusions, description of disturbances or modifications that may interfere with indicators, etc.)

Difficult Situation: Describe situation. For disturbed streams, note extent, type, and history of disturbance.

- ☐ Prolonged Abnormal Rainfall / Snowpack
  - ☐ Below Average
  - ☐ Above Average
- ☐ Natural or Anthropogenic Disturbance
- ☐ Other: _____

Additional Notes: (sketch of site, description of photos, comments on hydrological observations, etc.) Attach additional sheets as necessary.

- dry channel w/culvert under road

OHWM = line on bank

Ancillary Information:

- ☐ Riparian Corridor none observed
- ☐ Erosion and Deposition Very little
- ☐ Floodplain Connectivity no fldpln observed

Observed Amphibians, Snake, and Fish:

Taxa	Life History Stage	Location Observed	Number of Individuals Observed
None			

Trib 8

Appendix B: Streamflow Duration Field Assessment Form

Project # / Name 3678/Grassy Mtn		Assessor S.M. Harrelson	
Address		Date 5/19/17	
Waterway Name Trib 8		Coordinates at downstream end (ddd.mm.ss)	Lat. 43°43'29.02" N
Reach Boundaries see Fig 5			Long. 117°19'38.0" W
Precipitation w/in 48 hours (cm) 0.8	Channel Width (m) 1.14	☐ Disturbed Site / Difficult Situation (Describe in "Notes")	

Observed Hydrology

% of reach w/observed surface flow Ø

% of reach w/any flow (surface or hyporheic) Ø

# of pools observed Ø

Observations

Observed Wetland Plants (and indicator status):

None

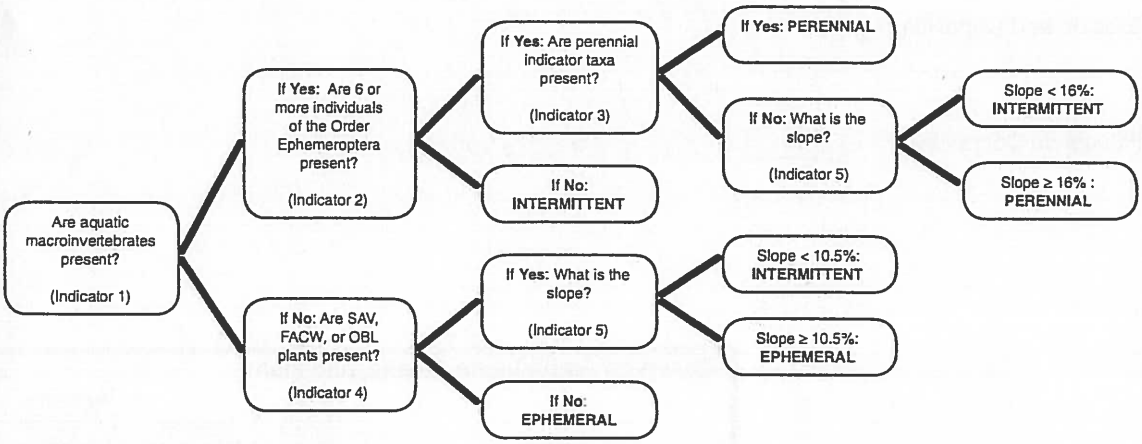
Observed Macroinvertebrates:

Taxon	Indicator Status	Ephemer-optera?	# of Individuals
None			

Indicators

1. Are aquatic macroinvertebrates present?	☐ Yes	☒ No
2. Are 6 or more individuals of the Order Ephemeroptera present?	☐ Yes	☒ No
3. Are perennial indicator taxa present? (refer to Table 1)	☐ Yes	☒ No
4. Are FACW, OBL, or SAV plants present? (Within ½ channel width)	☐ Yes	☒ No
5. What is the slope? (In percent, measured for the valley, not the stream)	3-10 %	

Conclusions



Single Indicators:
☐ Fish
☐ Amphibians

Finding:
☒ Ephemeral
☐ Intermittent
☐ Perennial

Trib 8

Notes: single indicator conclusions, description of disturbances or modifications that may interfere with indicators, etc.)

Difficult Situation:

Describe situation. For disturbed streams, note extent, type, and history of disturbance.

- ☐ Prolonged Abnormal Rainfall / Snowpack
  - ☐ Below Average
  - ☐ Above Average
- ☒ Natural or Anthropogenic Disturbance
- ☐ Other: _____

- an old berm cuts off a portion of the trib. Channel starts again outside of study area

Additional Notes: (sketch of site, description of photos, comments on hydrological observations, etc.) Attach additional sheets as necessary.

- dry channel along road
- ends at small berm, no channel present dwnstrm of this pt.
- OHWM = line on bank

Ancillary Information:

- ☐ Riparian Corridor NO
- ☐ Erosion and Deposition very little
- ☐ Floodplain Connectivity ~~YES~~ no fldpln observed

Observed Amphibians, Snake, and Fish:

Taxa	Life History Stage	Location Observed	Number of Individuals Observed
None			

Trib 9

Appendix B: Streamflow Duration Field Assessment Form

Project # / Name 3678 / Grassy MT		Assessor S.M. Harrelson	
Address		Date 5/19/17	
Waterway Name Trib 9		Coordinates at downstream end (ddd.mm.ss)	Lat. 43°48'15.03" N
Reach Boundaries see Fig 5			Long. 117°18'35.91" W
Precipitation w/in 48 hours (cm) 0.8	Channel Width (m) 1.42	☐ Disturbed Site / Difficult Situation (Describe in "Notes")	

Observed Hydrology

% of reach w/observed surface flow 0

% of reach w/any flow (surface or hyporheic) 0

# of pools observed 0

Observations

Observed Wetland Plants (and indicator status):

None

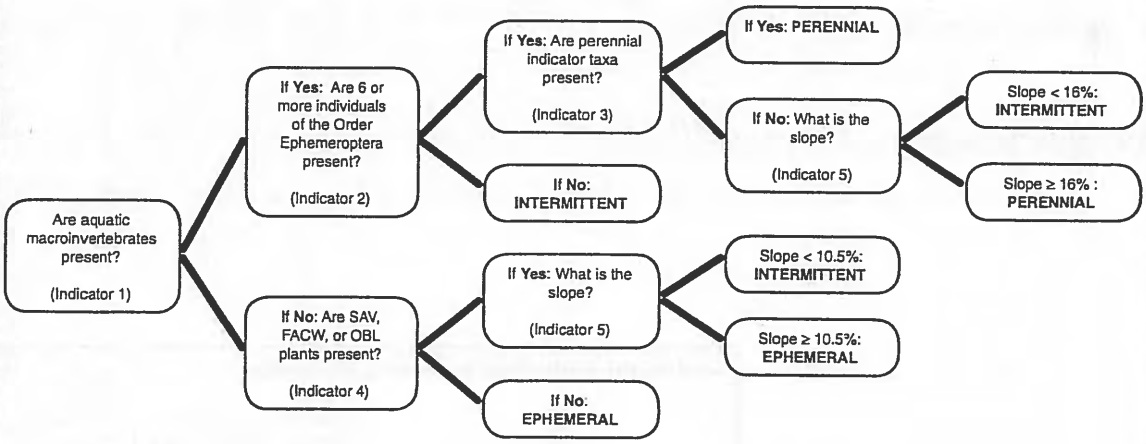
Observed Macroinvertebrates:

Taxon	Indicator Status	Ephemer-optera?	# of Individuals
None			

Indicators

1. Are aquatic macroinvertebrates present?	☐ Yes	☒ No
2. Are 6 or more individuals of the Order Ephemeroptera present?	☐ Yes	☒ No
3. Are perennial indicator taxa present? (refer to Table 1)	☐ Yes	☒ No
4. Are FACW, OBL, or SAV plants present? (Within ½ channel width)	☐ Yes	☒ No
5. What is the slope? (In percent, measured for the valley, not the stream)	8-20 %	

Conclusions



Single Indicators:
☐ Fish
☐ Amphibians

Finding:
☒ Ephemeral
☐ Intermittent
☐ Perennial

Trib 9

Notes: single indicator conclusions, description of disturbances or modifications that may interfere with indicators, etc.)

Difficult Situation:

Describe situation. For disturbed streams, note extent, type, and history of disturbance.

- ☐ Prolonged Abnormal Rainfall / Snowpack
  - ☐ Below Average
  - ☐ Above Average
- ☐ Natural or Anthropogenic Disturbance
- ☐ Other: _____

Additional Notes: (sketch of site, description of photos, comments on hydrological observations, etc.) Attach additional sheets as necessary.

- dry, channel, heavily incised
- Significant erosion ~75-80% of length

OHWM = substrate sorting, linear bank

Ancillary Information:

- ☐ Riparian Corridor None observed
- ☐ Erosion and Deposition Significant, observed along 60% of reach
- ☐ Floodplain Connectivity no, channel incised

Observed Amphibians, Snake, and Fish:

Taxa	Life History Stage	Location Observed	Number of Individuals Observed
None			

Appendix B: Streamflow Duration Field Assessment Form

Project # / Name	3678/Grassy mt.	Assessor	Harrelson
Address		Date	5/19'5/2017
Waterway Name	Trib 10	Coordinates at downstream end (ddd.mm.ss)	Lat. 4850166.42 N
Reach Boundaries	see Fig 5		Long. 475066.45 W
Precipitation w/in 48 hours (cm)	0.8	Channel Width (m)	☐ Disturbed Site / Difficult Situation (Describe in "Notes")

Observed Hydrology

% of reach w/observed surface flow Ø

% of reach w/any flow (surface or hyporheic) Ø

# of pools observed Ø

Observations

Observed Wetland Plants (and indicator status):

None

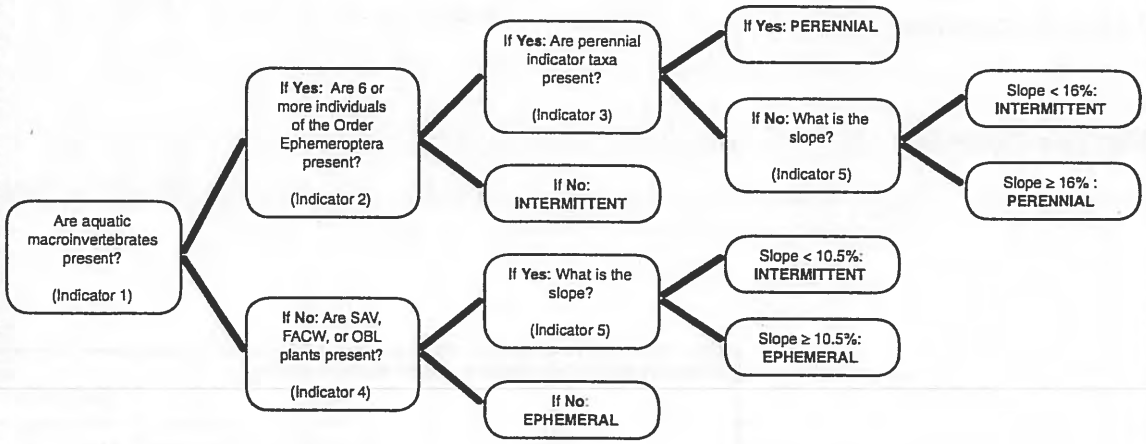
Observed Macroinvertebrates:

Taxon	Indicator Status	Ephemer-optera?	# of Individuals
None			

Indicators

1. Are aquatic macroinvertebrates present?	☐ Yes	☒ No
2. Are 6 or more individuals of the Order Ephemeroptera present?	☐ Yes	☒ No
3. Are perennial indicator taxa present? (refer to Table 1)	☐ Yes	☒ No
4. Are FACW, OBL, or SAV plants present? (Within ½ channel width)	☐ Yes	☒ No
5. What is the slope? (In percent, measured for the valley, not the stream)	1-5 %	

Conclusions



Single Indicators:
☐ Fish
☐ Amphibians

Finding:
☒ Ephemeral
☐ Intermittent
☐ Perennial

Trib 10

Notes: single indicator conclusions, description of disturbances or modifications that may interfere with indicators, etc.)

Difficult Situation: disturbance

Describe situation. For disturbed streams, note extent, type, and history of disturbance.

- cattle grazing for entire extent

☐ Prolonged Abnormal Rainfall / Snowpack

☐ Below Average

☐ Above Average

☒ Natural or Anthropogenic Disturbance

☐ Other: _____

Additional Notes: (sketch of site, description of photos, comments on hydrological observations, etc.) Attach additional sheets as necessary.

- highly disturbed ; incised dry channel
- heavily vegetated : cheat grass, herb sophia, Cirsium sp.

Ancillary Information:

☐ Riparian Corridor none observed

☐ Erosion and Deposition heavy erosion along entire reach

☐ Floodplain Connectivity no f/d p/n observed

* several erosional side channels were not mapped *

Observed Amphibians, Snake, and Fish:

Taxa	Life History Stage	Location Observed	Number of Individuals Observed
None			

Appendix B: Streamflow Duration Field Assessment Form

Project # / Name 3678 / Grassy Mtn		Assessor Harrelson	
Address		Date 5/20/17	
Waterway Name J-H Canal		Coordinates at downstream end (ddd.mm.ss)	Lat. 4861176.53 N
Reach Boundaries see Fig 5			Long. 475521.36 W
Precipitation w/in 48 hours (cm) 0.8	Channel Width (m) 4.8	☐ Disturbed Site / Difficult Situation (Describe in "Notes")	

Observed Hydrology

% of reach w/observed surface flow 100

% of reach w/any flow (surface or hyporheic) 100

# of pools observed Ø

Observations

Observed Wetland Plants (and indicator status):

Typha sp. OBL

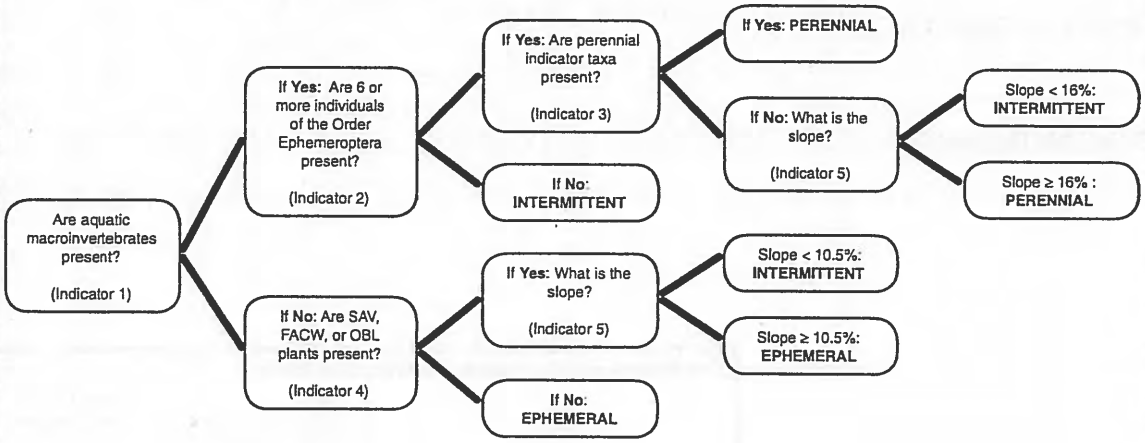
Observed Macroinvertebrates:

Taxon	Indicator Status	Ephemer-optera?	# of Individuals
None observed due to high flow, but presumed present			

Indicators

1. Are aquatic macroinvertebrates present?	☒ Yes	☐ No
2. Are 6 or more individuals of the Order Ephemeroptera present?	☐ Yes	☐ No unknown
3. Are perennial indicator taxa present? (refer to Table 1)	☒ Yes	☐ No assumed
4. Are FACW, OBL, or SAV plants present? (Within ½ channel width)	☒ Yes	☐ No
5. What is the slope? (In percent, measured for the valley, not the stream)	2-3 %	

Conclusions



Single Indicators:
☐ Fish
☐ Amphibians
↳ presumed present

Finding:
☐ Ephemeral
☐ Intermittent
☒ Perennial

Notes: single indicator conclusions, description of disturbances or modifications that may interfere with indicators, etc.)

Difficult Situation:

Describe situation. For disturbed streams, note extent, type, and history of disturbance.

- ☐ Prolonged Abnormal Rainfall / Snowpack
  - ☐ Below Average
  - ☐ Above Average
- ☐ Natural or Anthropogenic Disturbance
- ☐ Other: _____

Additional Notes: (sketch of site, description of photos, comments on hydrological observations, etc.) Attach additional sheets as necessary.

- irrigation canal w/ pumped water & water flow controls
- water murky, no fish/amphibians observed, but they are likley present w/in the canal

Ancillary Information:

- ☐ Riparian Corridor none
- ☐ Erosion and Deposition observed on right bank
- ☐ Floodplain Connectivity no fldpln observed

Observed Amphibians, Snake, and Fish:

Taxa	Life History Stage	Location Observed	Number of Individuals Observed
None observed			

APPENDIX C

SITE PHOTOGRAPHS

Grassy Mountain Mine Project – Wetland Delineation Report
Photolog

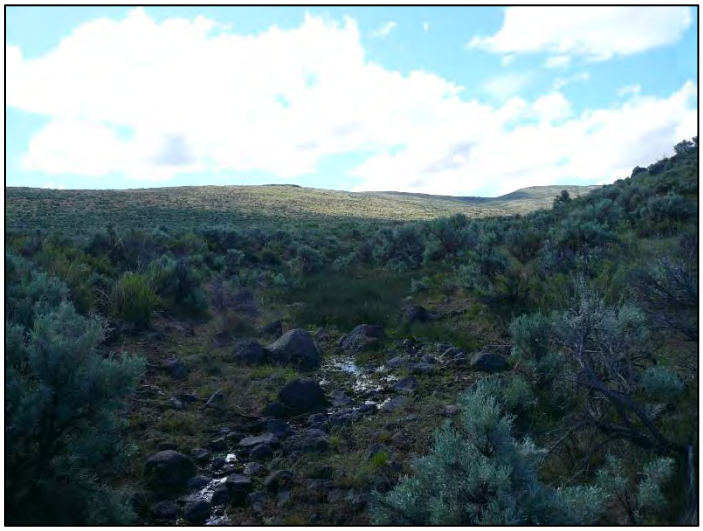
Photo 1.

Tributary 1 (ephemeral) facing upstream. OHWM defined by sediment sorting and scouring.

Photo 2.

Tributary 1 (ephemeral) facing downstream. Channel width ranged between 2-5 feet.

Photo 3.



Tributary 2b (intermittent) facing upstream. Some wetland plants and macroinvertebrates were observed.

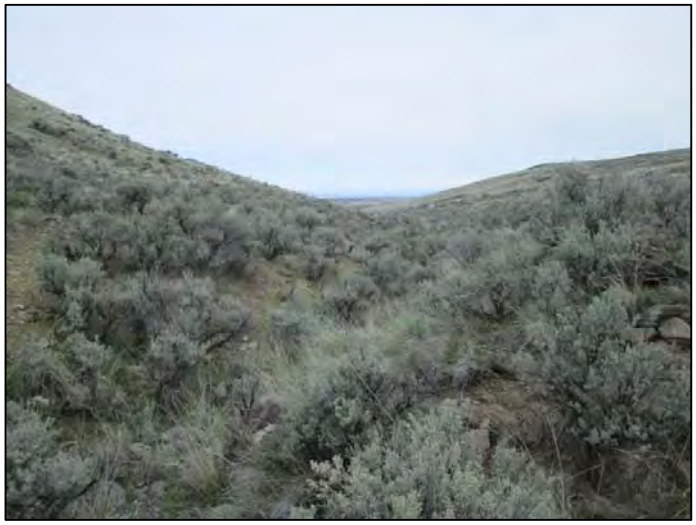
Photo 4.

Tributary 2b (intermittent) facing downstream.

Photo 5.

Tributary 2a (ephemeral) facing upstream at location above Schweizer Reservoir. Channel width ranged between 2-4 feet. OHWM was poorly defined (HDR 2015).

Photo 6.



Tributary 2a (ephemeral) facing down stream at location above Schweizer Reservoir. Vegetation was dominated by sagebrush and upland bunchgrasses (HDR 2015).

Photo 7.

Tributary 2a (ephemeral) facing upstream at location below Schweizer Reservoir. Reservoir embankment is visible in background. OHWM was poorly defined (HDR 2015).

Photo 8.

Tributary 2a (ephemeral) facing downstream. Vegetation was upland throughout (HDR 2015).

Photo 9.

Soil Pit #8A was dug at the low point of Schweizer reservoir to confirm the absence of wetlands. Soils were light in color and not hydric (HDR 2015).

Photo 10.

View of upland vegetation at Soil Pit #8A (HDR 2015).

Photo 11.

Schweizer Reservoir facing upstream at ephemeral drainage Tributary 2. Grazing was evident throughout the reservoir (HDR 2015).

Photo 12.

Schweizer Reservoir facing north toward reservoir embankment (HDR 2015).

Photo 13.

Tributary 3 (ephemeral) facing upstream. Channel width ranged between 2-3 feet. OHWM was poorly defined (HDR 2015).

Photo 14.

Tributary 3 (ephemeral) facing downstream. Vegetation was upland throughout (HDR 2015).

Photo 15.

Tributary 3 (ephemeral) facing upstream. OHWM was poorly defined, and upland vegetation was present throughout.

Photo 16.

Tributary 3 (ephemeral) facing downstream.

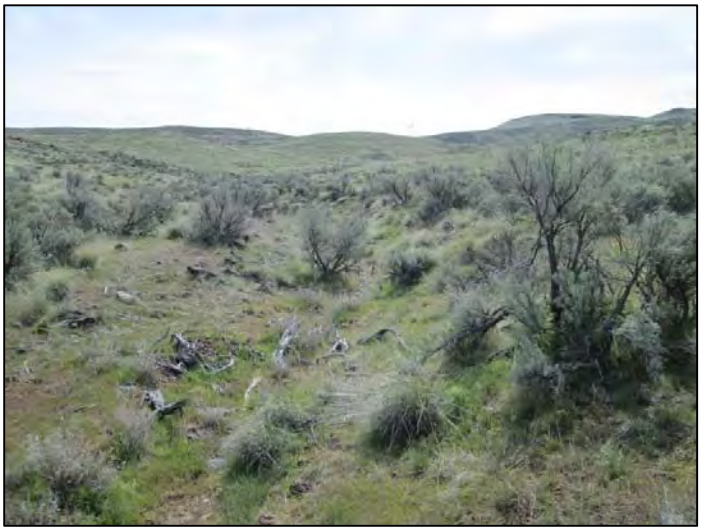
Photo 17.

