NATURAL RESOURCES TECHNICAL REPORT: AQUATIC RESOURCES

I-5: Fern Valley Interchange

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ACRONYMS

List of Acronyms and Abbreviations

API	Area of Potential Impact
BA	Biological Assessment
bgs	below ground surface
BMPs	Best Management Practices
CETAS	Collaborative Environmental and Transportation Agreement for Streamlining
CFR	Code of Federal Regulations
CWA	Clean Water Act
DEQ	Oregon Department of Environmental Quality
DSL	Oregon Department of State Lands
EA	Environmental Assessment
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ESCP	Erosion and Sediment Control Plan
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FVI	Fern Valley Interchange
GIS	Geographic Information System
GPS	Global Positioning System
HGM	Hydrogeomorphic
LWI	Local Wetlands Inventory
NEPA	National Environmental Policy Act
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
OAR	Oregon Administrative Rules
ODFW	Oregon Department of Fish and Wildlife
OHWM	Ordinary High Water Mark
ORS	Oregon Revised Statutes
PDOP	Position Dilution of Precision
RM	River Mile
SCS	Soil Conservation Service
TMDL	Total Maximum Daily Load
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

EXECUTIVE SUMMARY

This Technical Report evaluates the potential temporary and long-term adverse effects and benefits to aquatic biological resources resulting from the Fern Valley Interchange project. Measures are proposed to mitigate the potential temporary and long-term effects.

AREA OF POTENTIAL IMPACT

For the purposes of this assessment, the study area is defined as the Area of Potential Impact (API) and includes:

- All areas within 100 feet of the centerline of Fern Valley Road (including the construction footprint beyond the existing edge of pavement).
- All areas within 100 feet of the centerline of proposed roads and interchanges/ramps and any other areas of construction access and/or staging associated with the project alternatives.
- The aquatic environment of Bear Creek, extending from the upstream (south) side of the existing bridge (Fern Valley Road), downstream until impacts have attenuated to background levels (to be determined).
- The aquatic environment of Coleman Creek, extending from the upstream (west) side of the Main Street (OR 99) Bridge, downstream until impacts have attenuated to background levels (to be determined).
- The aquatic environment of Payne Creek, from the upstream crossing of the Fern Valley Thru proposed alignment, downstream until impacts have attenuated to background levels (to be determined).

METHODS AND COORDINATION

Potential temporary and long-term impacts to aquatic resources were assessed through a combination of field reconnaissance, literature, and data review. Data and literature review included an assessment of the following sources: (1) Biological Resources Baseline Report: Wildlife, Fish and Plants (URS, 2004), (2) The Biological Assessment (BA) for the Fern Valley Interchange Project, Phoenix, Oregon (Hart Crowser, 2002), (3) the National Marine Fisheries Service (NMFS) internet database for listed species and critical habitat, and (4) correspondence with Oregon Department of Transportation (ODOT) and Oregon Department of Fish and Wildlife (ODFW) biologists.

ENVIRONMENTAL BASELINE CONDITIONS

Aquatic Habitat and Water Quality

The Fern Valley Interchange project lies within the Bear Creek watershed (HUC# 1710030801) in the Klamath Mountain physiographic province, and includes three aquatic resources: Bear Creek, and two of its tributaries, Coleman Creek and Payne Creek. Because of their proximity to I-5 and other urban features, these stream channels and their floodplains have been modified and are generally confined to a narrow meander zone. The uplands of the Bear Creek watershed consist of highly erodible soils that result in high natural suspended sediment loads (MB&G, 2001). Extensive agricultural and urban development in the watershed have contributed additional sediment load. The result of these processes is poor water quality caused by elevated turbidity, and embedded substrates that have become generally unsuitable for spawning salmonids and incubating eggs.

Riparian zones present in the API are narrow and/or degraded to the extent that Large Woody Debris (LWD) recruitment potential is very low, and shading and other riparian functions are compromised system-wide (MB&G, 2001). In the API, Bear Creek flows through the linear Bear Creek Greenway, which may serve to provide long-term protection of the riparian zone.

The Bear Creek system is subject to irrigation diversion, upland and riparian vegetation clearing, and the addition of impervious surface, resulting in substantial changes to natural flow regimes (Shapiro, 2001). This results in a highly variable flow regime, which can reduce habitat quality as high flows scour the stream channel, and limit habitat availability as low flows de-water habitat components

Bear, Coleman, and Payne Creek are currently on the Oregon Department of Environmental Quality (DEQ) 303(d) List of Water Quality Limited Water Bodies for fecal coliform and temperature.