Tributary 3 (ephemeral) facing upstream. Channel width ranged between 4-12 feet. OHWM was poorly defined.

Photo 18.

Tributary 3 (ephemeral) facing downstream. End of defined channel.

Photo 19.

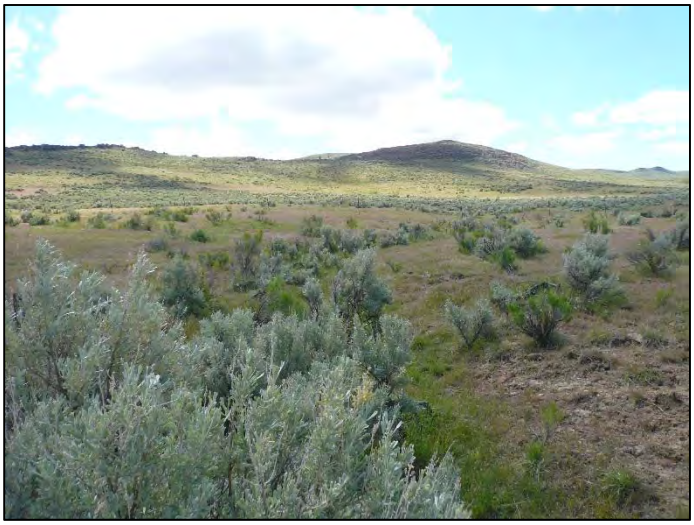


Tributary 4 (ephemeral) facing upstream. Channel width ranged between 3-4 feet. OHWM was poorly defined (HDR 2015).

Photo 20.

Tributary 4 (ephemeral) facing downstream. Vegetation was fairly sparse and soils were rocky (HDR 2015).

Photo 21.



Tributary 4 (ephemeral) facing upstream. Channel width ranged between 1-3 feet. OHWM was poorly defined.

Photo 22.

Tributary 4 (ephemeral) facing upstream. Vegetation was upland throughout, and areas was heavily grazed.

Photo 23.

Tributary 4 (ephemeral) facing downstream.

Photo 24.

Tributary 5 (ephemeral) facing upstream. Channel width ranged between 5-8 feet, and the OHWM was poorly defined.

Photo 25.

Tributary 5 (ephemeral) facing downstream. Sagebrush was common throughout the channel.

Photo 26.

Soil pit DP1 facing north. Partial berm from old pond is visible in the background.

Photo 27.

Photo facing downstream (south) from DP1 towards the end of Tributary 3 in this area.

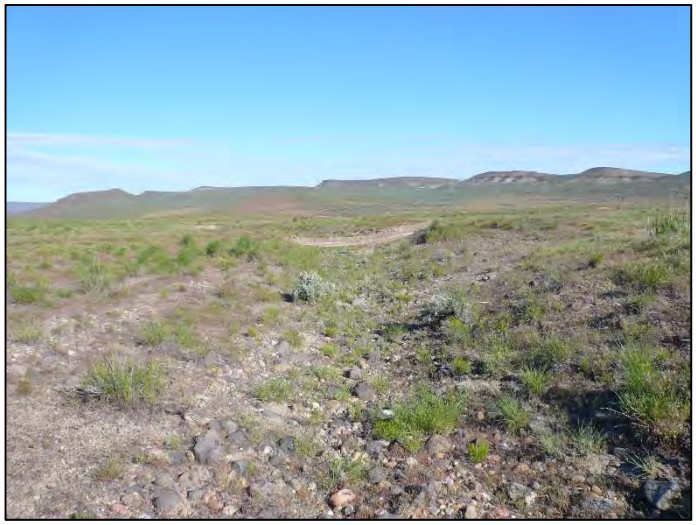
Photo 28.

Photo facing upstream (north) from DP1.

Photo 29.

Tributary 3 (ephemeral) facing upstream.

Photo 30.



Tributary 3 (ephemeral) facing downstream towards access road.

Photo 31.

Tributary 6 (ephemeral) facing upstream. Channel width ranged between 4-14 feet; OHWM was defined by scouring and a line impressed on the bank.

Photo 32.

Tributary 6 (ephemeral) facing downstream. Old berm is visible on the left bank.

Photo 33.

Photo facing southwest (upstream). Area north of Tributary 6 with no evident channel.

Photo 34.

Photo facing northeast (downstream). Area north of Tributary 6 with no evident channel.

Photo 35.

Photo facing south (upstream). Area mapped as a stream channel, however, no channel is evident.

Photo 36.

Photo facing north (downstream). Area mapped as a stream channel, however, no channel is evident.

Photo 37.

Photo facing southeast (upstream). Area mapped as a stream channel, however, no channel is evident.

Photo 38.

Photo facing northwest (downstream). Area mapped as a stream channel, however, no channel is evident.

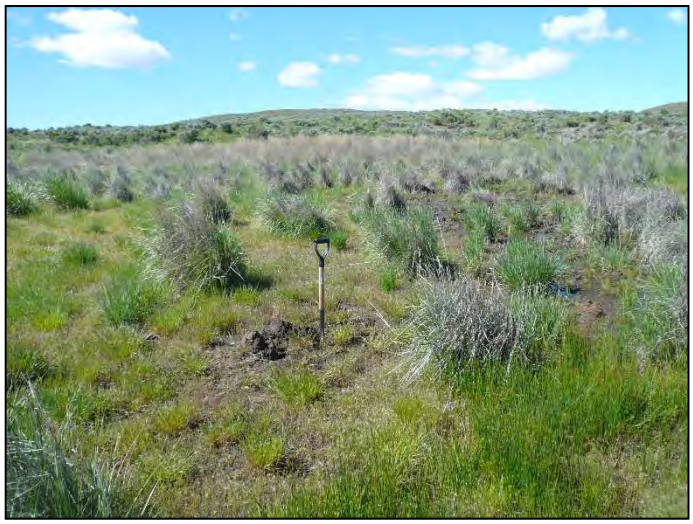
Photo 39.

Wetland 1 facing downslope (northeast).

Photo 40.

Wetland 1 facing upslope (southwest).

Photo 41.



Wetland data point DP2 facing south inside Wetland 1.

Photo 42.

Upland data point DP3 facing southwest.

Photo 43.

Photo facing east from Wetland 1 towards area mapped as a pond by NWI.

Photo 44.

Photo facing southeast (upstream). Area mapped as a stream channel, however, no channel is evident.

Photo 45.

Photo facing northwest (downstream). Area mapped as a stream channel, however, no channel is evident.

Photo 46.

Tributary 7 (ephemeral) facing upstream. Channel width ranged between 3-8 feet.

Photo 47.

Tributary 7 (ephemeral) facing downstream. OHWM was poorly defined.

Photo 48.

Tributary 8 (ephemeral) facing upstream. Beginning of defined channel.

Photo 49.

Tributary 8 (ephemeral) facing downstream. Channel width ranged between 2-6 feet.

Photo 50.

Tributary 8 (ephemeral) facing upstream.

Photo 51.

Tributary 8 (ephemeral) facing downstream. OHWM was defined by sediment sorting and a line impressed on the bank.

Photo 52.

Photo facing west (upstream). Area mapped as a stream channel, however, no channel is evident.

Photo 53.

Photo facing east (downstream). Area mapped as a stream channel, however, no channel is evident.

Photo 54.

Cattle pond outside project area.

Photo 55.

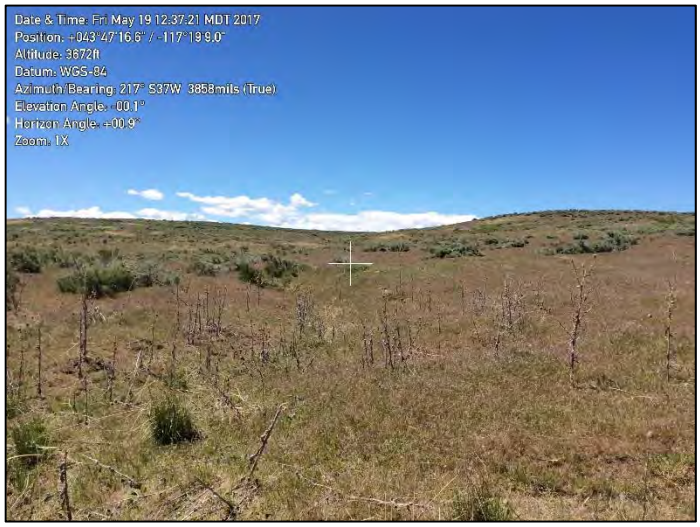


Photo facing southwest (upstream). Area mapped as a stream channel, however, no channel is evident.

Photo 56.

Photo facing northeast (downstream). Area mapped as a stream channel, however, no channel is evident.

Photo 57.

Tributary 9 (ephemeral) facing upstream. Beginning of defined channel.

Photo 58.

Tributary 9 (ephemeral) facing downstream. OHWM was defined by some sediment sorting and changes in vegetation.

Photo 59.

Tributary 9 (ephemeral) facing upstream. Channel widths ranged between 3-7 feet.

Photo 60.

Tributary 9 (ephemeral) facing downstream.

Photo 61.

Photo facing southwest (upstream). Area mapped as a stream channel, however, no channel is evident.

Photo 62.

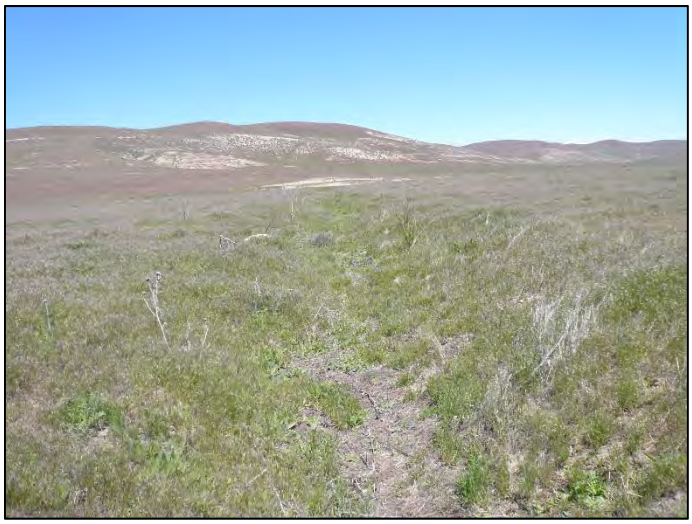


Photo facing northeast (downstream). Area mapped as a stream channel, however, no channel is evident.

Photo 63.

Photo facing northwest (upstream). Area mapped as a stream channel, however, no channel is evident.

Photo 64.

Photo facing southeast (downstream). Area mapped as a stream channel, however, no channel is evident.

Photo 65.

Tributary 10 (ephemeral) facing upstream. Area is heavily grazed with cattle roaming throughout channel.

Photo 66.

Tributary 10 (ephemeral) facing downstream. Channel width ranged between 2-20 feet.

Photo 67.

Tributary 10 (ephemeral) facing upstream.

Photo 68.

Tributary 10 (ephemeral) facing downstream. Channel is deeply incised with moderate to severe erosion.

Photo 69.

Tributary 10 (ephemeral) facing upstream. Area is heavily grazed with cattle roaming throughout channel.

Photo 70.

Tributary 10 (ephemeral) facing downstream.

Photo 71.

J-H Canal (artificial waterbody) facing upstream.

Photo 72.

J-H Canal (artificial waterbody) facing downstream. Berm is visible on right bank, and water control structure is visible on the left bank.

APPENDIX E

Habitat Categorization Methods

1 INTRODUCTION

This document describes the methods used to determine habitat category values as defined in the Oregon Department of Fish and Wildlife (ODFW) Habitat Mitigation Policy in the analysis area for the Grassy Mountain Mine Project (Project). The process presented here provides enough detail to understand the Geographic Information System (GIS) model concept and what the input datasets and output dataset include. The level of detail provided is sufficient to present the model and the steps taken to arrive at the final habitat categories. It is not intended to be used as a step-by-step instruction manual.

2 METHODS

The GIS model output dataset results in habitat category values as defined in Oregon Administrative Rule (OAR) 635-415-0025 being assigned to the Analysis Area for the Project. This is achieved through a GIS model which takes a combination of input datasets (e.g., Project-specific survey data and existing data) and creates an output dataset. This output dataset consists of various polygons within the Analysis Area that have been assigned a habitat category value.

2.1 Input Layers

Input layers included field-verified vegetation data, wildlife observations, wetland delineation data and mule deer winter range. Baseline habitat categories were assigned to vegetation community types based on their importance to wildlife, and then subsections of the vegetation community polygons were manually modified based on input from ODFW, presence of multiple ecotones (i.e., habitat heterogeneity) or important adjacent landscape features (i.e., springs). ODFW habitat category types are summarized in Table 1.

Table 1. ODFW Mitigation Goals and Implementation Standards by Habitat Category

Category	Description	Mitigation Goal	Achieved by
1	Irreplaceable, essential habitat for a fish or wildlife species, population, or a unique assemblage of species and is limited on either a physiographic province or site-specific basis, depending on the individual species, population, or unique assemblage.	No loss of either habitat quantity or quality	Avoidance of impacts through alternatives to the proposed development action.
2	Essential habitat for a fish or wildlife species, population, or unique assemblage of species and is limited either on a physiographic province or site-specific basis depending on the individual species, population, or unique assemblage.	No net loss of habitat quantity or quality and to provide a net benefit of habitat quantity or quality	Avoidance of impacts through alternatives to the proposed development action; or mitigation of impacts, if unavoidable, through reliable in-kind, in-proximity habitat mitigation to achieve no net loss of either pre-development habitat quantity or quality. In addition, a net benefit of habitat quantity or quality must be provided.

Category	Description	Mitigation Goal	Achieved by
3	Essential habitat for fish and wildlife, or important habitat for fish and wildlife that is limited either on a physiographic province or site-specific basis, depending on the individual species or population.	No net loss of habitat quantity or quality	Avoidance of impacts through alternatives to the proposed development action; or mitigation of impacts, if unavoidable, through reliable in-kind, in-proximity habitat mitigation to achieve no net loss in either pre-development habitat quantity or quality.
4	Important habitat for fish and wildlife species.	No net loss of habitat quantity or quality	Avoidance of impacts through alternatives to the proposed development action; or mitigation of impacts, if unavoidable, through reliable in-kind or out-of-kind, in-proximity or off-proximity habitat mitigation to achieve no net loss in either pre-development habitat quantity or quality.
5	High potential to become either essential or important habitat.	Net benefit in habitat quantity and quality	Avoidance of impacts through alternatives to the proposed development action; or mitigation of impacts, if unavoidable, through actions that contribute to essential or important habitat.
6	Low potential to become essential or important habitat.	Minimize impacts	Actions that minimize direct habitat loss and avoid impacts to offsite habitat.

The baseline habitat categorization used vegetation communities that were field-verified during biological surveys in 2019. The field-verified vegetation communities and their baseline habitat category are shown in Table 2. Also shown are land cover types not typically associated with vegetation (i.e., roads). Full descriptions supporting baseline categorization are found in the Wildlife Mitigation Plan, Sections 4.2.1 through 4.2.7.

Table 2. Land Cover and Habitat Types within the Permit Area

USNVC[1] Group	USNVC Alliance or Association	Habitat Type Description	Acres in Permit Area	Baseline Category
Vegetable Crop Cultural	N/A (Agricultural)	Cultivated fields.	12.0	6
N/A	Roads	Compacted gravel or dirt roads devoid of vegetation and offering no value to wildlife.	57.9	6
Intermountain Semi-Desert Steppe and Shrubland Group	Yellow Rabbitbrush/ Bluebunch Wheatgrass Shrubland	Sparse to moderate shrub cover with bluebunch wheatgrass and other native bunchgrasses in the understory.	71.7	4
Intermountain Semi-Desert Grassland	Indian Ricegrass-Bluebunch-Wheatgrass-Sandhill-Muhly Grassland	Co-dominated by bluebunch wheatgrass and cheatgrass, with native perennial forbs and grasses commonly occurring throughout. Potentially a transitioning state as a result of shrub cover lost due to rangeland wildfires.	118.5	4

Great Basin-Intermountain Ruderal Dry Shrubland and Grassland	Wyoming Big Sagebrush/ Cheatgrass Ruderal Shrubland	A disturbed native plant community with Wyoming big sagebrush and an understory that is dominated by non-native annuals, including medusahead grass (*Taeniatherum caput-medusae*, tansy mustard (*Descurainia pinnata*), and cheatgrass.	138.4	4
	Crested Wheatgrass Western Ruderal Perennial Grassland	Non-native vegetation type due to restoration seeding following rangeland fires. Dominated by crested wheatgrass with cheatgrass and Sandberg bluegrass (*Poa secunda*) also occurring. Sparse shrub cover occurs sporadically.	283.4	5
	Cheatgrass Ruderal Grassland	Highly disturbed, weedy, and dominated by non-native species, namely cheatgrass, and including noxious weeds like Scotch thistle (*Onopordum acanthium*) and rush skeleton weed (*Chondrilla juncea*). Some native grasses and forbs are present.	508.3	4/5
Intermountain Mesic Tall Sagebrush Steppe and Shrubland	Wyoming Big Sagebrush/ Bluebunch Wheatgrass Shrubland	Dominated by sparse to moderate cover of Wyoming big sagebrush with low to moderate cover of bluebunch wheatgrass. Other native bunchgrass and forb species are present.	571.5	3
Total Acres			**1761.7**	

[1] USNVC 2019

2.2 Modifier Layers

Once the baseline categories were assigned, the wildlife point observations were overlaid with the field-verified vegetation polygons. Due to the biased nature of these observations, care was taken to base any modification of baseline habitat category on reasonable determinations in addition to the presence of wildlife observations. If a cluster of observations was located in an area with multiple ecotones or a mosaic of vegetation communities, a manual polygon was created around the "edges". If there were areas with vegetation mosaics or several ecotones in close proximity without wildlife observation clusters, these were also manually encircled and assigned to Category 3. If a cluster of wildlife observations did not fit these determinations, no manual modification of polygons was performed.

All wetlands or ephemeral drainages with a vegetative response were automatically assigned as Category 2, with the exception of a modified drainage ditch that was assigned to Category 5 in consultation with ODFW. Ephemeral drainages without a vegetative response were assigned to Category 3.

Mule deer winter range was automatically assigned as Category 2. The mule deer winter range layer was placed on top of all other layers, overriding previous habitat categories with the new

category (2). Finally, the wetland delineation layer was placed on top of all other layers. All previous categories within the overlap of this layer were forced into the new category (2), with the exception of existing roads. The end result is that any polygonal overlap of input or modifier layers resulted in the assignment of the lowest category number to that polygon (i.e., if a polygon has a baseline of Category 4, and overlaps with a portion of mule deer winter range that is Category 2, the overlap portion will be upgraded to Category 2). The final habitat output is summarized in Table 3.

Table 3. Final Habitat Category Summary

Category	Acres in Project Area	Description
2	174	Habitat in this category is either mule deer winter range as mapped by ODFW (2013) or any type of wetland with a vegetative response (i.e., spring, seep, intermittent drainage). These two input layers override all other layers except where they overlap with existing roads.
3	892	The determining factor for inclusion in this category is that habitat must be essential and limited. Areas within the Project Area that are a heterogenous mix of vegetation communities, with numerous ecotone "edges", were manually carved out and assigned to this category due to the importance of edge habitats and the generally higher species richness compared to homogenous habitats. The baseline category of some vegetation communities was upgraded to this category in response to comments from ODFW, including the crested wheatgrass communities occurring along the access road. Nearly all of the vegetation communities have some portions classified as Category 3, based on various inputs. Ephemeral drainages in the Project Area were considered a Category 3 modifier layer.
4	461	This category is made up of baseline category 4 vegetation communities that were not overlapping with any input layer that justified elevating the category. See the Wildlife Mitigation Plan, Sections 4.2.1-4.2.7, for detailed habitat descriptions and justification for baseline classification.
5	175	This category comprises vegetation communities that were baseline categorized as 5 that did not overlap with any input layer that would justify elevating the category, as well as the modified canal that runs along the northern end of the Access Road Area. The modified canal was assigned to this category at the direction of ODFW. See the Wildlife Mitigation Plan, Sections 4.2.1-4.2.7, for detailed habitat descriptions and justification for baseline classification.
6	60	Road surfaces are included in this category type. Portions of agricultural areas in the Project Area are also included, where they did not overlap with either mule deer winter range as mapped by ODFW (2013) or with any wetland (i.e., spring, seep, intermittent/ephemeral drainage).

3 REFERENCES

United States National Vegetation Classification (USNVC). 2019. United States National Vegetation Classification Database, V2.03. Federal Geographic Data Committee, Vegetation Subcommittee, Washington DC. [usnvc.org] Accessed September 14, 2020.

APPENDIX F

Habitat Quantification Tool Outputs

OREGON SAGE-GROUSE HABITAT QUANTIFICATION TOOL CALCULATOR

Version 2.2 Last updated: 2019-03-01

Instructions: Enter project identifying information on this worksheet.
Enter map unit data in yellow cells in the "Data Entry" worksheet. Gray cells are calculated automatically by the spreadsheet.
Enter project-level information for minimization reductions and the legal protection multiplier on the 'Project Summary' worksheet.
Summary values will be transferred automatically to the 'Project Summary' worksheet.

The 'Classify state - Upland' and 'Classify state - Mesic' tabs can be used to help determine ecological states based on field data and the standard decsion tree. Data from these worksheets will not transfer automatically and must be entered by the user in the 'Data Entry' tab, where appropriate.

Full instructions are provided in the HQT User Guide. Questions regarding the spreadsheet/calculator should be directed to Willamette Partnership at info@willamettepartnership.org. Worksheets are protected to prevent inadvertent modification of formulas.

LEGEND: Headings Data Entry Calculated Cells

Site Name	Calico (2nd Change to Perimiter Fence) 12-8-2021
Location	Malheur County
Project Description	Gold Mine and Processing Facility

OREGON SAGE-GROUSE HABITAT QUANTIFICATION TOOL CALCULATOR Version 2.2 Last updated: 2019-03-01

Data Entry

Calculated Cells

Management Designations Index 0.218

Enter the MDI score for the full project analysis area

Site Name: Calico (2nd Change to Perimiter Fence) 12-8-2021

Location: Malheur County

RAW DEBIT(-) OR CREDIT(+) ACRES

Upland -668.8

Mesic -0.7

DATA ENTRY								BASELINE HABITAT FUNCTION			HABITAT MODIFICATION								FUNCTIONAL ACRES		
				Ecological State		Development Impacts					Ecological State			Development Impacts							
Map Unit ID	**Acres**	Mesic (1=yes, 0=no)	Habitat Type	Pre-Project Ecological State	Post-Project Ecological State	Pre-Project Development Score	Post-Project Development Score	Pre-Project Ecological State Score	Pre-Project Development Score	**Baseline Habitat Function Subscore**	Pre-Project Ecological State Score	Post-Project Ecological State Score	**Change** in Ecological State Score	Pre-Project Development Score	Post-Project Development Score	**Change** in Development Score	**Pre-Project Habitat Modification Subscore**	**Post-Project Site Habitat Modification Subscore**	Pre-Project Functional Acres	Post-Project Functional Acres	**Debit (-) or Credit (+) Acres**
EXAMPLE	***80.0***	*0*	*Upland*	*B*	*B*	*0.700*	*0.500*	*0.80*	*0.700*	*0.750*	*0.80*	*0.80*	*0.00*	*0.700*	*0.500*	*-0.200*	*0.750*	*0.650*	*45.00*	*39.00*	***-6.00***
0	**620.2**	0	Upland	A	A	0.527	0.236	1.00	0.527	0.582	1.00	1.00	0.00	0.527	0.236	-0.291	0.763	0.618	275.36	222.84	**-52.52**
1	**218.0**		Upland	AC	AC	0.720	0.647	0.65	0.720	0.529	0.65	0.65	0.00	0.720	0.647	-0.073	0.685	0.648	79.05	74.83	**-4.22**
2	**214.3**		Upland	C-IAG	C-IAG	0.594	0.383	0.30	0.594	0.371	0.30	0.30	0.00	0.594	0.383	-0.211	0.447	0.342	35.52	27.14	**-8.38**
3	**1299.8**		Upland	BD	BD	0.612	0.467	0.45	0.612	0.427	0.45	0.45	0.00	0.612	0.467	-0.146	0.531	0.458	294.71	254.26	**-40.45**
4	**17.7**		Upland	D-IAG	D-IAG	0.810	0.810	0.10	0.810	0.376	0.10	0.10	0.00	0.810	0.810	0.000	0.455	0.455	3.03	3.03	0.00
5	**124.1**		Upland	D-IAG	D-IAG	0.789	0.789	0.10	0.789	0.369	0.10	0.10	0.00	0.789	0.789	0.000	0.445	0.445	20.38	20.38	0.00
6	**73.9**		Upland	D-IAG	D-IAG	0.869	0.869	0.10	0.869	0.396	0.10	0.10	0.00	0.869	0.869	0.000	0.485	0.485	14.17	14.17	0.00
7	**13.0**		Upland	B	Developed	0.611	0.129	0.80	0.611	0.543	0.80	0.00	-0.80	0.611	0.129	-0.483	0.706	0.000	4.98	0.00	**-4.98**
8	**3.1**		Upland	C-IAG	Developed	0.704	0.022	0.30	0.704	0.407	0.30	0.00	-0.30	0.704	0.022	-0.682	0.502	0.000	0.64	0.00	**-0.64**
9	**45.0**		Upland	A	A	0.615	0.486	1.00	0.615	0.611	1.00	1.00	0.00	0.615	0.486	-0.128	0.807	0.743	22.19	20.43	**-1.76**
10	**22.0**		Upland	B	B	0.561	0.546	0.80	0.561	0.526	0.80	0.80	0.00	0.561	0.546	-0.015	0.681	0.673	7.88	7.79	**-0.09**
11	**873.2**		Upland	D-IAG	D-IAG	0.558	0.482	0.10	0.558	0.292	0.10	0.10	0.00	0.558	0.482	-0.076	0.329	0.291	83.94	74.23	**-9.70**
12	**531.0**		Upland	B	B	0.587	0.224	0.80	0.587	0.535	0.80	0.80	0.00	0.587	0.224	-0.363	0.693	0.512	196.99	145.48	**-51.51**
13	**889.1**		Upland	C-IAG	C-IAG	0.607	0.065	0.30	0.607	0.375	0.30	0.30	0.00	0.607	0.065	-0.542	0.453	0.182	151.12	60.79	**-90.33**
14	**1051.2**		Upland	B	B	0.580	0.180	0.80	0.580	0.533	0.80	0.80	0.00	0.580	0.180	-0.401	0.690	0.490	386.64	274.42	**-112.22**
15	**1019.9**		Upland	C-IAG	C-IAG	0.739	0.715	0.30	0.739	0.419	0.30	0.30	0.00	0.739	0.715	-0.024	0.520	0.507	222.09	216.92	**-5.16**
16	**137.1**		Upland	C-IAG	C-IAG	0.746	0.732	0.30	0.746	0.421	0.30	0.30	0.00	0.746	0.732	-0.014	0.523	0.516	30.19	29.79	**-0.39**
17	**294.1**		Upland	C-IAG	C-IAG	0.443	0.402	0.30	0.443	0.320	0.30	0.30	0.00	0.443	0.402	-0.041	0.371	0.351	34.99	33.05	**-1.94**
18	**344.1**		Upland	C-IAG	Developed	0.745	0.000	0.30	0.745	0.421	0.30	0.00	-0.30	0.745	0.000	-0.745	0.523	0.000	75.72	0.00	**-75.72**
19	**462.7**		Upland	D-IAG	D-IAG	0.566	0.155	0.10	0.566	0.295	0.10	0.10	0.00	0.566	0.155	-0.412	0.333	0.127	45.46	17.39	**-28.07**
20	**61.1**		Upland	BD	BD	0.503	0.224	0.45	0.503	0.390	0.45	0.45	0.00	0.503	0.224	-0.279	0.477	0.337	11.37	8.04	**-3.33**
21	**288.1**		Upland	B	B	0.544	0.309	0.80	0.544	0.521	0.80	0.80	0.00	0.544	0.309	-0.235	0.672	0.555	100.81	83.20	**-17.61**
30	**5.7**	1	Mesic	B	B	0.506	0.252	0.80	0.506	0.508	0.80	0.80	0.00	0.506	0.252	-0.254	0.653	0.526	1.89	1.52	**-0.37**
31	**41.7**	1	Mesic	B	B	0.748	0.721	0.80	0.748	0.589	0.80	0.80	0.00	0.748	0.721	-0.027	0.774	0.760	18.99	18.66	**-0.34**
32	**0.8**	1	Mesic	B	B	0.593	0.470	0.80	0.593	0.537	0.80	0.80	0.00	0.593	0.470	-0.124	0.697	0.635	0.30	0.28	**-0.03**
97	**14.9**		Upland	Nonhabitat	Nonhabitat	0.629	0.501	0.00	0.629	0.282	0.00	0.00	0.00	0.629	0.501	-0.128	0.000	0.000	0.00	0.00	0.00
98	**11.6**		Upland	Developed	Developed	0.150	0.069	0.00	0.150	0.123	0.00	0.00	0.00	0.150	0.069	-0.081	0.000	0.000	0.00	0.00	0.00
99	**30.2**		Upland	Developed	Developed	0.483	0.261	0.00	0.483	0.234	0.00	0.00	0.00	0.483	0.261	-0.223	0.000	0.000	0.00	0.00	0.00
101	**214.5**		Upland	D-IAG	D-IAG	0.558	0.476	0.10	0.558	0.292	0.10	0.10	0.00	0.558	0.476	-0.081	0.329	0.288	20.59	18.05	**-2.54**
102	**266.3**		Upland	A	A	0.742	0.722	1.00	0.742	0.653	1.00	1.00	0.00	0.742	0.722	-0.020	0.871	0.861	151.55	149.81	**-1.74**
103	**211.5**		Upland	C-IAG	C-IAG	0.712	0.667	0.30	0.712	0.410	0.30	0.30	0.00	0.712	0.667	-0.045	0.506	0.484	43.90	41.94	**-1.95**
104	**61.2**		Upland	D-IAG	D-IAG	0.572	0.351	0.10	0.572	0.297	0.10	0.10	0.00	0.572	0.351	-0.221	0.336	0.225	6.10	4.09	**-2.01**
105	**597.4**		Upland	D-IAG	D-IAG	0.637	0.511	0.10	0.637	0.318	0.10	0.10	0.00	0.637	0.511	-0.126	0.368	0.305	70.04	58.07	**-11.97**
181	**320.3**		Upland	A	A	0.509	0.296	1.00	0.509	0.576	1.00	1.00	0.00	0.509	0.296	-0.213	0.754	0.648	139.05	119.43	**-19.62**
182	**1017.6**		Upland	BD	BD	0.504	0.295	0.45	0.504	0.391	0.45	0.45	0.00	0.504	0.295	-0.210	0.477	0.372	189.79	148.08	**-41.71**
183	**74.4**		Upland	A	A	0.731	0.479	1.00	0.731	0.650	1.00	1.00	0.00	0.731	0.479	-0.252	0.865	0.739	41.85	35.75	**-6.10**
201	**221.1**		Upland	B	B	0.595	0.133	0.80	0.595	0.538	0.80	0.80	0.00	0.595	0.133	-0.462	0.697	0.466	82.92	55.46	**-27.46**
202	**1432.6**		Upland	AC	AC	0.615	0.489	0.65	0.615	0.494	0.65	0.65	0.00	0.615	0.489	-0.125	0.632	0.570	447.68	403.37	**-44.30**
203	**986.8**		Upland	A	A	0.832	0.830	1.00	0.832	0.683	1.00	1.00	0.00	0.832	0.830	-0.001	0.916	0.915	617.44	617.07	**-0.37**

OREGON SAGE-GROUSE HABITAT QUANTIFICATION TOOL CALCULATOR Version 2.2 Last updated: 2019-03-01

SITE INFORMATION

Site Name	Calico (2nd Change to Perimiter Fence) 12-8-2021
Location	Malheur County
Description	Gold Mine and Processing Facility

DATA ENTRY: HQT ADJUSTMENT FACTORS

Minimization reductions		*Applies to development [debit] projects only. Default value is **0**.*
Legal protection multiplier	5%	*Applies to credit generation projects only. Default value is **5%**.*

HQT PROJECT DEBIT/CREDIT VALUES

UPLAND Habitat	
HQT Upland Debit(-) or Credit(+) Acres	**-769.1**

MESIC Habitat	
HQT Mesic Debit(-) or Credit(+) Acres	**-0.8**

UPLAND CALCULATIONS (Do not modify these tables. Numbers are calculated from the "Data Entry" tab.)

UPLAND Map Unit Data Summary

36 map units entered		Functional Acres		Raw Upland Debit(-) or Credit(+) Acres	Average Scores (weighted by map unit area)					
					Ecological State			Development Impacts		
	Physical Acres	Pre-Project	Post-Project		Pre-Project State Score	Post-Project State Score	Change in State Score	Pre-Project Development Score	Post-Project Development Score	Change in Development Score
Direct impacts	360.3	81.3	0.0	-81.3						
Indirect impacts	13687.9	3826.8	3239.3	-587.5						
TOTAL	**14048.2**	**3908.1**	**3239.3**	**-668.8**	**0.52**	**0.51**	**-0.01**	**0.622**	**0.416**	**-0.206**

UPLAND Credit Adjustments *all values in units of functional acres*

Raw upland habitat credit value	**-668.8**	Credit value after minimization	**-668.8**
Total post-project functional acres eligible for legal protection credit	**0**	Legal protection credit	**0.0**
Debit projects are required to achieve a net conservation benefit	**15%**	Net conservation benefit	**-100.3**
		HQT Upland Debit(-) or Credit(+) Acres	**-769.1**

MESIC CALCULATIONS (Do not modify these tables. Numbers are calculated from the "Data Entry" tab.)

MESIC Map Unit Data Summary

3 map units entered		Functional Acres		Raw Upland Debit(-) or Credit(+) Acres	Average Scores (weighted by map unit area)					
					Ecological State			Development Impacts		
	Physical Acres	Pre-Project	Post-Project		Pre-Project State Score	Post-Project State Score	Change in State Score	Pre-Project Development Score	Post-Project Development Score	Change in Development Score
Direct impacts	0.0	0.0	0.0	0.0						
Indirect impacts	48.2	21.2	20.5	-0.7						
TOTAL	**48.2**	**21.2**	**20.5**	**-0.7**	**0.80**	**0.80**	**0.00**	**0.717**	**0.661**	**-0.056**

MESIC Credit Adjustments *all values in units of functional acres*

Raw mesic habitat credit value	**-0.7**	Credit value after minimization	**-0.7**
Total post-project functional acres eligible for legal protection credit	**0**	Legal protection credit	**0.0**
Debit projects are required to achieve a net conservation benefit	**15%**	Net conservation benefit	**-0.1**
		HQT Mesic Debit(-) or Credit(+) Acres	**-0.8**

OREGON SAGE-GROUSE HABITAT QUANTIFICATION TOOL CALCULATOR Version 2.2 Last updated: 2019-03-01

Ecological State Information

Ecological states describe the primary ecological threats that are expressed, as well as the current condition of vegetation as potential habitat for sage-grouse.

Upland habitat can be coarsely classified into ecological states according to relative abundance of several vegetation functional groups: juniper, invasive annual grasses (IAG), sagebrush, and native perennial bunchgrasses (PG).

Table 1 describes the vegetation indicators and guideline quantitative thresholds associated with each upland ecological state.

Use the 'Classify state - Upland' tab to calculate an ecological state for upland areas from field observations.

Mesic habitat (wetlands, riparian areas along streams) is classified into a separate set of ecological states based on the presence and intensity of observed threats.

Table 2 describes ecological states for mesic areas.

Use the 'Classify state - Mesic' tab to calculate an ecological state for mesic areas from field observations.

Each ecological state is associated with a *score* for habitat quantification.

Scoring is based on the classification of states into categories of A, B, C, D, or E, reflecting current habitat value for sage-grouse and risk of loss to primary ecological threats.

Detailed scoring information is provided in Table 3. These scores apply to both upland and mesic habitat.

See the HQT Scientific Rationale for a full description of the purpose, classification, and scoring of ecological states in the HQT.

Table 1. Summary of characteristics defining ecological states: UPLAND areas

Threat category	State name	Score	Is **juniper** threat expressed? (juniper present at site)	Is **IAG** threat expressed? (IAG cover greater than a 1:1 ratio with PG cover)	Is **sagebrush** well represented? (generally >10% cover)	Is **juniper** canopy cover well-developed? (generally >10% cover)	Is **perennial understory** largely intact? (generally >5% cover and/or more than 5 plants per m2)	State description
Minimal threats expressed	**A**	1.0	No	No	Good sagebrush cover	--	--	Intact native shrubland
	B	0.8	No	No	Sparse sagebrush cover	--	--	Intact native grassland
IAG threat	**C-IAG**	0.3	No	Yes	Good sagebrush cover	--	--	Shrubland with annual grass understory
	D-IAG	0.1	No	Yes	Sparse sagebrush cover	--	--	Annual grassland
Dual/ Juniper	**C-Dual/Juniper**	0.3	Yes	No	Good sagebrush cover	--	--	Shrubland with encroaching juniper
Dual threat	**D-Dual**	0.1	Yes	Yes	--	Limited juniper cover	--	Shrubland or grassland with encroaching juniper and annual grass understory
	E-Dual	0.1	Yes	Yes	--	Dense juniper cover	--	Juniper woodland with annual grass understory
Juniper threat	**D-Juniper**	0.1	Yes	No	Sparse sagebrush cover	--	Intact understory	Juniper woodland with native perennial understory
	E-Juniper	0.1	Yes	No	Sparse sagebrush cover	--	Degraded understory	Juniper woodland with denuded understory

Table 2. Description of basic ecological states: MESIC areas

Common observable threats to mesic areas include: grazing pressure; hydrologic modification; invasive plants; and woody species encroachment.

Threats are classified as present or absent; if present, then the level of degradation from the threat is classified as low, medium, or high.

State	Score	Threat Levels
A	1.0	No threats present
B	0.8	Only low threats
C	0.3	One medium threat
D	0.1	One or more high threat(s), or multiple medium threats

Table 3. Scoring for upland ecological states

'Prime' category states provide credit for ongoing protection and management of good-quality habitat.

'Transitional' states and associated intermediate scores may be assigned to areas where the indicators are near the threshold levels or in order to better characterize conditions observed in the field.

Category	Ecological State	Score	Comments
Prime	A*	1.2	State-A habitat with active site management and performance standards.
Basic	A	1.0	
Prime	B*	1.0	State-B habitat with active site management and performance standards.
Basic	B	0.8	
Basic	C-IAG	0.3	
Basic	C-Dual/Juniper	0.3	
Basic	D-IAG	0.1	
Basic	D-Dual	0.1	
Basic	D-Juniper	0.1	
Basic	E-Dual	0.1	
Basic	E-Juniper	0.1	
Prime/Trans.	AB*	1.10	State-A/B habitat with active site management and performance standards.
Transitional	AB	0.90	
Transitional	AC	0.65	
Transitional	BC	0.55	
Transitional	BD	0.45	
Transitional	CD	0.20	
Nonhabitat	Nonhabitat	0	Areas such as open water or steep canyons that are not habitat for sage-grouse
Nonhabitat	Developed	0	Development footprint areas

Table 4. Categorical class values for upland vegetation indicators

Lookup table used by the 'Classify State - Upland' tab.

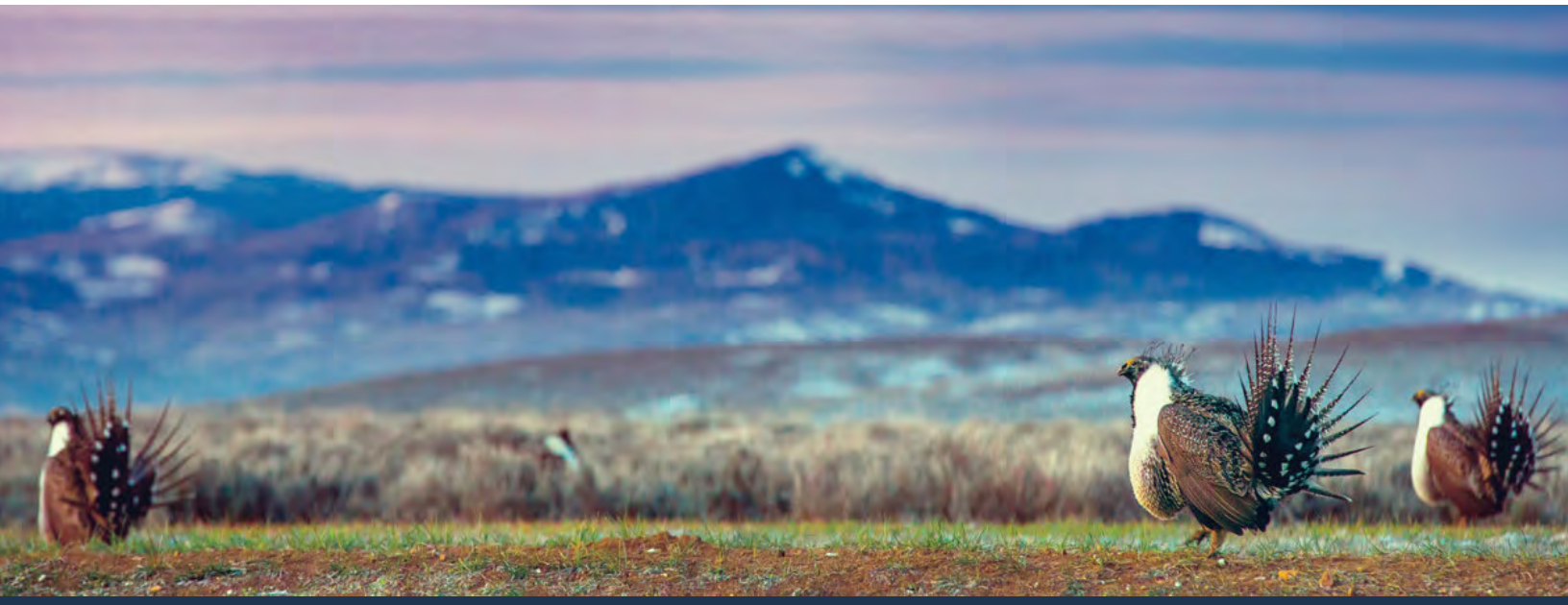
Juniper present	IAG threat expressed	Sagebrush canopy cover	Juniper canopy cover	Perennial understory
No	No	Good	Limited	Intact
Yes	Yes	Sparse	Dense	Degraded

APPENDIX G

TerraWest Conservation Bank Summary

TerraWest Conservancy

Providing economical, ecological, and perpetual solutions for wildlife and their environment.



Preserving Habitat. Protecting Wildlife.

TerraWest Conservancy ("TerraWest") is a habitat conservation and management company near Jackson, Wyoming. Our mission is to provide economical, ecological, and perpetual solutions for wildlife and their environment. TerraWest is established as a leader and trailblazer in Conservation and Mitigation Bank development projects. Our expertise is centered in habitat development and land stewardship projects for diverse wildlife habitations. All of our business ventures improve the earth's climate and protect endangered and sensitive species. We employ diverse conservation tools, including environmental consulting, regulatory compliance, mitigation, and credit marketing and sales. Thus, perpetually protecting disadvantaged species and their natural habitat. We are both experienced and continual participants in upland permitting and compliance. We are well equipped to deliver the best environmental solutions while remaining strictly compliant with all regulatory standards. Whether it be conservation organizations, government entities or departments, local municipalities, or energy companies, a synergistic approach is key to achieving our mission.

FAQ's

What is a Conservation Bank?

A Conservation Bank ("Bank") is a parcel of land containing significant natural resource values that are conserved and managed, typically in perpetuity, for an endangered or sensitive species, pursuant to the Endangered Species Act ("ESA"). The Bank is protected through a series of deed restrictions or conservation easements, managed according to an adaptive Long-term Management Plan ("LTMP") and funded through a non-wasting endowment account. The Bank is operated by a Bank Sponsor and receives habitat credits to satisfy the mitigation requirements within the Bank's Geographic Service Area ("GSA").

What is the purpose of a Conservation Bank?