Fisheries Resources

Bear Creek and Coleman Creek support several anadromous fish species, including Coho salmon and summer steelhead. Bear Creek also supports fall Chinook. Neither summer steelhead (Klamath Mountain Province Distinctive Population Segment (DPS) nor fall Chinook (Southern Oregon Coastal and Northern California Coastal Ecologically Significant Units (ESU)) are listed under the Endangered Species Act. Coho salmon (Southern Oregon/Northern California Coast ESU) are currently listed as Threatened under the Endangered Species Act. Critical habitat for Southern Oregon/Northern California Coast Coho has been designated by the National Marine Fisheries Service, and includes Bear Creek, Coleman Creek, and Payne Creek.

Payne Creek has historically supported anadromous salmonids (including cutthroat trout (*O. clarki*), steelhead, and coho salmon). Today, only the lower reaches of Payne Creek

between the I-5 Culvert and the confluence of Bear Creek are known to support salmonids. The absence of fish in Payne Creek is likely due to the presence of barriers that prevent fish from entering the stream. Payne Creek is designated as critical habitat by the NMFS.

ENVIRONMENTAL CONSEQUENCES

Potential impacts to aquatic resources include direct, indirect, and cumulative effects resulting from the proposed project. These effects are discussed below in the context of the No-Build, Fern Valley Thru, and N. Phoenix Thru Alternatives.

Direct Impacts

No Build Alternative

Selecting the No-Build Alternative would not adversely affect the fisheries baseline or designated critical habitat in Bear or Coleman Creeks.

Fern Valley Thru and N. Phoenix Thru Alternatives

Potential direct impacts to fisheries resources and water quality resulting from the Fern Valley Thru Alternative would affect more of the aquatic indicators (identified below and listed in the Summary Table) than those associated with the N. Phoenix Thru Alternative. Each of the identified indicators has additional criteria (e.g., water quality – temperature, sediment/turbidity, chemical, construction debris) used to establish the measure of change from the implementation of the alternatives. These are further defined and assessed in the environmental consequences section of this report and summarized by indicator category below and in the Summary Table:

- Water Quality
- In-Water Noise
- Visual Disturbance
- Habitat Access (physical barriers)
- Habitat Elements
- Change Conditions (hydraulics)
- Base Flows and Drainage Network Increase (stormwater)
- Watershed Conditions
- Net New Impervious Surface

Bear Creek. Potential temporary and long-term impacts to the aquatic indicators resulting from both alternatives are similar with respect to project actions occurring in or near Bear Creek (west of I-5) (see Summary Table).

Coleman Creek. Potential impacts to the aquatic indicators resulting from both alternatives are similar with respect to project actions occurring in or near Coleman Creek (see Summary Table)

Payne Creek. The Fern Valley Thru Alternative has the potential for impacting fisheries resource attributes (indicators) and water quality in areas located east of I-5 associated with the relocation (removal and replacement) of an existing culvert in Payne Creek, and construction of a new roadway adjacent to Payne Creek. The N. Phoenix Thru Alternative would not involve removal and replacement of this culvert and additional roadway construction. This is the greatest difference between these two alternatives for aquatic resources. However, no listed species of fish are present in Payne Creek.

Project actions and potential effects to indicators outlined above would occur in and adjacent to Payne Creek and would be located above a complete fish passage barrier. The extent to which these impacts would affect aquatic resources located downstream in Bear Creek is considered to be minor based on the scope and intensity of this project. Potential short-term, construction-related impacts to water quality would attenuate to background levels prior to entering Bear Creek. Potential long-term effects that may impact water quality downstream would be due primarily to the net increase of impervious surface and untreated run-off which is greater in the Fern Valley Thru Alternative due to the additional impervious surface and the culvert removal on Payne Creek. The project stormwater treatment goal is to have a net zero water quality impact to Bear Creek. As follows, it is assumed that the proposed project would not result in increases to untreated stormwater.

Indirect Effects

No Build Alternative

Indirect impacts to aquatic resources and species due to the No-Build Alternative would include the deterioration of the bridge structure over Bear Creek and erosion of adjacent supporting embankments. This erosion could, over time, result in higher sediment loads in Bear Creek. Increases in growth, traffic, and interchange use are expected to continue. As a result, traffic movements and safety would become more complicated, adding to the potential for species harassment and additional water quality implications from storm water discharge.

Fern Valley Thru Alternative

An increase in the rate of development, and associated increase in traffic, in the rural area within the API may be considered an indirect effect of the interchange project. However, this area has experienced and is likely to continue to experience increased development regardless of the construction of the one of the alternatives. Possible indirect effects of the proposed project include a net loss of infiltration that would increase surface flows,

and possible failure of stormwater facilities. These factors could affect water quality and quantity in receiving streams and have a negative effect on aquatic species.