A Conservation Bank, when fully entitled, is used to offset negative impacts to in-kind natural resources occurring on non-bank lands. A Conservation Bank is large enough to create landscape-scale conservation measures and accommodate the mitigation requirements of multiple projects within a specified GSA.

What is the difference between a Conservation Bank and Conservation Easement?

A Conservation Bank utilizes a Conservation Easement; however, a Conservation Bank has advantages over a standalone Conservation Easement. A Bank has assurances and durability that are filed and permitted with the Bank Enabling Instrument ("BEI"). The additional assurances include a Long-term Management Plan, a non-wasting endowment account, strict monitoring requirements and long-term obligations by the landowner to ensure the success of the mitigation site. The Bank also transfers liability from the State and the project proponent (the "Developer") to the Bank Sponsor.

Who certifies the bank and how long does it take to permit?

Conservation Banks are permitted through an Interagency Review Team ("IRT") which is comprised of both state and federal wildlife agencies. Species that are protected under the ESA require federal approval through the United States Fish & Wildlife Service ("USFWS"). Species that are managed under state jurisdiction are approved through the State's game and fish or wildlife agency. In Oregon, the permitting agency is the Oregon Department of Fish & Wildlife ("ODF&W").

How long is the land preserved?

Under federal jurisdiction, Conservation Banks are required to be in perpetuity. Some states have authorized Term Credit Banks. This means that a bank's protections have a specified term and then expires. A Term Bank can operate with species that are under State jurisdiction. However, if and when the target species revert back to federal regulations, Term Banks will no longer be an acceptable form of mitigation. This could transfer all liability back to the States. Therefore, we believe the best approach is to provide durable, and perpetual species recovery. Perpetual Habitat Credits offer the greatest number of protections against future threats.

Who purchases Habitat Credits?

Any development that causes exceedances or surpasses required thresholds with negative impacts to sensitive, general, or core area habitat may be required to mitigate for the negative impacts. This may include renewable and nonrenewable energy projects, transmission and pipeline developments, surface and sub surface mining operations, commercial and residential developments, roadway expansions, and other forms of anthropogenic disturbances.

How does a Conservation Bank benefit a developer?

Conservation banks provide a simple, economical alternative for developers and other project proponents. A one-time purchase of credits saves developers time and money and provides regulatory certainty. By purchasing credits from a Bank, the project proponent frees up valuable resources to focus on other critical components of their project design, and severs any liability associated with the success of their long term mitigation plans. Conservation Banks also provide a developer the opportunity to create positive Public Relations within their local communities, as Bank Sponsors typically contribute revenue into a variety of local programs through credit sales.

How does a Conservation Bank benefit the County? The State?

Conservation Banks provide States the ability to approve construction permits for necessary energy developments while simultaneously complying with local and state-wide Resource Management Plans ("RMPs"). Another key advantage of a Bank is its ability to offer preventative conservation measures, preserving and managing the land years before any negative impacts occur elsewhere. On a local level, cooperative efforts between a Bank Sponsor and the applicable counties can lead to community-level improvements by funds generated from the sale of habitat credits.

TerraWest Conservancy

PO Box 1775
Afton, WY 83110
(307) 885-5555
terrawestconservancy.com

Environmental Impact Mitigation Proposal

for the

GRASSY MOUNTAIN GOLD PROJECT

Calico Resources

Provided By

Northern Great Basin Conservation Bank

TerraWest Conservancy
PO Box 1775, Afton, WY 83110
(307) 885-5555

ENVIRONMENTAL IMPACT MITIGATION PROPOSAL
for the
GRASSY MOUNTAIN GOLD PROJECT
CALICO RESOURCES

INTRODUCTION

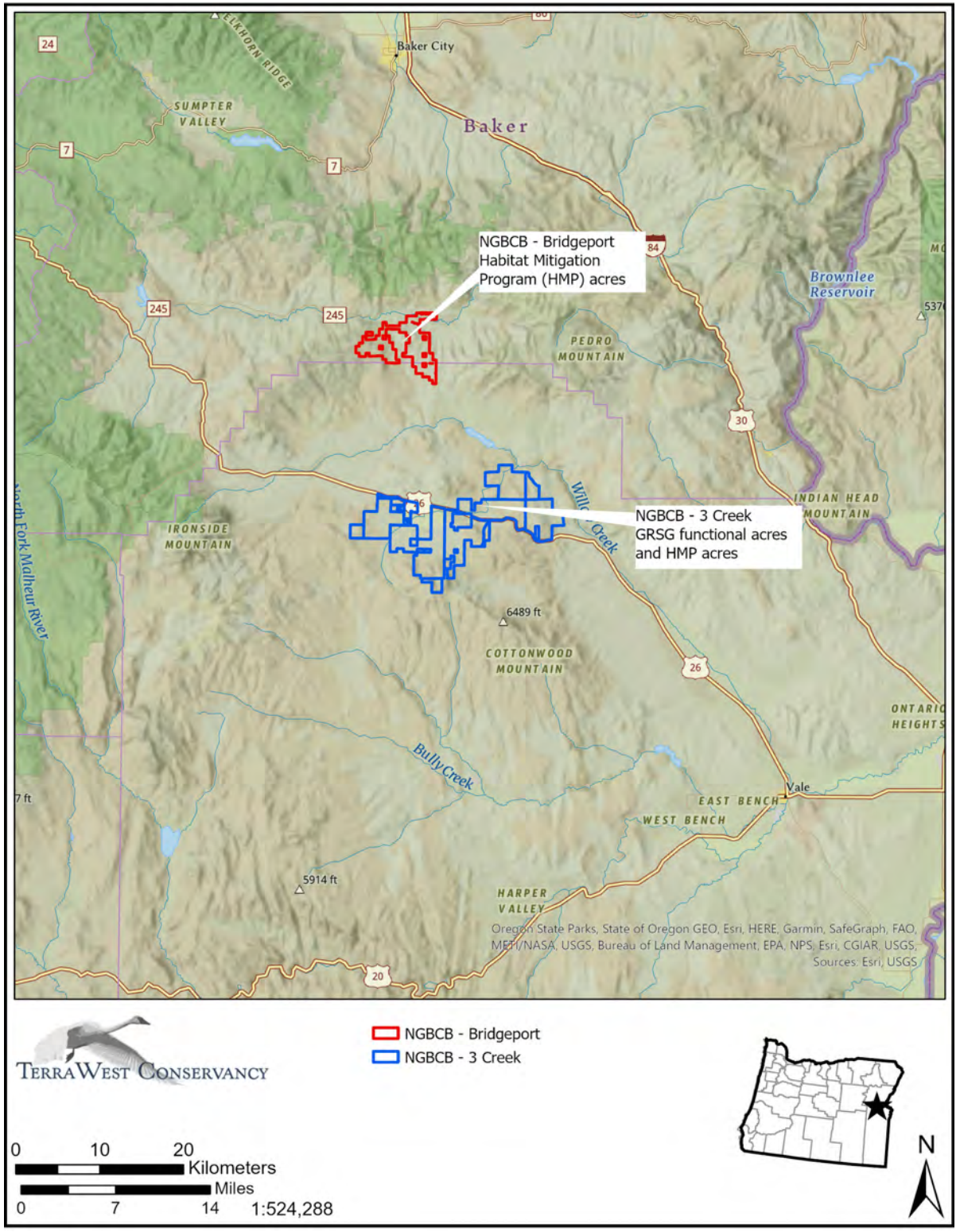
The Northern Great Basin Conservation Bank (NGBCB or Bank) is pleased to offer the following proposal with a view to providing a thorough, timely and cost-effective solution to Calico Resource's mitigation requirements for the Grassy Mountain Gold Project (GMGP).

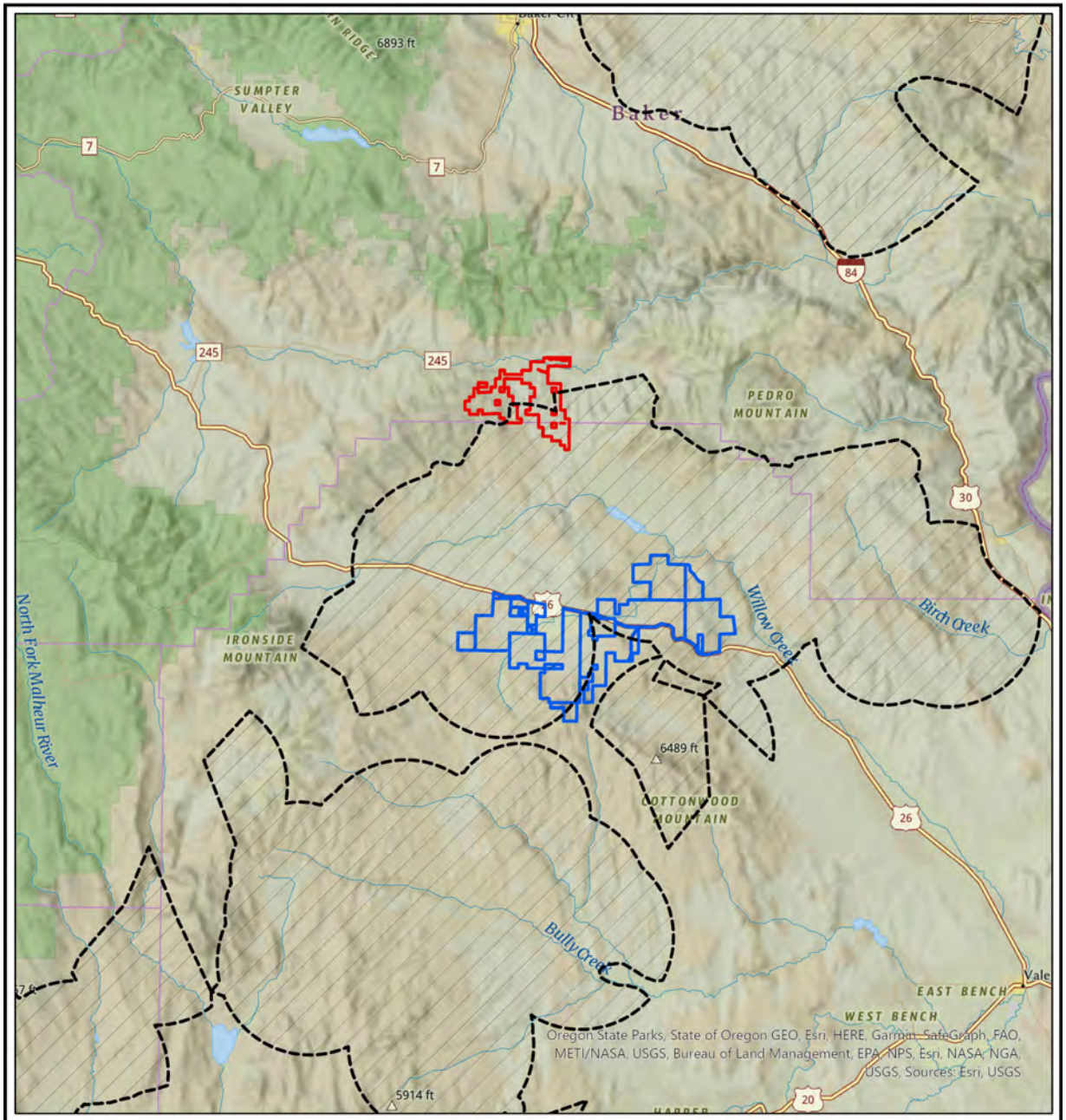
The NGBCB will provide perpetual conservation offsets for compensatory mitigation for negative or adverse impacts to identified species and habitat. Such offsets result from extensive ongoing coordination with relevant state and federal wildlife agencies, including Oregon Department of Fish & Wildlife (ODFW), Oregon Department of Geology and Mineral Industries (DOGAMI), Bureau of Land Management (BLM), United States Fish & Wildlife Service (USFWS). These State and Federal agencies have implemented regulations governing compensatory mitigation when unavoidable adverse impacts from anthropogenic disturbances occur on significant ecological resources, including wildlife habitat.[*]

The NGBCB site is located on a large contiguous conservation site in Malheur County, Oregon, and consists of deeded land surrounded by both private land and federal lands managed by the BLM and the State of Oregon. The Bank is comprised of high-quality year-round habitat for the greater sage-grouse (Centrocercus urophasianus); the properties also contain a diverse array of habitat for other sensitive species and riparian resources across the landscape. This includes both crucial winter range and summer range habitat for elk (Cervus elaphus) and mule deer (Odocoileus hemionus). A large portion of the Bank is in the Cow Valley Priority Area of Concern, located within Oregon's designated Core Area Habitat for Greater Sage-Grouse. The Bank lies within the State of Oregon's Northern Great Basin Geographic Service Area for Greater Sage-Grouse Mitigation.

The Bank provides mitigation opportunities that will add ecological benefits and long-term uplift to existing sage-grouse habitat and elk and mule deer winter and summer range and will meet the goals of a multi-species conservation plan.

[*] "Regulatory agencies now generally prefer conservation banks ... due to a number of advantages over traditional permittee-responsible compensatory mitigation; Banks are more likely to achieve desired long-term outcomes and to create mitigation sites that are protected in perpetuity by organizations dedicated to resource conservation ... and assemble and apply extensive financial resource planning and scientific expertise, and enable efficient use of limited agency resources in the review and compliance monitoring of compensatory mitigation projects" (*fhwa.dot.gov; epa.gov.).*


NGBCB - Bridgeport Habitat Mitigation Program (HMP) acres
NGBCB - 3 Creek GRSG functional acres and HMP acres
Baker City
Baker
SUMPTER VALLEY
ELKHORN RIDGE
PEDRO MOUNTAIN
Brownlee Reservoir
INDIAN HEAD MOUNTAIN
IRONSIDE MOUNTAIN
North Fork Malheur River
Willow Creek
6489 ft
COTTONWOOD MOUNTAIN
Bully Creek
Vale
EAST BENCH
WEST BENCH
5914 ft
HARPER VALLEY
ONTARIO HEIGHTS
Oregon State Parks, State of Oregon GEO, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, Esri, CGIAR, USGS, Sources: Esri, USGS
TERRAWEST CONSERVANCY
NGBCB - Bridgeport
NGBCB - 3 Creek
0 10 20
Kilometers
Miles
0 7 14
1:524,288
N

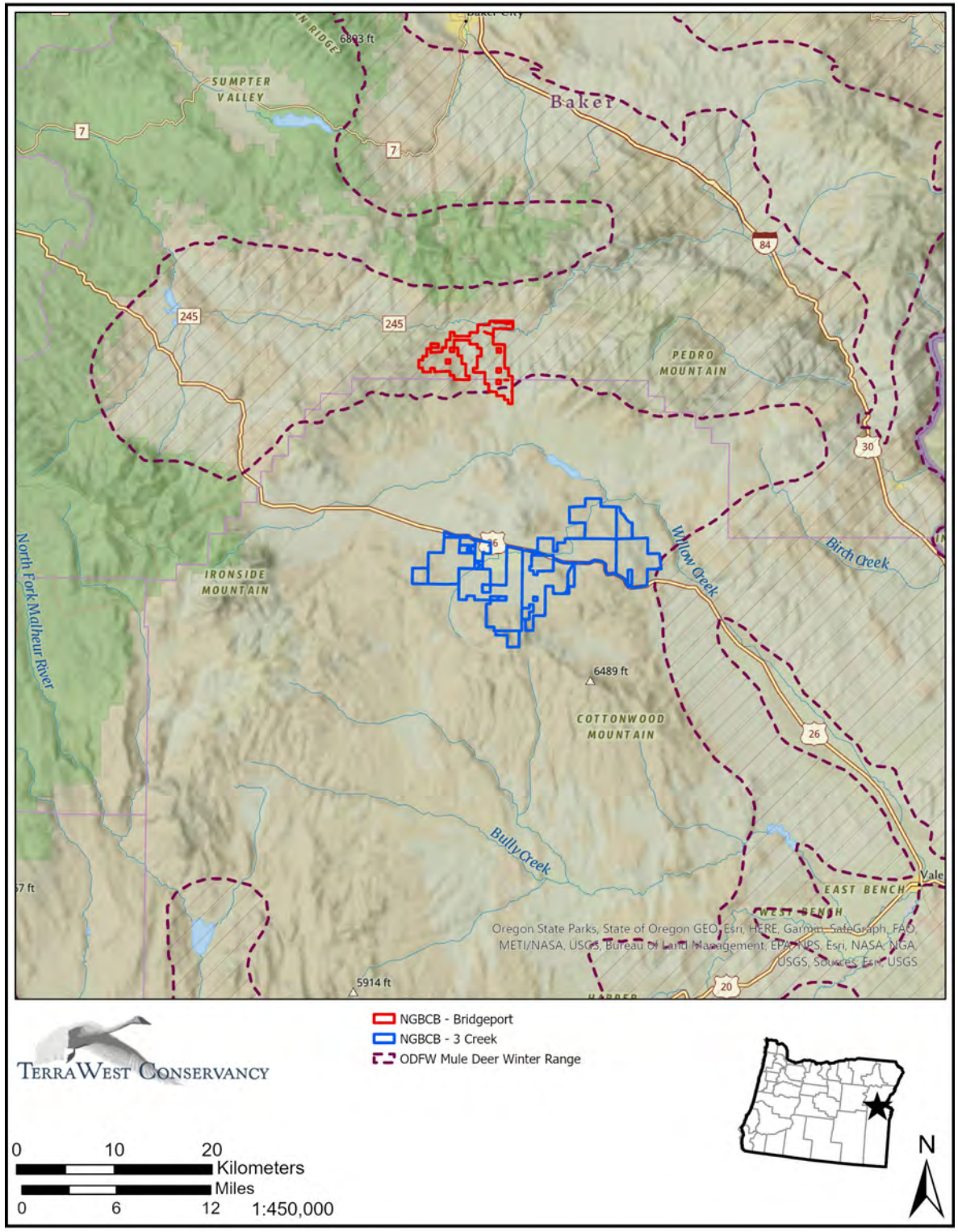


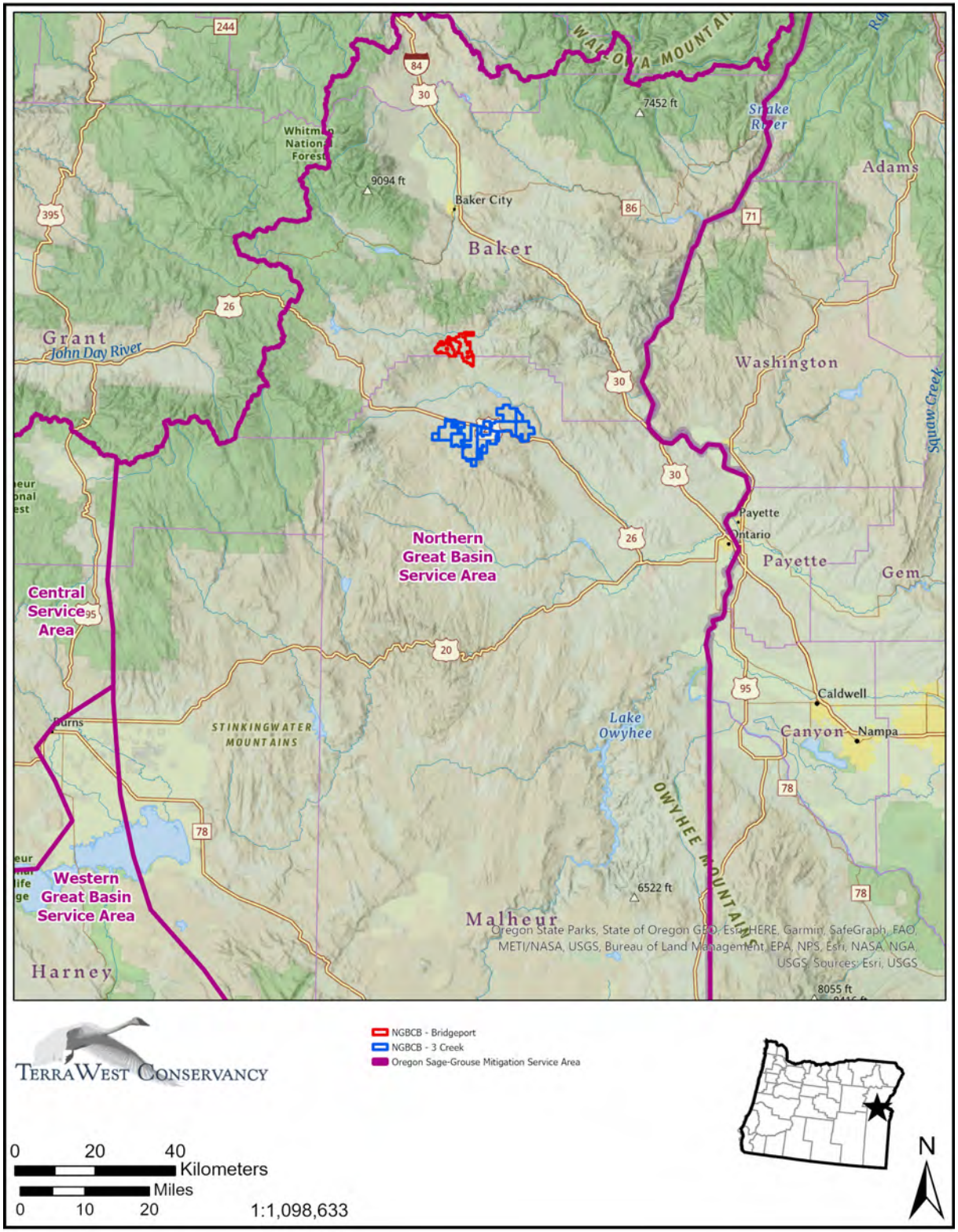
TerraWest Conservancy

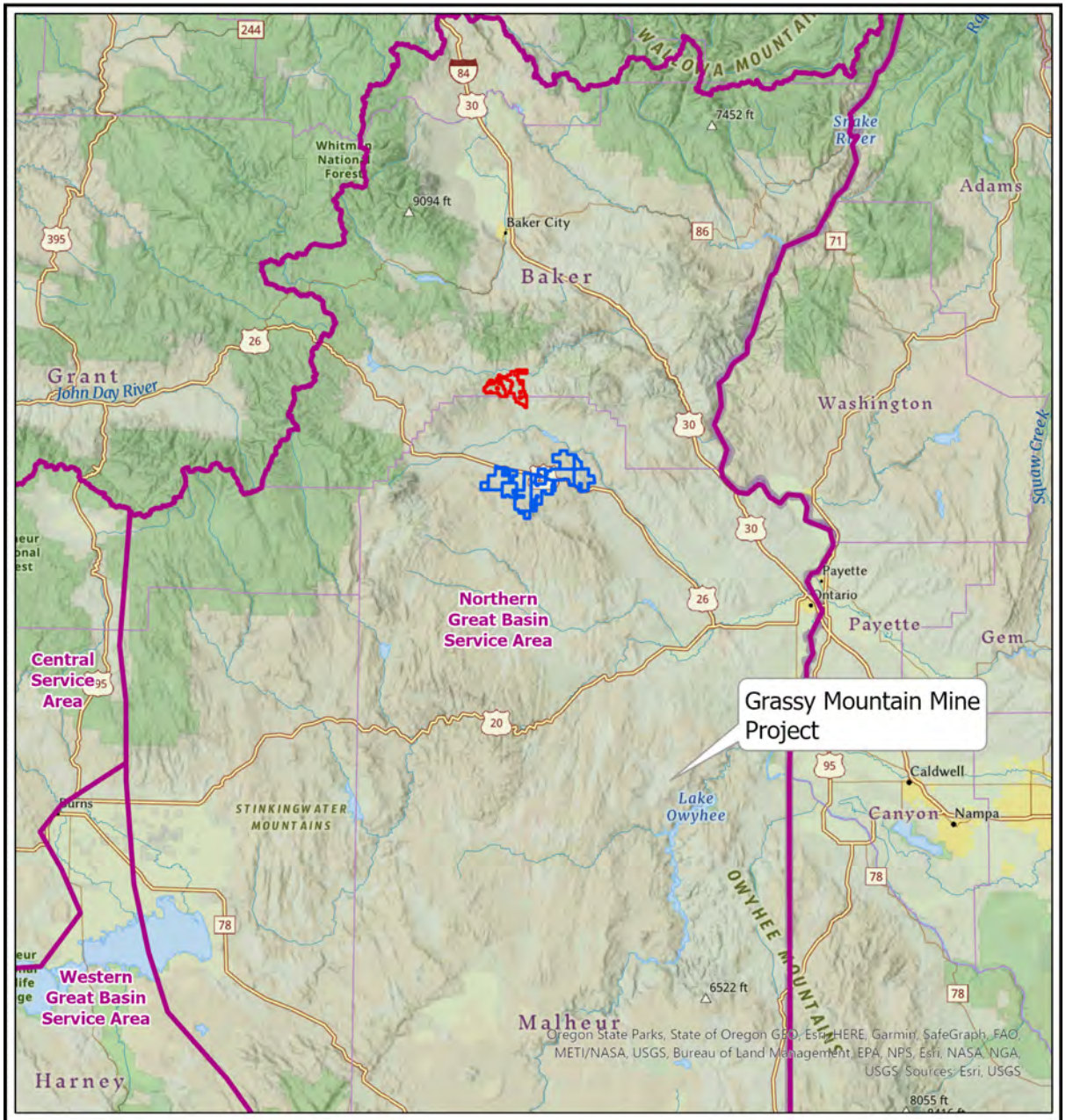
NGBCB - Bridgeport
NGBCB - 3 Creek
GRSG Priority Areas for Conservation

N

0 10 20 Kilometers
0 6 12 Miles
1:450,000


6893 ft
SUMPTER VALLEY
Baker
7
84
245
PEDRO MOUNTAIN
30
IRONSIDE MOUNTAIN
North Fork Malheur River
Willow Creek
Birch Creek
6489 ft
COTTONWOOD MOUNTAIN
26
Bully Creek
Vale
EAST BENCH
WEST BENCH
Oregon State Parks, State of Oregon GEO, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, Esri, NASA, NGA, USGS, Sources, Esri, USGS
5914 ft
20
HARPER
NGBCB - Bridgeport
NGBCB - 3 Creek
ODFW Mule Deer Winter Range
TERRAWEST CONSERVANCY
0 10 20
Kilometers
Miles
0 6 12
1:450,000
N


Northern Great Basin Service Area
Central Service Area
Western Great Basin Service Area
Baker
Grant
Washington
Adams
Payette
Gem
Canyon
Malheur
Harney
Baker City
Caldwell
Nampa
Burns
Lake Owyhee
STINKINGWATER MOUNTAINS
OWYHEE MOUNTAINS
9094 ft
7452 ft
6522 ft
8055 ft
John Day River
Squaw Creek
Oregon State Parks, State of Oregon GEO, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, Esri, NASA, NGA, USGS, Sources: Esri, USGS
TERRAWEST CONSERVANCY
NGBCB - Bridgeport
NGBCB - 3 Creek
Oregon Sage-Grouse Mitigation Service Area
0 20 40
Kilometers
Miles
0 10 20
1:1,098,633
N



TERRAWEST CONSERVANCY

NGBCB - Bridgeport
NGBCB - 3 Creek
Oregon Sage-Grouse Mitigation Service Area

0 20 40 Kilometers
0 10 20 Miles

1:1,098,633

N

APPENDIX H

Prospective HMA Assessments

Desktop Assessment of Site Candidacy for Compensatory Mitigation

Parcel Identification: Hank Bishop Parcels

Parcel Size (Acres): 1,232

Location: T22S-R43E sections 11, 12, 13, 14, and 15. Tax lots 22S43E00101 and 22S43E00300 (Malheur County)

Listing: N/A

Table 1. Vegetation Community Description

Habitat NVC_GROUP (GAP LANDFIRE Database)	Acres
Intermountain Shadscale - Saltbush Scrub	11.5645
Intermountain Mesic Tall Sagebrush Steppe & Shrubland	233.5142
Intermountain Dry Tall Sagebrush Stepp & Shrubland	229.9559
Intermountain Semi-Desert Grassland	10.8973
Intermountain Basins Cliff, Scree & Badland Sparse Vegetation	49.3716
Introduced & Semi Natural Vegetation	685.6422

The existing vegetation communities that are likely to be most similar to those impacted by the project are the:

- Intermountain Dry Tall Sagebrush Steppe & Shrubland (230 acres)
- Intermountain Mesic Tall Sagebrush Steppe & Shrubland (233.5 acres)
- Intermountain Basins Cliff, Scree & Badland Sparse Vegetation (49.4 acres)
- Introduced & Semi Natural Vegetation (685.6 acres)

Is the parcel located within the GRSG Northern Great Basin Service Area? Yes

How many acres are Low Density? 1,232

How many acres are within a PAC? 0

Is the parcel located within ODFW designated mule deer biological winter range? No

How many acres? 0

Are there any mapped wetland or stream features on the property? Yes

NWI:

- A perennial stream (R5UBH)
- A few intermittent, seasonally flooded streams (R4SBC)
- Three temporary freshwater ponds (PUSA) (stock ponds)

What is the adjacent land use?

Property is entirely surrounded by BLM land

Is there a residence on the parcel? Evidence of other structures? Provide a qualitative description of road density or other disturbances.

There are no visible structures aside from stock ponds and cattle pens in southeastern corner along Twin Springs Rd.

Roads are dirt and gravel. Twin Springs Rd cuts along the southeastern extent of property.

Mitigation Potential

The following sections summarize the potential mitigation value of the assessed property.

Targeted Mitigation Function

Greater Sage-Grouse

The Hank Bishop property was selected for assessment primarily to meet the compensatory mitigation needs of the Project for its impacts to GRSG Low Density habitat. Calico coordinated with ODFW to obtain a preliminary HQT output for the property to better understand its compensatory mitigation potential. The ODFW Sage-Grouse Mitigation Coordinator prepared the HQT calculator output for the property in April 2023 and the summary worksheets are included in Attachment B. Prior to implementation of conservation and mitigation measures the actual acres of the property support approximately 298.2 functional acres of GRSG upland habitat. Based on the current ecological states found of the property and their potential for uplift, the HQT estimated the parcel could support 475.8 functional acres of GRSG upland habitat. Mitigation measures could provide an uplift of 177.6 raw functional acres or credits. The mitigation site would also receive 23.8 credits for legally protecting the property resulting in a total of **201.4 upland functional acres or credits**.

Other Wildlife Habitat

The Hank Bishop property could be used to fulfill the compensatory mitigation for Project-related direct impacts to other wildlife habitat located outside of the GRSG low-density habitat. Compressed from Table 8 in the WMP, mitigation acreages by ODFW category and generalized habitat type are cross-walked with similar habitat types on Hank Bishop and shown in Table 2.

Table 2. Crosswalk between Other Wildlife Habitat Mitigation Needs and Available Similar Habitat on Subject Property.

ODFW Habitat Category	Wildlife Habitat Type	Mitigation Acres Needed	Habitat Available on Hank Bishop	Will acres available fulfill mitigation?
2	Wetland/Riparian Association	1.38	Yes (unquantified)[1]	Yes[1]
2,3,4	Sagebrush Shrubland	318.08	512.84	Yes
2,3,4	Perennial Grassland	92.29	353.72	Yes
2,3,4,5	Annual Introduced Grassland	38.54	342.82	Yes
Total		**450.3**	**1209.38**	

[1]Seeps, springs, and stream features are noted on the NWI layer and visible on aerial photography but have yet to be surveyed or acreage quantified.

Based on this initial review of available data, the Hank Bishop property would provide sufficient acreage to fulfill the mitigation needs of the Project for impacts to other wildlife habitat.

Mule Deer Winter Range

The Hank Bishop property is located outside of the biological winter range for mule deer and would not fulfill the mitigation needs for Project-related impacts to this resource.

Mitigation Site Management

Property would be purchased by Calico through a fee title acquisition. Ownership would be transferred to and approved Non-governmental Organization (NGO), Land Trust, or State or Federal entity.

Site-Specific Mitigation Actions

The HQT identified site-specific areas (map units) where either good pre-HMA ecological state could be maintained and protected or a degraded ecological state could be improved by the implementation of the mitigation measures. These opportunities for preservation, maintenance, and ecological uplift result in the increase in functional acres, in this case the 201.4 upland credits. Site-specific mitigation actions for GRSG habitat include:

Weed treatment: Invasive annual grasses (IAG) are common on this property and affect a large proportion of the vegetation communities mapped on this site. Weed treatments could be applied to restore native grassland habitats (ecological state B) or native shrubland habitats (ecological state A).

Native shrubland or grassland restoration: Some areas on the property were mapped as poor quality annual invasive grassland with sparse sagebrush cover (ecological state D-IAG) or moderate quality shrubland with an annual invasive grass understory (ecological state C-IAG). There were also some transitional upland habitat areas (ecological state BD). These areas could be targeted for restoration to native shrubland or grassland habitats.

Preserve and maintain intact native shrubland with good sagebrush cover (Ecological State A): A portion of the property was identified as good quality native shrubland habitat. Protection within the HMA and ongoing monitoring and maintenance actions could preserve this habitat.

Wildfire planning: The habitat resources available on the property would be uplifted by the development of a vegetation management plan that is coordinated to address wildfire threats. Resources could also be staged to reduce the threat of wildfire to habitat.

Livestock grazing management: This property is currently used for livestock grazing. Grazing pressure could be removed entirely, or a grazing plan could be developed to reduce impacts to habitat and provide habitat enhancement services.

Infrastructure: Remove unneeded fences and roads or paths and upgrade needed remaining fences to meet wildlife passage guidelines. Fences would be constructed from wood or smooth wire and no higher than 48 inches, and the lowest wire would be at least 15 inches from the ground.

Seep/Spring Restoration and Management: The HQT did not identify any mesic habitat on the property; however, the desktop assessment indicated some areas where mesic habitat pockets could exist (e.g. areas associated with Sourdough Springs or the ephemeral features noted on the NWI). Associated

wetland or riparian plant communities could be established or maintained if field inspection indicates they could be restored or established on the property.

Mitigation actions that target increased quality of native grasslands and shrublands would also benefit other wildlife species and could be used to fulfill the compensatory mitigation needs for those species and habitat types.

Monitoring

A site-specific monitoring plan would be developed in coordination with ODFW. Typically monitoring includes the establishment of vegetation plots and photo points. Most plans require annual monitoring and reporting for the first 3 to 5 years as the mitigation measures are initiated, followed by longer time intervals, such as every 5 years once the mitigation measures have been established.

Success Criteria

Site-specific success criteria would be developed for the property based on the mix of mitigation measures selected to provide the ecological uplift.

Financial Estimate

The table below provides an approximate estimate of the HMA acquisition and examples of costs for the implementation of typical mitigation measures designed to provide ecological uplift. This estimate does not include costs of the initial development of the management plan.

Action	**Cost per Unit**	**Units**	**Frequency**	**Expense**
One-Time Expenses				
Property Acquisition[1]	$? (unlisted)	1		$?
Recurring Costs				
Weed Treatments[2]	$25	1,232	5	$154,000
Native Plant Restoration[3]	$118	1,116	3	$395,064
Native Plant Restoration (Shrub)[4]	$549	46	3	$75,762
Wetland Enhancement[5]	$2,455	1		$2,455
Annual Habitat Monitoring and Management[6]	$23	1,232	30 (years)	$850,080
TOTAL				**$1,477,361 (plus acquisition)**

[1] Property is not listed as of 5/1/2023.

[2] Per acre cost of treatment from the USDA NRCS EQIP Fiscal Year 2022 for Oregon, Code 315 Herbaceous Weed Treatment, High Cost Chemical. Assume applied up to 5x to all acres except Developed.

[3] Per acre cost of treatment from the USDA NRCS EQIP Fiscal Year 2022 for Oregon, Code 645 Upland Wildlife Habitat Management, Establishment of seasonal forage or cover for wildlife on non-cropland. Assume restoring native grassland.

[4]Per acre cost of treatment from the USDA NRCS EQIP Fiscal Year 2022 for Oregon, Code 612 Tree/Shrub Establishment, Native seed, Hand plant. Assume restoring native shrubland

[5]Per unit cost for wetland enhancement from USDA NRCS EQIP Fiscal Year 2022 for Oregon, Code 659 Wetland Enhancement, Simple, Small project.

[6] Annual estimated per acre cost from the USDA NRCS EQIP Fiscal Year 2022 for Oregon, Code 645 Habitat Monitoring and Management, Medium Intensity and Complexity.

Conclusions

1) The property is not within ODFW mapped mule deer biological winter range and would not fulfill the compensatory mitigation needs of the project for that resource.
2) The property is identified as Low Density habitat for GRSG, so it could be used to provide GRSG habitat mitigation.
3) The property would likely fulfill the compensatory mitigation needs for other wildlife habitat. The property offers upland vegetation communities that are in-kind to those affected by the proposed project. The area shows potential for restoration of upland habitats.

Attachment A

Figures

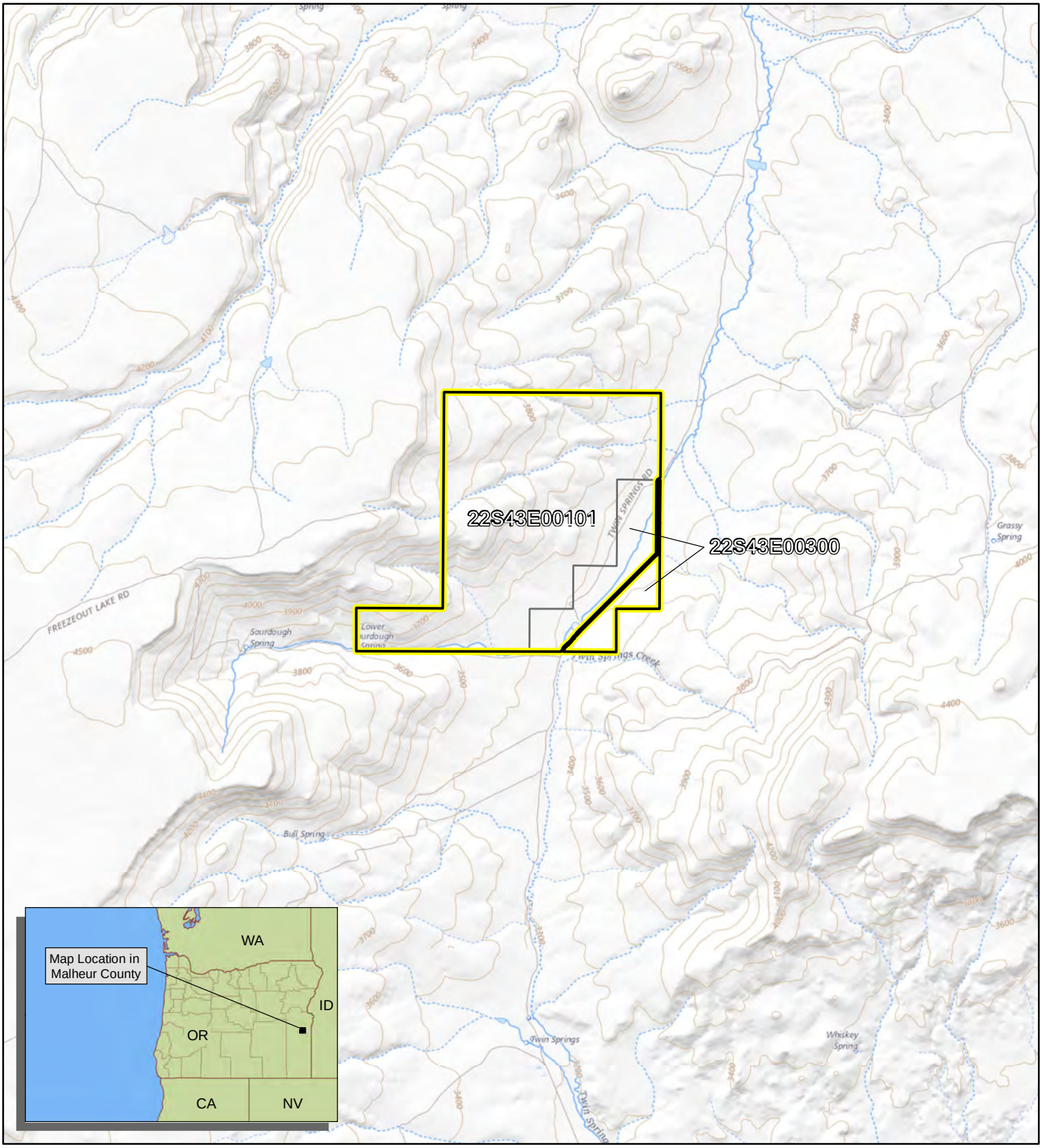


Figure 1. Habitat Mitigation Area Boundary for the Hank Bishop Parcels

MB&G

Potential Habitat Mitigation Area

Source: Basemap from USGS; mitigation parcel digitized by MB&G. Reproduced for informational purposes and may not be suitable for legal, engineering, or surveying purposes. Conclusions drawn from such information are the responsibility of the user.

N

0 1,000 2,000 4,000 Feet

Potential Mitigation Area for
Grassy Mountain Mine Project

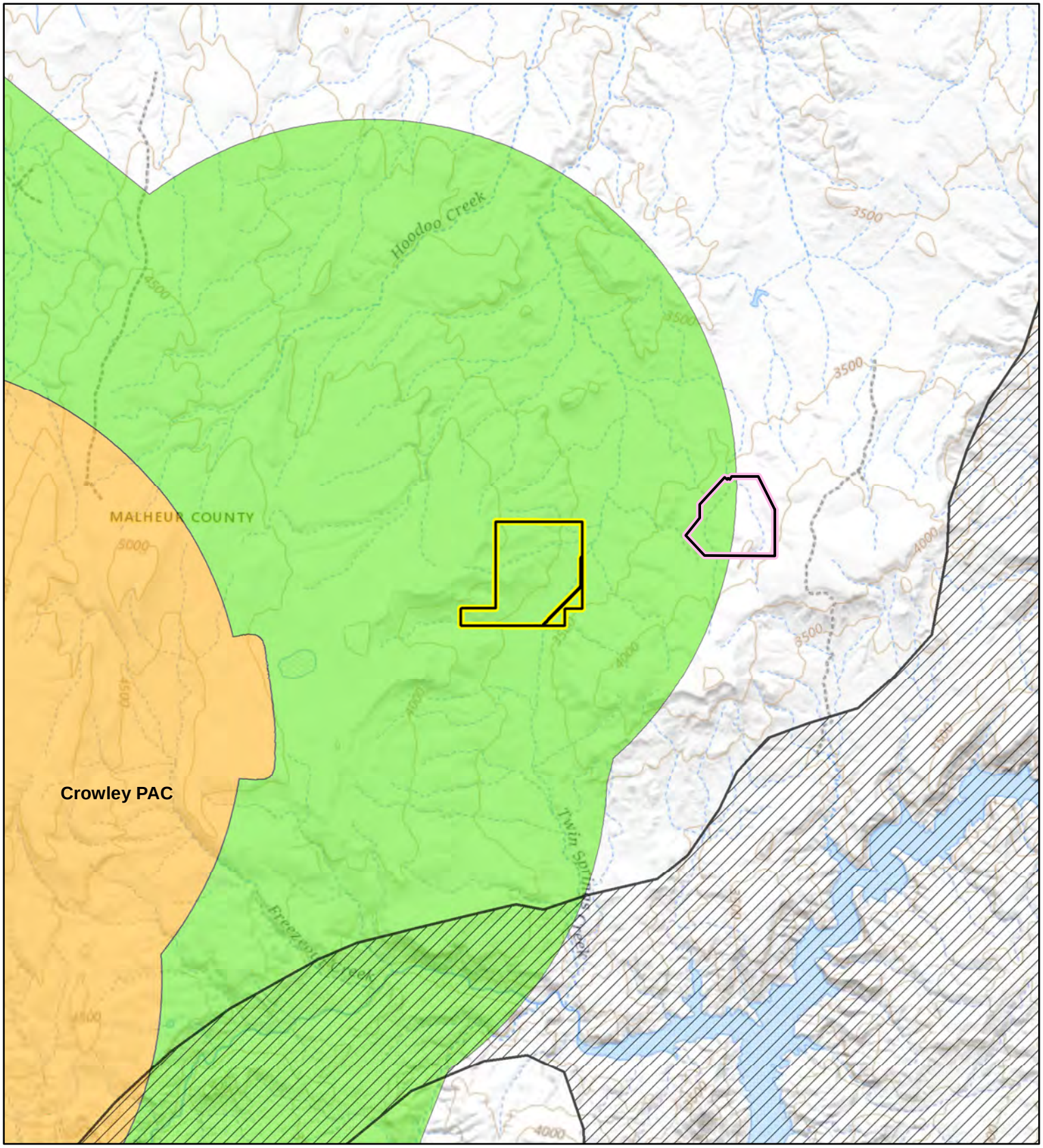


Figure 2. Habitat Mitigation Area Boundary for the Hank Bishop Parcels with ODFW Mule Deer Winter Range, Low-Density Sage-Grouse Habitat, and Sage-Grouse Priority Areas for Conservation (PACs)

Potential Mitigation Area for
Grassy Mountain Mine Project

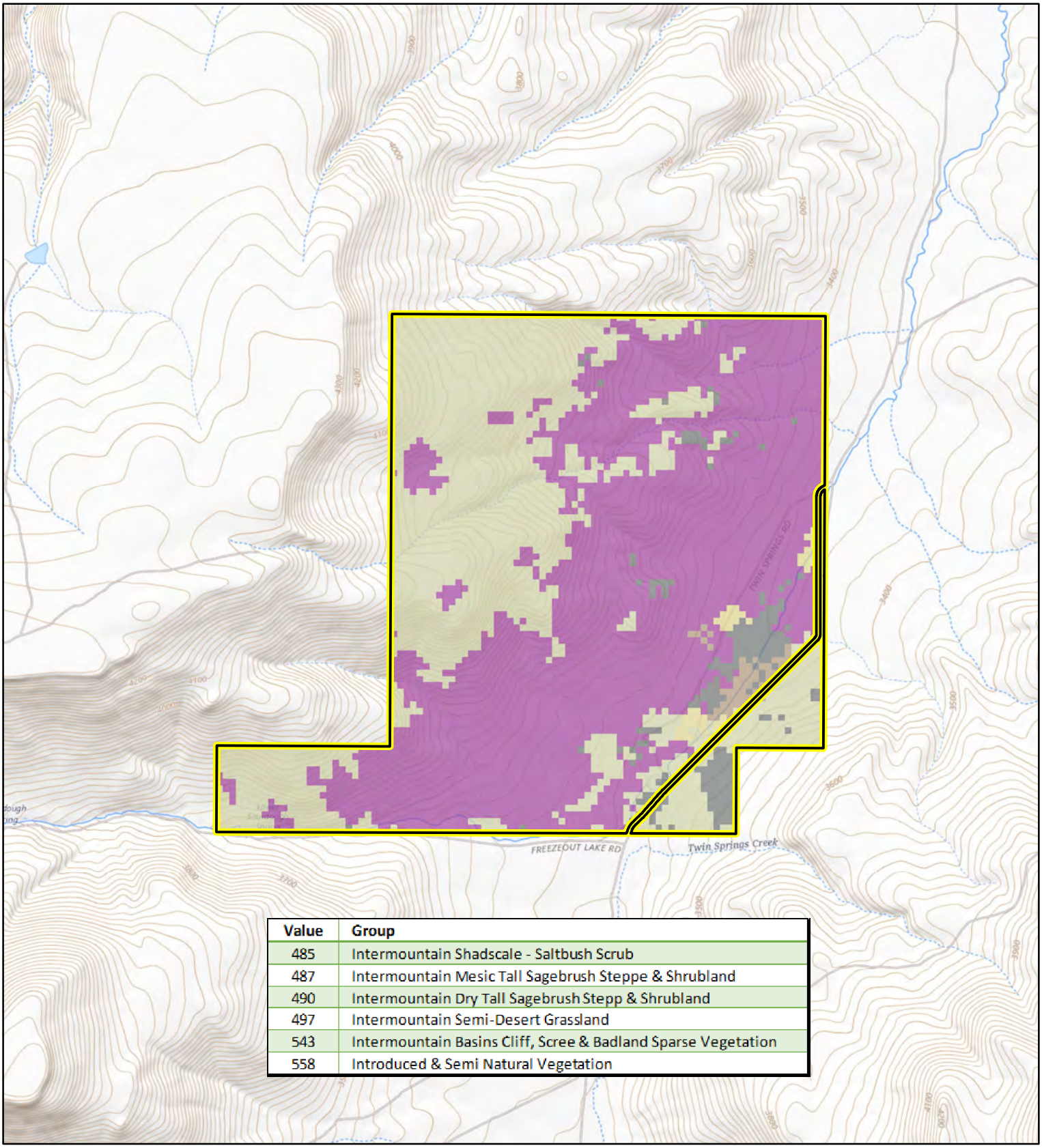
- Calico Grassy Mtn. Mine Area of Impact
- Potential Habitat Mitigation Area
- ODFW Mule Deer Winter Range
- Low-Density Sage-Grouse Habitat
- Sage-Grouse PAC

MB&G

Source: Basemap from USGS; mitigation parcel digitized by MB&G; mule deer winter range from ODFW; low-density sage-grouse habitat from INR; sage-grouse PAC(s) from ODFW. Reproduced for informational purposes and may not be suitable for legal, engineering, or surveying purposes. Conclusions drawn from such information are the responsibility of the user.

N

0 ½ 1 2 Miles



Value	Group
485	Intermountain Shadscale - Saltbush Scrub
487	Intermountain Mesic Tall Sagebrush Steppe & Shrubland
490	Intermountain Dry Tall Sagebrush Stepp & Shrubland
497	Intermountain Semi-Desert Grassland
543	Intermountain Basins Cliff, Scree & Badland Sparse Vegetation
558	Introduced & Semi Natural Vegetation

Figure 3. Habitat Mitigation Area Boundary for the Hank Bishop Parcels with National Vegetation Classification (NVC) Groups

Potential Mitigation Area for Grassy Mountain Mine Project

Potential Habitat Mitigation Area

485 497
487 543
490 558

MB&G

Source: Basemap from USGS; mitigation parcel digitized by MB&G; NVC Groups from USGS GAP data. Reproduced for informational purposes and may not be suitable for legal, engineering, or surveying purposes. Conclusions drawn from such information are the responsibility of the user.

N

0 500 1,000 2,000
Feet

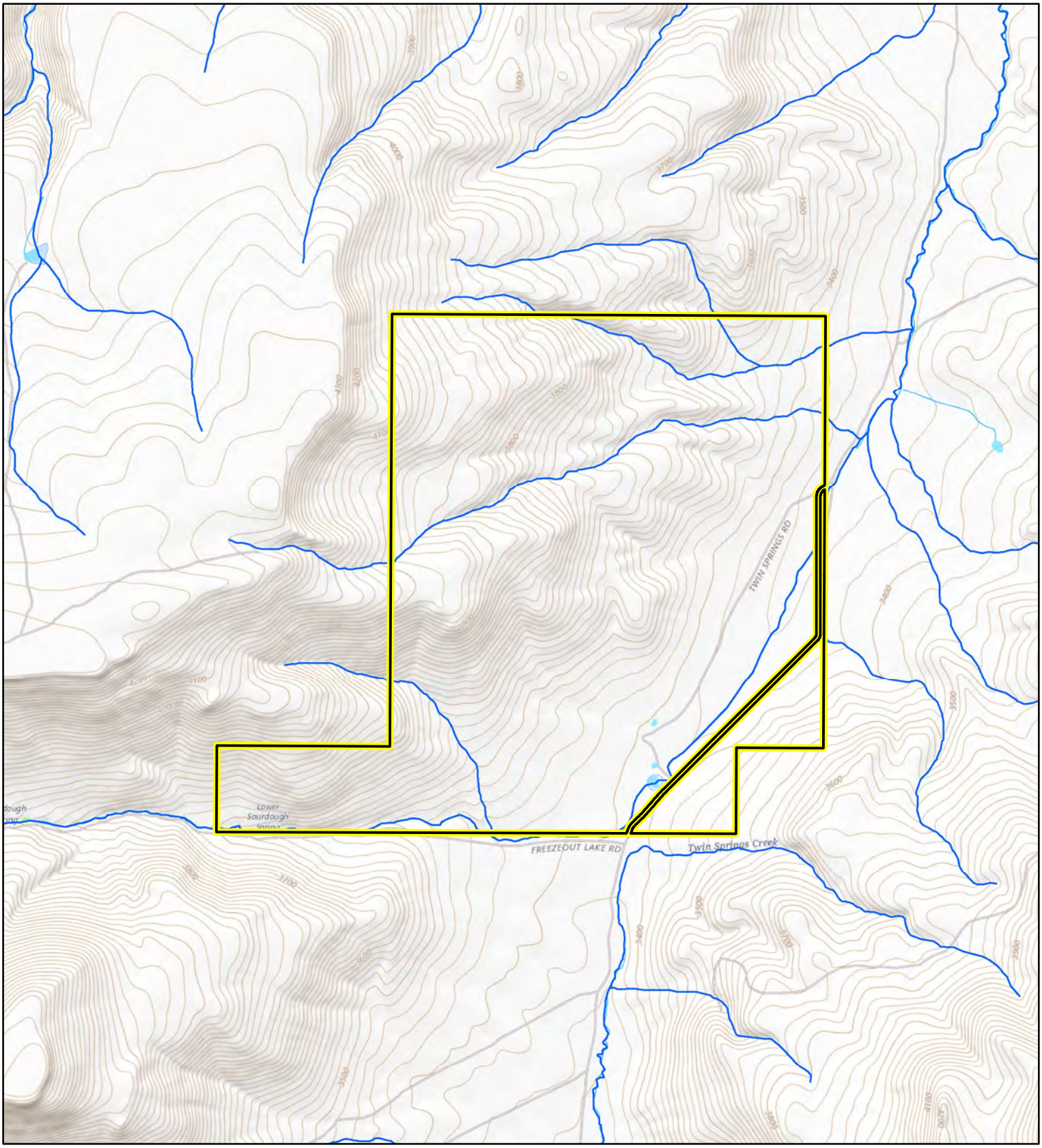


Figure 4. Habitat Mitigation Area Boundary for the Hank Bishop Parcels with National Wetland Inventory (NWI) and National Hydrography Dataset (NHD)

Potential Mitigation Area for Grassy Mountain Mine Project

Potential Habitat Mitigation Area

NHDFlowline

NWI WETLAND TYPE

Emergent Wetland

Pond

Riverine

MB&G

Source: Basemap from USGS; mitigation parcel digitized by MB&G; NWI from USFWS; NHD from USGS. Reproduced for informational purposes and may not be suitable for legal, engineering, or surveying purposes. Conclusions drawn from such information are the responsibility of the user.

N

0 500 1,000 2,000 Feet

Figure 5. Habitat Mitigation Area Boundary for the Hank Bishop Parcels with Aerial Imagery (acquired 2017)

Potential Habitat Mitigation Area

Source: Basemap from USGS; mitigation parcel digitized by MB&G; aerial imagery from OSIP; roads from Esri. Reproduced for informational purposes and may not be suitable for legal, engineering, or surveying purposes. Conclusions drawn from such information are the responsibility of the user.

N

0 350 700 1,400 Feet

Potential Mitigation Area for
Grassy Mountain Mine Project

Attachment B

HQT Worksheets

OREGON SAGE-GROUSE HABITAT QUANTIFICATION TOOL CALCULATOR

Version 2.2 Last updated: 2019-03-01

Instructions: Enter project identifying information on this worksheet.
Enter map unit data in yellow cells in the "Data Entry" worksheet. Gray cells are calculated automatically by the spreadsheet.
Enter project-level information for minimization reductions and the legal protection multiplier on the 'Project Summary' worksheet.
Summary values will be transferred automatically to the 'Project Summary' worksheet.

The 'Classify state - Upland' and 'Classify state - Mesic' tabs can be used to help determine ecological states based on field data and the standard decsion tree. Data from these worksheets will not transfer automatically and must be entered by the user in the 'Data Entry' tab, where appropriate.

Full instructions are provided in the HQT User Guide. Questions regarding the spreadsheet/calculator should be directed to Willamette Partnership at info@willamettepartnership.org. Worksheets are protected to prevent inadvertent modification of formulas.

LEGEND: Headings Data Entry Calculated Cells

Site Name	Calico Bishop Mitigation Site
Location	Malhuer County
Project Description	Habitat restoration near the mine site

OREGON SAGE-GROUSE HABITAT QUANTIFICATION TOOL CALCULATOR Version 2.2 Last updated: 2019-03-01

Data Entry

Calculated Cells

Management Designations Index 0.500

Enter the MDI score for the full project analysis area

Site Name: Calico Bishop Mitigation Site

Location: Malhuer County

RAW DEBIT(-) OR CREDIT(+) ACRES

Upland 177.6

Mesic 0.0

DATA ENTRY								BASELINE HABITAT FUNCTION			HABITAT MODIFICATION								FUNCTIONAL ACRES		
				Ecological State		Development Impacts					Ecological State			Development Impacts							
Map Unit ID	**Acres**	Mesic (1=yes, 0=no)	Habitat Type	Pre-Project Ecological State	Post-Project Ecological State	Pre-Project Development Score	Post-Project Development Score	Pre-Project Ecological State Score	Pre-Project Development Score	**Baseline Habitat Function Subscore**	Pre-Project Ecological State Score	Post-Project Ecological State Score	**Change** in Ecological State Score	Pre-Project Development Score	Post-Project Development Score	**Change** in Development Score	**Pre-Project Habitat Modification Subscore**	**Post-Project Site Habitat Modification Subscore**	Pre-Project Functional Acres	Post-Project Functional Acres	**Debit (-) or Credit (+) Acres**
EXAMPLE	***80.0***	*0*	*Upland*	*B*	*B*	*0.700*	*0.500*	*0.80*	*0.700*	*0.750*	*0.80*	*0.80*	*0.00*	*0.700*	*0.500*	*-0.200*	*0.750*	*0.650*	*45.00*	*39.00*	***-6.00***
3	**70.0**		Upland	A	A*	0.535	0.535	1.00	0.535	0.678	1.00	1.20	0.20	0.535	0.535	0.000	0.767	0.867	36.46	41.21	4.75
1	**797.6**		Upland	BD	B*	0.629	0.629	0.45	0.629	0.526	0.45	1.00	0.55	0.629	0.629	0.000	0.540	0.815	226.54	342.00	115.46
5	**46.0**		Upland	C	A*	0.343	0.343	0.30	0.343	0.381	0.30	1.20	0.90	0.343	0.343	0.000	0.321	0.771	5.63	13.52	7.88
2	**257.2**		Upland	D-IAG	B*	0.427	0.427	0.10	0.427	0.342	0.10	1.00	0.90	0.427	0.427	0.000	0.264	0.714	23.22	62.84	39.63
4	**61.2**		Upland	D-IAG	B*	0.476	0.476	0.10	0.476	0.359	0.10	1.00	0.90	0.476	0.476	0.000	0.288	0.738	6.31	16.19	9.87
99	**1.4**		Upland	Developed	Developed	0.323	0.323	0.00	0.323	0.274	0.00	0.00	0.00	0.323	0.323	0.000	0.000	0.000	0.00	0.00	0.00

OREGON SAGE-GROUSE HABITAT QUANTIFICATION TOOL CALCULATOR Version 2.2 Last updated: 2019-03-01

SITE INFORMATION

Site Name	Calico Bishop Mitigation Site
Location	Malhuer County
Description	Habitat restoration near the mine site

DATA ENTRY: HQT ADJUSTMENT FACTORS

Minimization reductions		*Applies to development [debit] projects only. Default value is **0**.*
Legal protection multiplier	5%	*Applies to credit generation projects only. Default value is **5%**.*

HQT PROJECT DEBIT/CREDIT VALUES

UPLAND Habitat	
HQT Upland Debit(-) or Credit(+) Acres	**201.4**

MESIC Habitat	
HQT Mesic Debit(-) or Credit(+) Acres	**0.0**

UPLAND CALCULATIONS (Do not modify these tables. Numbers are calculated from the "Data Entry" tab.)

UPLAND Map Unit Data Summary

6 map units entered		Functional Acres		Raw Upland Debit(-) or Credit(+) Acres	Average Scores (weighted by map unit area)					
					Ecological State			Development Impacts		
	Physical Acres	Pre-Project	Post-Project		Pre-Project State Score	Post-Project State Score	Change in State Score	Pre-Project Development Score	Post-Project Development Score	Change in Development Score
Direct impacts	1232.0	298.2	475.8	177.6						
Indirect impacts	1.4	0.0	0.0	0.0						
TOTAL	**1233.4**	**298.2**	**475.8**	**177.6**	**0.38**	**1.02**	**0.63**	**0.563**	**0.563**	**0.000**

UPLAND Credit Adjustments *all values in units of functional acres*

Raw upland habitat credit value	**177.6**	Credit value after minimization	**177.6**
Total post-project functional acres eligible for legal protection credit	**475.8**	Legal protection credit	**23.8**
Debit projects are required to achieve a net conservation benefit	**15%**	Net conservation benefit	**0.0**
		HQT Upland Debit(-) or Credit(+) Acres	**201.4**

MESIC CALCULATIONS (Do not modify these tables. Numbers are calculated from the "Data Entry" tab.)

MESIC Map Unit Data Summary

0 map units entered		Functional Acres		Raw Upland Debit(-) or Credit(+) Acres	Average Scores (weighted by map unit area)					
					Ecological State			Development Impacts		
	Physical Acres	Pre-Project	Post-Project		Pre-Project State Score	Post-Project State Score	Change in State Score	Pre-Project Development Score	Post-Project Development Score	Change in Development Score
Direct impacts	0.0	0.0	0.0	0.0						
Indirect impacts	0.0	0.0	0.0	0.0						
TOTAL	**0.0**	**0.0**	**0.0**	**0.0**						

MESIC Credit Adjustments *all values in units of functional acres*

Raw mesic habitat credit value	**0.0**	Credit value after minimization	**0.0**
Total post-project functional acres eligible for legal protection credit	**0**	Legal protection credit	**0.0**
Debit projects are required to achieve a net conservation benefit	**15%**	Net conservation benefit	**0.0**
		HQT Mesic Debit(-) or Credit(+) Acres	**0.0**

Desktop Assessment of Site Candidacy for Compensatory Mitigation

Parcel Identification: Dry Creek Ranch

Parcel Size (Acres): 1,451

Location: 3730 Bully Creek Rd., Westfall, OR, 97920 (Malheur County)

Listing: https://www.landwatch.com/malheur-county-oregon-farms-and-ranches-for-sale/pid/411298821

Vegetation Community Description

Habitat NVC_GROUP (GAP LANDFIRE Database)	Acres
Rocky Mountain & Great Basin Lowland & Foothill Riparian Shrubland	16.0124
Central Rocky Mountain Lower Montane, Foothill & Valley Grassland	3.5583
Western Montane-Subalpine Riparian & Seep Shrubland	54.0419
North American Desert Alkaline-Saline Wet Scrub	45.8133
Intermountain Mesic Tall Sagebrush Steppe & Shrubland	109.8631
Intermountain Dry Tall Sagebrush Stepp & Shrubland	373.6233
Intermountain Basins Cliff, Scree & Badland Sparse Vegetation	177.9159
Intermountain Sparsely Vegetated Dune Scrub & Grassland	164.7946
Rocky Mountain-Sierran Alpine Bedrock & Scree	0.4448
Row & Close Grain Crop Cultural Formation	40.4759
Introduced & Semi Natural Vegetation	399.1987
Developed & Urban	92.7386

The existing vegetation communities that are likely to be most similar to those impacted by the project are the:

- Intermountain Dry Tall Sagebrush Steppe & Shrubland (373.6 acres)
- Intermountain Mesic Tall Sagebrush Steppe & Shrubland (109.9 acres)
- Intermountain Basins Cliff, Scree & Badland Sparse Vegetation (177.9 acres)
- Introduced & Semi Natural Vegetation (399.2 acres)

Is the parcel located within the GRSG Northern Great Basin Service Area? Yes

How many acres are Low Density? 0

How many acres are within a PAC? 1367

Is the parcel located within ODFW designated mule deer biological winter range? No

How many acres? 0

Are there any mapped wetland or stream features on the property? Yes

NWI:

- A network of intermittent streams (R4SBC)
- Palustrine emergent PEM1A and PEM1C wetlands

- Two freshwater ponds (PUBFh)

What is the adjacent land use?

Property is surrounded by BLM land except at its southern end where there is private agricultural development (pastures and irrigated pivots)

Property has grazing rights for cattle on some of the adjacent BLM land

Is there a residence on the parcel? Evidence of other structures? Provide a qualitative description of road density or other disturbances.

- There are two homes on the property. These and most other outbuildings appear to be located in the central part of this long, linear parcel.
- There are fields and pastures developed along the creek which passes through the long axis of the property from north to south.
- There are some agricultural pivots on the southern end of the property
- The property is grazed by cattle
- Roads are dirt and gravel and generally parallel the creek

Mitigation Potential

The following sections summarize the potential mitigation value of the assessed property.

Targeted Mitigation Function

The Dry Creek Ranch was selected for assessment primarily to meet the compensatory mitigation needs of the Project for its impacts to GRSG Low Density habitat. Calico coordinated with ODFW to obtain a preliminary HQT output for the property to better understand its compensatory mitigation potential. The ODFW Sage-Grouse Mitigation Coordinator prepared the HQT calculator output for the property in May 2023 and the summary worksheets are included in Attachment B. Prior to implementation of conservation and mitigation measures the actual acres of the property support approximately 256 functional acres of GRSG upland habitat and 364.1 functional acres of GRSG mesic habitat. Based on the current ecological states found of the property and their potential for uplift, the HQT estimated the parcel could support 588.5 functional acres of GRSG upland habitat and 418.5 functional acres of GRSG mesic habitat. Mitigation measures could provide an uplift of 332.5 raw upland functional acres or credits and 54.3 raw mesic functional acres or credits. The mitigation site would also receive 29.4 upland and 20.9 mesic credits for legally protecting the property resulting in a total of **361.9 upland functional acres or credits and 75.2 mesic functional acres or credits**.

Mitigation Site Management

Property would be purchased by Calico through a fee title acquisition. Ownership would be transferred to and approved Non-governmental Organization (NGO), Land Trust, or State or Federal entity.

Site-Specific Mitigation Actions

The HQT identified site-specific areas (map units) where either good pre-HMA ecological state could be maintained and protected or a degraded ecological state could be improved by the implementation of the mitigation measures. These opportunities for preservation, maintenance, and ecological uplift result

in the increase in functional acres, in this case the 361.9 upland credits and 75.2 mesic credits. Site-specific mitigation actions for GRSG habitat include:

Upland Habitat Restoration

Weed treatment: Invasive annual grasses (IAG) are common on this property and appear to affect a large proportion of the upland vegetation communities mapped on this site. Weed treatments could be applied to restore native grassland habitats (ecological state B) or native shrubland habitats (ecological state A).

Native shrubland or grassland restoration: Some areas on the property were mapped as poor quality annual invasive grassland with sparse sagebrush cover (ecological state D-IAG) or moderate quality shrubland with an annual invasive grass understory (ecological state C-IAG. These areas could be targeted for restoration to native shrubland or grassland habitats.

Wildfire planning: The habitat resources available on the property would be uplifted by the development of a vegetation management plan and staged resources to reduce the threat of wildfire to habitat.

Livestock grazing management: There is evidence of current use of this property for livestock grazing. Grazing pressure could be removed entirely, or a grazing plan could be developed to reduce impacts to habitat and provide habitat enhancement services.

Infrastructure: Remove unneeded fences and roads or paths and upgrade existing perimeter fences to meet wildlife passage guidelines. Fences would be constructed from wood or smooth wire and no higher than 48 inches, and the lowest wire would be at least 15 inches from the ground.

Mesic Habitat Restoration:

Mesic habitats were preliminarily assigned ecological states B or C meaning they exhibited low or medium degradation by threats. Threats indicated for this property included grazing pressure, invasive vegetation, and possibly hydrologic modification. Field investigations could identify additional threats.

Weed treatment: Wetland and riparian plant communities could be established or restored in mesic habitats located on the property.

Wildfire planning: The habitat resources available on the property would be uplifted by the development of a vegetation management plan and staged resources to reduce the threat of wildfire to habitat.

Livestock grazing management: There is evidence of current use of this property for livestock grazing. Grazing pressure could be removed entirely, or a grazing plan could be developed to reduce impacts to habitat and provide habitat enhancement services.

Infrastructure: Remove unneeded fences and roads or paths and upgrade existing perimeter fences to meet wildlife passage guidelines. Fences would be constructed from wood or smooth wire and no higher than 48 inches, and the lowest wire would be at least 15 inches from the ground.

Monitoring

A site-specific monitoring plan would be developed in coordination with ODFW. Typically monitoring includes the establishment of vegetation plots and photo points. Most plans require annual monitoring and reporting for the first 3 to 5 years as the mitigation measures are initiated, followed by longer time intervals, such as every 5 years once the mitigation measures have been established.

Success Criteria

Site-specific success criteria would be developed for the property based on the mix of mitigation measures selected to provide the ecological uplift.

Financial Estimate

The table below provides an approximate estimate of the HMA acquisition and examples of costs for the implementation of typical mitigation measures designed to provide ecological uplift. This estimate does not include costs of the initial development of the management plan.

Action	Cost per Unit	Units	Frequency	Expense
One-Time Expenses				
Property Acquisition[1]	$5,000,000	1		$5,000,000
Recurring Costs				
Weed Treatments[2]	$25	1,407 acres	5	$175,875
Native Plant Restoration[3]	$118	339 acres	3	$407,619
Native Plant Restoration (Shrub)[4]	$549	122 acres	3	$200,934
Restoration of Mesic Habitat[5]	$41.03	946 acres	1	$38,814
Annual Habitat Monitoring and Management[6]	$23	1,451 acres	30 (years)	$1,001,190
TOTAL				**$6,824,432**

[1] Cost of purchase is based on the listed price as of 5/2/2023.

[2] Per acre cost of treatment from the USDA NRCS EQIP Fiscal Year 2022 for Oregon, Code 315 Herbaceous Weed Treatment, High Cost Chemical. Assume applied up to 5x to all acres except Nonhabitat and those retained as Developed.

[3] Per acre cost of treatment from the USDA NRCS EQIP Fiscal Year 2022 for Oregon, Code 645 Upland Wildlife Habitat Management, Establishment of seasonal forage or cover for wildlife on non-cropland. Assume restoring native grassland.

[4]Per acre cost of treatment from the USDA NRCS EQIP Fiscal Year 2022 for Oregon, Code 612 Tree/Shrub Establishment, Native seed, Hand plant. Assume restoring native shrubland

[5]Per acre cost for mesic habitat restoration from USDA NRCS EQIP Fiscal Year 2022 for Oregon, Code 643 Restoration of Rare or Declining Natural Communities, Habitat Monitoring and Management, Medium Intensity and Complexity, applied to mesic acres.

[6] Annual estimated per acre cost from the USDA NRCS EQIP Fiscal Year 2022 for Oregon, Code 645 Habitat Monitoring and Management, Medium Intensity and Complexity.

Conclusions

1) The property is not within ODFW mapped mule deer biological winter range and would not fulfill the compensatory mitigation needs of the project for that resource.
2) Much of the property is identified as a priority area of conservation for GRSG, so it could be used to provide GRSG habitat mitigation. PAC is higher quality and therefore of a higher mitigation value than Low Density habitat (based on mapping, not on-the-ground assessment).
3) The property would likely fulfill the compensatory mitigation needs for other wildlife habitat. The property offers upland and riparian vegetation communities that are both in-kind and in addition to (e.g. riparian associates) those affected by the proposed project. There area shows potential for restoration of both upland and riparian/wetland habitats along the Dry Creek.

Attachment A

Figures

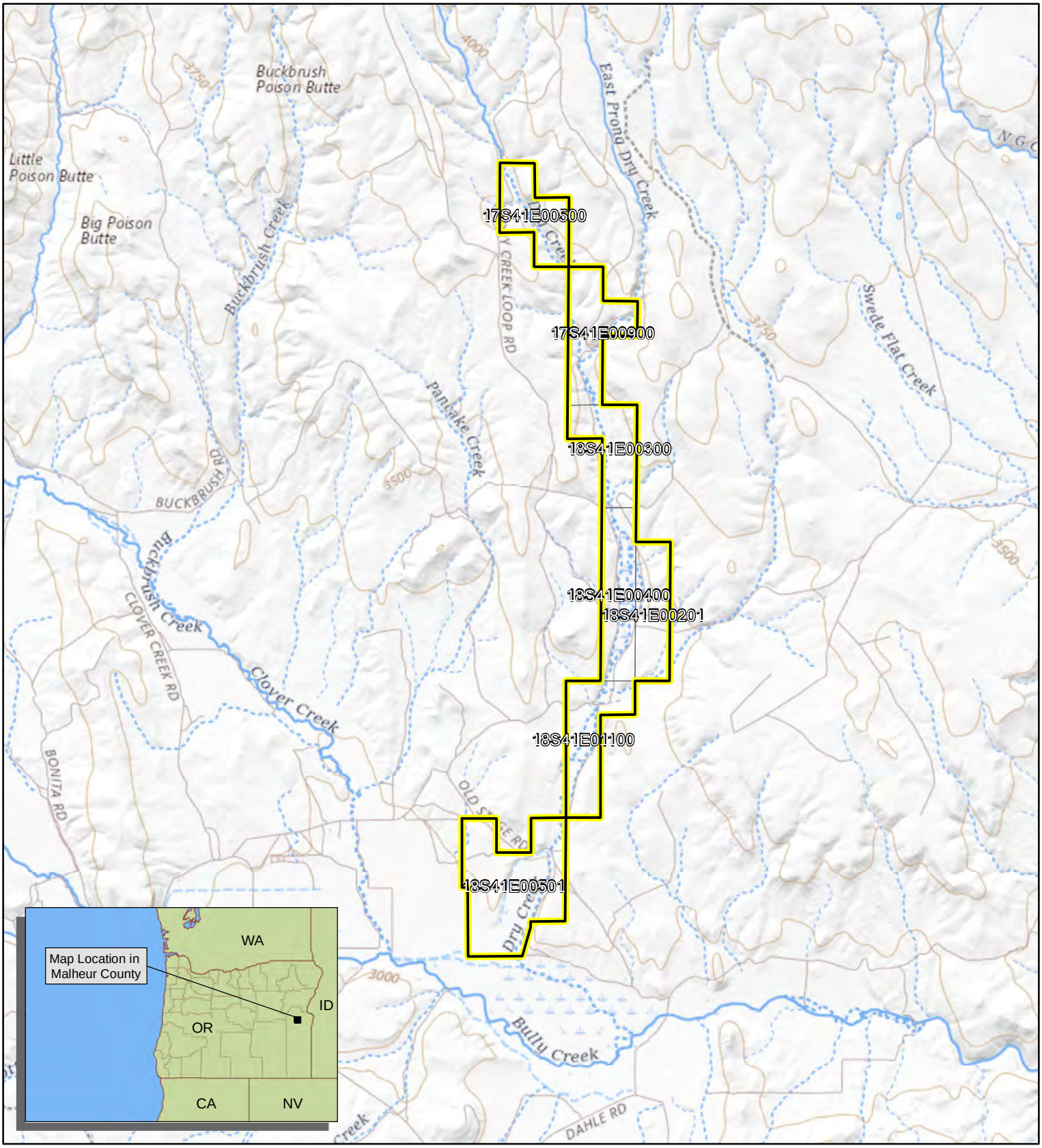


Figure 1. Habitat Mitigation Area Boundary for the Dry Creek Ranch

MB&G

Potential Habitat Mitigation Area

Source: Basemap from USGS; mitigation parcel digitized by MB&G. Reproduced for informational purposes and may not be suitable for legal, engineering, or surveying purposes. Conclusions drawn from such information are the responsibility of the user.

N

0 ¼ ½ 1 Miles

Potential Mitigation Area for
Grassy Mountain Mine Project

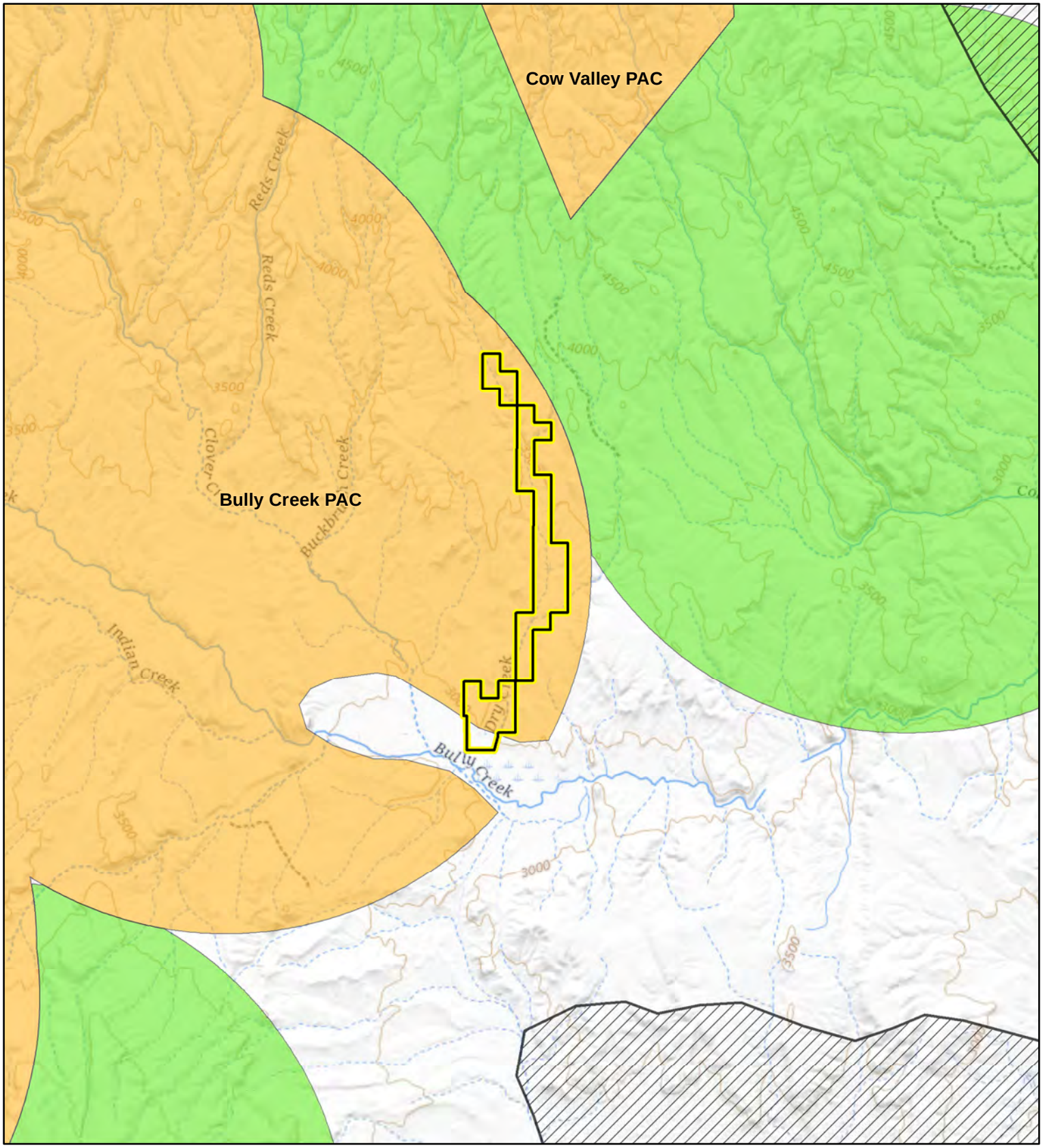


Figure 2. Habitat Mitigation Area Boundary for the Dry Creek Ranch with ODFW Mule Deer Winter Range, Low-Density Sage-Grouse Habitat, and Sage-Grouse Priority Areas for Conservation (PACs)

Potential Mitigation Area for Grassy Mountain Mine Project

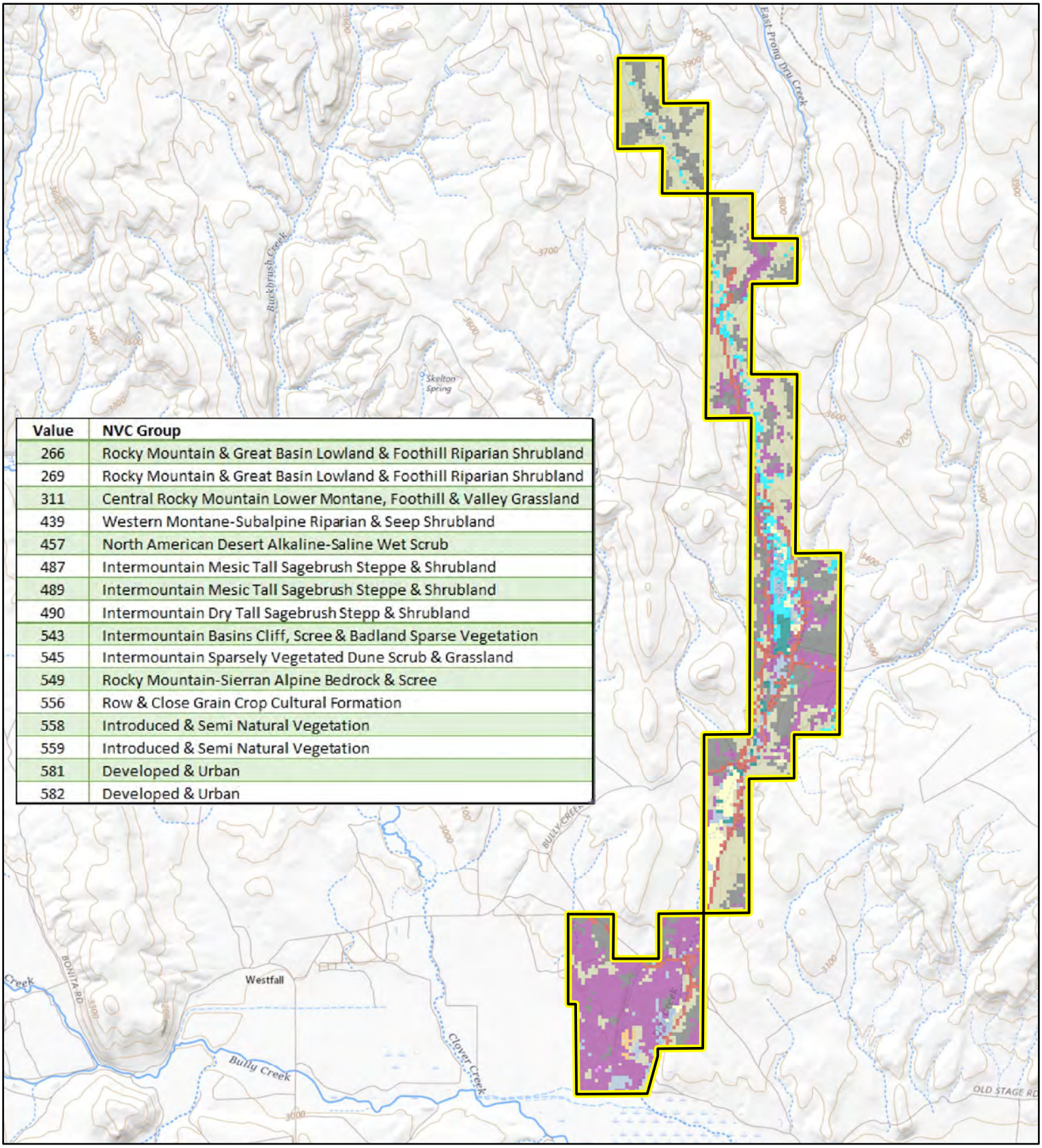
- Potential Habitat Mitigation Area
- ODFW Mule Deer Winter Range
- Low-Density Sage-Grouse Habitat
- Sage-Grouse PAC

MB&G

Source: Basemap from USGS; mitigation parcel digitized by MB&G; mule deer winter range from ODFW; low-density sage-grouse habitat from INR; sage-grouse PAC(s) from ODFW. Reproduced for informational purposes and may not be suitable for legal, engineering, or surveying purposes. Conclusions drawn from such information are the responsibility of the user.

N

0 ½ 1 2 Miles



Value	NVC Group
266	Rocky Mountain & Great Basin Lowland & Foothill Riparian Shrubland
269	Rocky Mountain & Great Basin Lowland & Foothill Riparian Shrubland
311	Central Rocky Mountain Lower Montane, Foothill & Valley Grassland
439	Western Montane-Subalpine Riparian & Seep Shrubland
457	North American Desert Alkaline-Saline Wet Scrub
487	Intermountain Mesic Tall Sagebrush Steppe & Shrubland
489	Intermountain Mesic Tall Sagebrush Steppe & Shrubland
490	Intermountain Dry Tall Sagebrush Stepp & Shrubland
543	Intermountain Basins Cliff, Scree & Badland Sparse Vegetation
545	Intermountain Sparsely Vegetated Dune Scrub & Grassland
549	Rocky Mountain-Sierran Alpine Bedrock & Scree
556	Row & Close Grain Crop Cultural Formation
558	Introduced & Semi Natural Vegetation
559	Introduced & Semi Natural Vegetation
581	Developed & Urban
582	Developed & Urban

Figure 3. Habitat Mitigation Area Boundary for the Dry Creek Ranch with National Vegetation Classification (NVC) Groups

Potential Habitat Mitigation Area

266 269 311 439 457 487 489 490 543 545 549 556 558 559 581 582

MB&G

Source: Basemap from USGS; mitigation parcel digitized by MB&G; NVC Groups from USGS GAP data. Reproduced for informational purposes and may not be suitable for legal, engineering, or surveying purposes. Conclusions drawn from such infor-mation are the responsibility of the user.

N

0 1,000 2,000 4,000 Feet

Potential Mitigation Area for Grassy Mountain Mine Project

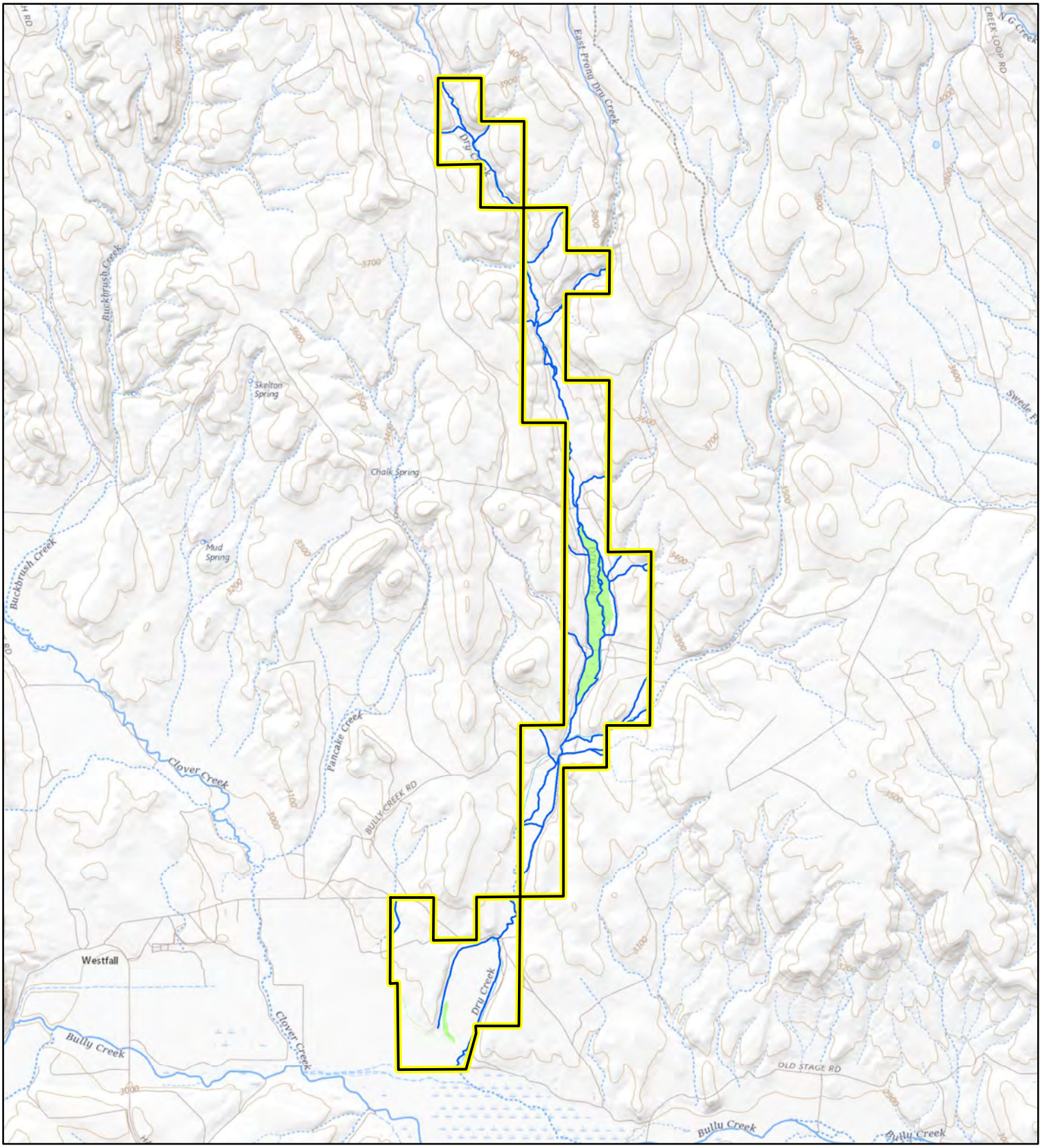


Figure 4. Habitat Mitigation Area Boundary for the Dry Creek Ranch with National Wetland Inventory (NWI) and National Hydrography Dataset (NHD)

Potential Mitigation Area for
Grassy Mountain Mine Project

Potential Habitat Mitigation Area

NHDFlowline

NWI WETLAND

Emergent Wetland

Pond

Riverine

MB&G

Source: Basemap from USGS; mitigation parcel digitized by MB&G; NWI from USFWS; NHD from USGS. Reproduced for informational purposes and may not be suitable for legal, engineering, or surveying purposes. Conclusions drawn from such infor-mation are the responsibility of the user.

N

0 1,000 2,000 4,000

Feet

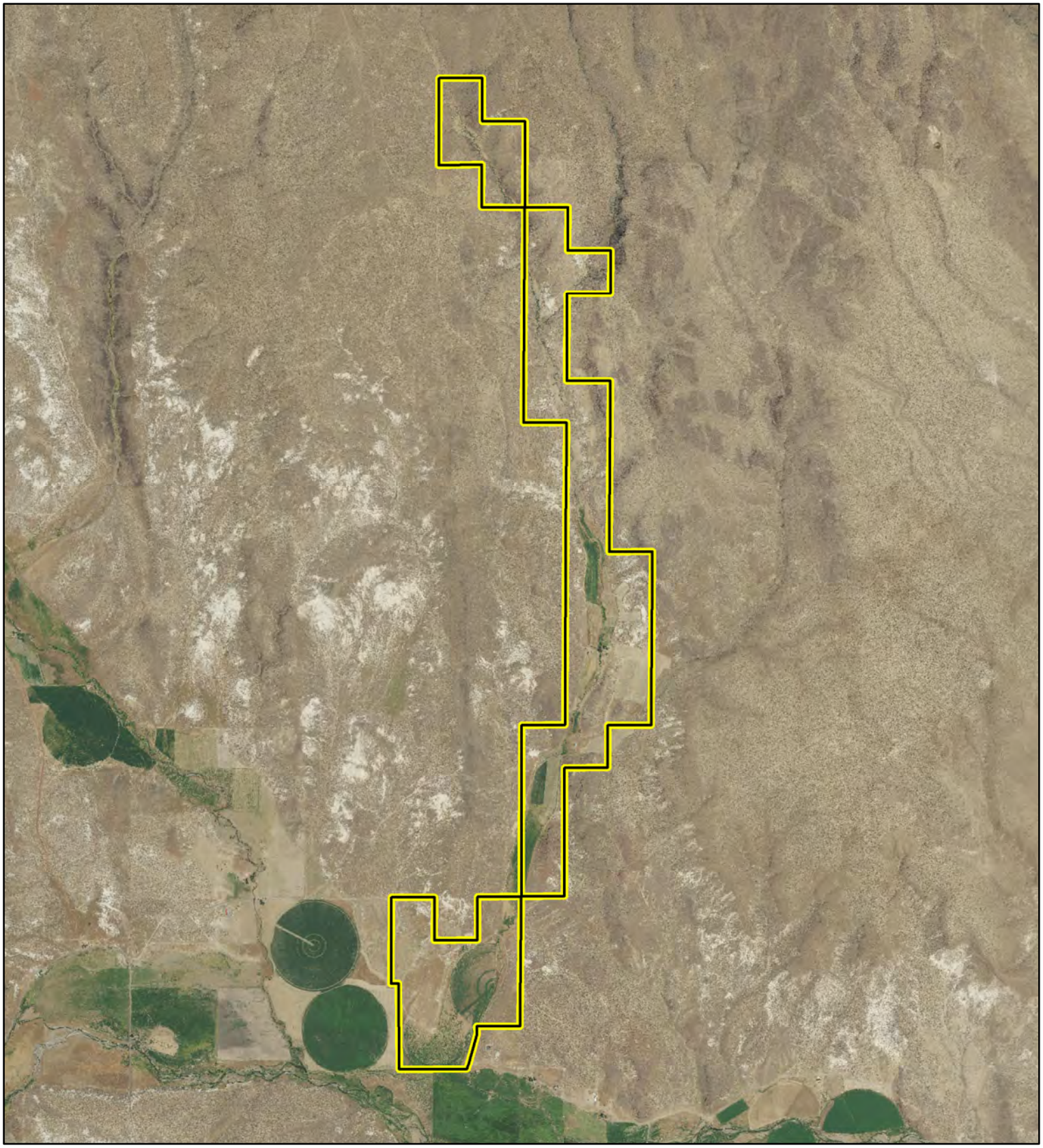


Figure 5. Habitat Mitigation Area Boundary for the Dry Creek Ranch with Aerial Imagery (acquired 2017)

Potential Habitat Mitigation Area

Potential Mitigation Area for
Grassy Mountain Mine Project

MB&G

Source: Basemap from USGS; mitigation parcel digitized by MB&G; aerial imagery from OSIP; roads from Esri. Reproduced for informational purposes and may not be suitable for legal, engineering, or surveying purposes. Conclusions drawn from such information are the responsibility of the user.

N

0 1,000 2,000 4,000
Feet

Attachment B

HQT Worksheets

OREGON SAGE-GROUSE HABITAT QUANTIFICATION TOOL CALCULATOR

Version 2.2 Last updated: 2019-03-01

Instructions: Enter project identifying information on this worksheet.
Enter map unit data in yellow cells in the "Data Entry" worksheet. Gray cells are calculated automatically by the spreadsheet.
Enter project-level information for minimization reductions and the legal protection multiplier on the 'Project Summary' worksheet.
Summary values will be transferred automatically to the 'Project Summary' worksheet.

The 'Classify state - Upland' and 'Classify state - Mesic' tabs can be used to help determine ecological states based on field data and the standard decsion tree. Data from these worksheets will not transfer automatically and must be entered by the user in the 'Data Entry' tab, where appropriate.

Full instructions are provided in the HQT User Guide. Questions regarding the spreadsheet/calculator should be directed to Willamette Partnership at info@willamettepartnership.org. Worksheets are protected to prevent inadvertent modification of formulas.

LEGEND: Headings Data Entry Calculated Cells

Site Name	Dry Cr Mitigation Site
Location	Malheur County
Project Description	Sage-grouse mitigation for Calico Gold Mine

OREGON SAGE-GROUSE HABITAT QUANTIFICATION TOOL CALCULATOR Version 2.2 Last updated: 2019-03-01

Data Entry

Calculated Cells

Management Designations Index 0.756
Enter the MDI score for the full project analysis area

Site Name: Dry Cr Mitigation Site

Location: Malheur County

RAW DEBIT(-) OR CREDIT(+) ACRES

Upland 332.5

Mesic 54.3

DATA ENTRY								BASELINE HABITAT FUNCTION			HABITAT MODIFICATION								FUNCTIONAL ACRES		
				Ecological State		Development Impacts					Ecological State			Development Impacts							
Map Unit ID	**Acres**	Mesic (1=yes, 0=no)	Habitat Type	Pre-Project Ecological State	Post-Project Ecological State	Pre-Project Development Score	Post-Project Development Score	Pre-Project Ecological State Score	Pre-Project Development Score	**Baseline Habitat Function Subscore**	Pre-Project Ecological State Score	Post-Project Ecological State Score	**Change** in Ecological State Score	Pre-Project Development Score	Post-Project Development Score	**Change** in Development Score	**Pre-Project Habitat Modification Subscore**	**Post-Project Site Habitat Modification Subscore**	Pre-Project Functional Acres	Post-Project Functional Acres	**Debit (-) or Credit (+) Acres**
EXAMPLE	***80.0***	*0*	*Upland*	*B*	*B*	*0.700*	*0.500*	*0.80*	*0.700*	*0.750*	*0.80*	*0.80*	*0.00*	*0.700*	*0.500*	*-0.200*	*0.750*	*0.650*	*45.00*	*39.00*	***-6.00***
01_D-IAG	**115.0**		Upland	D-IAG	B*	0.338	0.338	0.10	0.338	0.398	0.10	1.00	0.90	0.338	0.338	0.000	0.219	0.669	10.03	30.63	**20.60**
02_C-IAG	**17.2**		Upland	C-IAG	A*	0.381	0.381	0.30	0.381	0.479	0.30	1.20	0.90	0.381	0.381	0.000	0.341	0.791	2.81	6.52	**3.71**
03_Non_Hab to B	**10.8**		Upland	Developed	B*	0.345	0.345	0.00	0.345	0.367	0.00	1.00	1.00	0.345	0.345	0.000	0.000	0.673	0.00	2.67	**2.67**
04_Non-Hab_to_B	**129.7**		Upland	Developed	B*	0.286	0.286	0.00	0.286	0.347	0.00	1.00	1.00	0.286	0.286	0.000	0.000	0.643	0.00	28.97	**28.97**
05_D-IAG	**23.5**		Upland	D-IAG	B*	0.343	0.343	0.10	0.343	0.400	0.10	1.00	0.90	0.343	0.343	0.000	0.221	0.671	2.08	6.30	**4.22**
06_C-IAG	**20.7**		Upland	C-IAG	A*	0.289	0.289	0.30	0.289	0.448	0.30	1.20	0.90	0.289	0.289	0.000	0.295	0.745	2.74	6.93	**4.19**
07_D-IAG	**14.5**		Upland	D-IAG	B*	0.279	0.279	0.10	0.279	0.378	0.10	1.00	0.90	0.279	0.279	0.000	0.190	0.640	1.04	3.52	**2.48**
08_C-IAG	**20.3**		Upland	C-IAG	A*	0.369	0.369	0.30	0.369	0.475	0.30	1.20	0.90	0.369	0.369	0.000	0.334	0.784	3.22	7.55	**4.33**
09_Non-Hab_to B	**45.0**		Upland	Developed	B*	0.491	0.491	0.00	0.491	0.416	0.00	1.00	1.00	0.491	0.491	0.000	0.000	0.746	0.00	13.94	**13.94**
10_C-IAG	**63.9**		Upland	C-IAG	A*	0.479	0.479	0.30	0.479	0.512	0.30	1.20	0.90	0.479	0.479	0.000	0.389	0.839	12.73	27.44	**14.71**
100_Non Habitat	**9.0**		Upland	Nonhabitat	Nonhabitat	0.780	0.780	0.00	0.780	0.512	0.00	0.00	0.00	0.780	0.780	0.000	0.000	0.000	0.00	0.00	0.00
11_D-IAG	**6.6**		Upland	D-IAG	B*	0.497	0.497	0.10	0.497	0.451	0.10	1.00	0.90	0.497	0.497	0.000	0.298	0.748	0.88	2.21	**1.33**
12_D-IAG	**6.7**		Upland	D-IAG	B*	0.499	0.499	0.10	0.499	0.452	0.10	1.00	0.90	0.499	0.499	0.000	0.300	0.750	0.90	2.25	**1.35**
13_C-IAG	**118.4**		Upland	C-IAG	A*	0.545	0.545	0.30	0.545	0.534	0.30	1.20	0.90	0.545	0.545	0.000	0.423	0.873	26.69	55.12	**28.43**
14_D-IAG	**21.9**		Upland	D-IAG	B*	0.517	0.517	0.10	0.517	0.458	0.10	1.00	0.90	0.517	0.517	0.000	0.308	0.758	3.09	7.61	**4.51**
15_C-IAG	**37.1**		Upland	C-IAG	A*	0.524	0.524	0.30	0.524	0.527	0.30	1.20	0.90	0.524	0.524	0.000	0.412	0.862	8.04	16.83	**8.78**
16_C-IAG	**4.0**		Upland	C-IAG	A*	0.565	0.565	0.30	0.565	0.540	0.30	1.20	0.90	0.565	0.565	0.000	0.432	0.882	0.94	1.92	**0.98**
17_D-IAG	**6.2**		Upland	D-IAG	B*	0.545	0.545	0.10	0.545	0.467	0.10	1.00	0.90	0.545	0.545	0.000	0.322	0.772	0.94	2.25	**1.31**
18_Non-Hab_To_B	**45.8**		Upland	Developed	B*	0.534	0.534	0.00	0.534	0.430	0.00	1.00	1.00	0.534	0.534	0.000	0.000	0.767	0.00	15.09	**15.09**
19_Non-Hab_To_B	**41.4**		Upland	Developed	B*	0.539	0.539	0.00	0.539	0.432	0.00	1.00	1.00	0.539	0.539	0.000	0.000	0.769	0.00	13.75	**13.75**
20_Dev_To_B	**2.2**		Upland	Developed	B*	0.507	0.507	0.00	0.507	0.421	0.00	1.00	1.00	0.507	0.507	0.000	0.000	0.753	0.00	0.69	**0.69**
21_D-IAG	**44.7**		Upland	D-IAG	B*	0.566	0.566	0.10	0.566	0.474	0.10	1.00	0.90	0.566	0.566	0.000	0.333	0.783	7.05	16.58	**9.53**
22_C-IAG	**286.0**		Upland	C-IAG	A*	0.724	0.724	0.30	0.724	0.593	0.30	1.20	0.90	0.724	0.724	0.000	0.512	0.962	86.92	163.31	**76.38**
23_D-IAG	**5.5**		Upland	D-IAG	B*	0.681	0.681	0.10	0.681	0.512	0.10	1.00	0.90	0.681	0.681	0.000	0.390	0.840	1.10	2.37	**1.27**
24_D-IAG	**6.8**		Upland	D-IAG	B*	0.701	0.701	0.10	0.701	0.519	0.10	1.00	0.90	0.701	0.701	0.000	0.400	0.850	1.42	3.01	**1.59**
25_C-IAG	**66.9**		Upland	C-IAG	A*	0.766	0.766	0.30	0.766	0.607	0.30	1.20	0.90	0.766	0.766	0.000	0.533	0.983	21.68	39.98	**18.30**
26_D-IAG	**3.3**		Upland	D-IAG	B*	0.755	0.755	0.10	0.755	0.537	0.10	1.00	0.90	0.755	0.755	0.000	0.428	0.878	0.77	1.57	**0.81**
27_D-IAG	**3.9**		Upland	D-IAG	B*	0.845	0.845	0.10	0.845	0.567	0.10	1.00	0.90	0.845	0.845	0.000	0.472	0.922	1.04	2.04	**0.99**
28_D-IAG	**16.6**		Upland	D-IAG	B*	0.886	0.886	0.10	0.886	0.581	0.10	1.00	0.90	0.886	0.886	0.000	0.493	0.943	4.74	9.07	**4.33**
29_D-IAG	**27.4**		Upland	D-IAG	B*	0.930	0.930	0.10	0.930	0.595	0.10	1.00	0.90	0.930	0.930	0.000	0.515	0.965	8.40	15.74	**7.34**
30_C-IAG	**62.5**		Upland	C-IAG	A*	0.922	0.922	0.30	0.922	0.659	0.30	1.20	0.90	0.922	0.922	0.000	0.611	1.061	25.18	43.72	**18.54**
31_C-IAG	**54.9**		Upland	C-IAG	A*	0.898	0.898	0.30	0.898	0.651	0.30	1.20	0.90	0.898	0.898	0.000	0.599	1.049	21.40	37.48	**16.08**
32_Dev_To_B	**2.7**		Upland	Developed	B*	0.507	0.507	0.00	0.507	0.421	0.00	1.00	1.00	0.507	0.507	0.000	0.000	0.753	0.00	0.85	**0.85**
33_D-IAG	**2.6**		Upland	D-IAG	B*	0.232	0.232	0.10	0.232	0.363	0.10	1.00	0.90	0.232	0.232	0.000	0.166	0.616	0.15	0.57	**0.42**
50_Mes-B	**9.8**	1	Mesic	B	A*	0.343	0.343	4.50	0.343	1.866	4.50	5.25	0.75	0.343	0.343	0.000	2.421	2.796	44.47	51.36	**6.89**
51_Mesic_B	**43.1**	1	Mesic	B	A*	0.707	0.707	4.50	0.707	1.988	4.50	5.25	0.75	0.707	0.707	0.000	2.604	2.979	223.12	255.26	**32.14**
52_Mesic_B	**0.7**	1	Mesic	B	A*	0.494	0.494	4.50	0.494	1.917	4.50	5.25	0.75	0.494	0.494	0.000	2.497	2.872	3.29	3.78	**0.49**
53_Mesic_B	**2.1**	1	Mesic	B	A*	0.517	0.517	4.50	0.517	1.924	4.50	5.25	0.75	0.517	0.517	0.000	2.508	2.883	10.19	11.71	**1.52**
54_Mesic_B	**6.7**	1	Mesic	B	A*	0.543	0.543	4.50	0.543	1.933	4.50	5.25	0.75	0.543	0.543	0.000	2.522	2.897	32.69	37.55	**4.86**
55_Mesic_B	**3**	1	Mesic	B	A*	0.815	0.815	4.50	0.815	2.024	4.50	5.25	0.75	0.815	0.815	0.000	2.658	3.033	14.40	16.43	**2.03**
56_Mesic_B	**4**	1	Mesic	B	A*	0.851	0.851	4.50	0.851	2.036	4.50	5.25	0.75	0.851	0.851	0.000	2.675	3.050	21.77	24.82	**3.05**
57_Mesic_C	**1**	1	Mesic	C	A*	0.915	0.915	3.75	0.915	1.807	3.75	5.25	1.50	0.915	0.915	0.000	2.333	3.083	5.92	7.83	**1.90**
58_Mesic_C	**0**	1	Mesic	C	A*	0.516	0.516	3.75	0.516	1.674	3.75	5.25	1.50	0.516	0.516	0.000	2.133	2.883	0.57	0.76	**0.20**
59_Mesic_B	**2**	1	Mesic	B	A*	0.238	0.238	4.50	0.238	1.831	4.50	5.25	0.75	0.238	0.238	0.000	2.369	2.744	7.72	8.94	**1.22**
99_Access Road	**37**		Upland	Developed	Developed	0.559	0.559	0.00	0.559	0.438	0.00	0.00	0.00	0.559	0.559	0.000	0.000	0.000	0.00	0.00	0.00
99_Developed	**6**		Upland	Developed	Developed	0.438	0.438	0.00	0.438	0.398	0.00	0.00	0.00	0.438	0.438	0.000	0.000	0.000	0.00	0.00	0.00

OREGON SAGE-GROUSE HABITAT QUANTIFICATION TOOL CALCULATOR Version 2.2 Last updated: 2019-03-01

SITE INFORMATION

Site Name	Dry Cr Mitigation Site
Location	Malheur County
Description	Sage-grouse mitigation for Calico Gold Mine

DATA ENTRY: HQT ADJUSTMENT FACTORS

Minimization reductions		*Applies to development [debit] projects only. Default value is **0**.*
Legal protection multiplier	5%	*Applies to credit generation projects only. Default value is **5%**.*

HQT PROJECT DEBIT/CREDIT VALUES

UPLAND Habitat	
HQT Upland Debit(-) or Credit(+) Acres	**361.9**

MESIC Habitat	
HQT Mesic Debit(-) or Credit(+) Acres	**75.2**

UPLAND CALCULATIONS (Do not modify these tables. Numbers are calculated from the "Data Entry" tab.)

UPLAND Map Unit Data Summary

36 map units entered		Functional Acres		Raw Upland Debit(-) or Credit(+) Acres	Average Scores (weighted by map unit area)					
					Ecological State			Development Impacts		
	Physical Acres	Pre-Project	Post-Project		Pre-Project State Score	Post-Project State Score	Change in State Score	Pre-Project Development Score	Post-Project Development Score	Change in Development Score
Direct impacts	1334.4	256.0	588.5	332.5						
Indirect impacts	42.3	0.0	0.0	0.0						
TOTAL	**1376.7**	**256.0**	**588.5**	**332.5**	**0.19**	**1.08**	**0.89**	**0.574**	**0.574**	**0.000**

UPLAND Credit Adjustments *all values in units of functional acres*

Raw upland habitat credit value	**332.5**	Credit value after minimization	**332.5**
Total post-project functional acres eligible for legal protection credit	**588.5**	Legal protection credit	**29.4**
Debit projects are required to achieve a net conservation benefit	**15%**	Net conservation benefit	**0.0**
		HQT Upland Debit(-) or Credit(+) Acres	**361.9**

MESIC CALCULATIONS (Do not modify these tables. Numbers are calculated from the "Data Entry" tab.)

MESIC Map Unit Data Summary

10 map units entered		Functional Acres		Raw Upland Debit(-) or Credit(+) Acres	Average Scores (weighted by map unit area)					
					Ecological State			Development Impacts		
	Physical Acres	Pre-Project	Post-Project		Pre-Project State Score	Post-Project State Score	Change in State Score	Pre-Project Development Score	Post-Project Development Score	Change in Development Score
Direct impacts	72.5	364.1	418.5	54.3						
Indirect impacts	0.0	0.0	0.0	0.0						
TOTAL	**72.5**	**364.1**	**418.5**	**54.3**	**4.48**	**5.25**	**0.77**	**0.639**	**0.639**	**0.000**

MESIC Credit Adjustments *all values in units of functional acres*

Raw mesic habitat credit value	**54.3**	Credit value after minimization	**54.3**
Total post-project functional acres eligible for legal protection credit	**418.5**	Legal protection credit	**20.9**
Debit projects are required to achieve a net conservation benefit	**15%**	Net conservation benefit	**0.0**
		HQT Mesic Debit(-) or Credit(+) Acres	**75.2**