N. Phoenix Thru Alternative

Indirect impacts for the N. Phoenix Thru Alternative are expected to be the same or similar to the Fern Valley Thru Alternative.

Cumulative Impacts

No Build Alternative

In general, urbanization in the surrounding vicinity would likely cause increased water quality issues from increased impervious surfaces and potential for additional stream crossings and riparian losses. In addition, waterways such as Bear Creek would likely experience increased stormwater flows and decreased water quality regardless of construction of the FVI project.

Fern Valley Thru Alternative

The majority of the projects summarized below would impact aquatic resources and other waters that are located outside the FVI project API. However, the following projects could cumulatively impact aquatic resources within the FVI project API:

- The City of Phoenix Bolz Road widening between OR 99[1] and Fern Valley Road would further increase impervious area above Bear Creek.

- The Jackson County Bear Creek Greenway Trail completion would further increase impervious area above Bear Creek (upstream and downstream of the FVI project API).

- The ODOT I-5 South Medford Interchange would further increase impervious area above Bear Creek (downstream of the FVI project API).

- Commercial property development may result in additional impacts to wetlands and ditches in the northeast and southwest quadrants of the interchange and further increase impervious surface area that drains to Bear Creek.

The incremental cumulative contribution of the FVI project to the past, present, and future foreseeable actions described above would likely be small for water quality parameters and aquatic species habitat parameter impacts. It should be noted that current regulations require that new impervious surface area improvements include updated stormwater treatment, and mitigation for habitat loss. As such, existing, untreated runoff as a result of this project would likely become treated prior to entering waterways, and loss of wetland acres and functions would be mitigated. For this reason, cumulative

[1] OR 99 is also known as Highway 99 and Main Street.

impacts associated with either alternative are assumed to be similarly negligible to other waters within the API. Collectively, all projects when reviewed together could have a small impact on aquatic habitat and species. All of the impacts associated with these projects would be mitigated, and residual cumulative impacts would therefore be considered negligible.

SUMMARY OF POTENTIAL EFFECTS BY ALTERNATIVE		
Indicators for Measure of Change	**Fern Valley Thru**	**N. Phoenix Thru**
Water Quality	Negligible – Small temporary construction-related impacts to overall water quality in Bear and Payne Creeks. Small long-term impacts to Payne Creek.	Negligible – Small temporary construction-related impacts to Bear and Payne Creeks. Small long-term impacts are expected to overall water quality to Bear and Payne Creeks.
In-Water Noise	Negligible – Small temporary construction-related impacts are expected to Bear	Negligible – Small temporary construction-related impacts are expected to Bear
Visual Disturbance	Negligible – Small temporary construction-related impacts are expected to Bear	Negligible – Small temporary construction-related impacts are expected to Bear
Habitat Access (physical barriers)	Small temporary construction-related impacts to habitat access to Bear and Payne Creeks.	Small temporary construction-related impacts to habitat access to Bear and Payne Creeks.
Habitat Elements	No impact	No impact
Change Conditions (hydraulics)	Negligible – Construction-related impacts to hydraulics in Bear and Payne Creeks.	No impact
Flow/ Hydrology/ Peak Base Flows	Negligible – Temporary construction-related impacts to Bear Creek. Small temporary construction-related impacts to Payne Creek.	Negligible temporary construction-related impacts are expected to Bear Creek.
Net New Impervious Surface	15.8 acres	15.2 acres
Watershed Conditions	Negligible–Small temporary and long-term related impacts to Bear Creek.	Negligible–Small temporary and long-term related impacts to Bear Creek.
Take of Fish	Small temporary construction-related impacts to Bear Creek.	Small temporary construction-related impacts to Bear Creek.

CONSERVATION AND MITIGATION MEASURES

Conservation measures would be implemented to minimize or avoid potential temporary and long-term environmental impacts to listed fish species or critical habitat. Most conservation measures would be applied to actions taking place in, or adjacent to, Bear, Coleman, and Payne Creeks, and would follow practices outlined in ODOT's Standard Specifications for Highway Construction (2002d). Standard specifications would be amended in the Special Provisions to include any additional conservation measures that may be applicable to specific project actions. Because the Fern Valley Interchange project is in the early stages of design, all obligations that appear in this section are non-binding and subject to change as design progresses (Section 7).

In addition to standard ODOT conservation measures, the Oregon Department of Fish and Wildlife (ODFW) has expressed support of two mitigation measures which will be reviewed by ODOT and finalized when the Preferred Alternative is selected. These include:

1. Removal of a section of the existing culvert between Bear Creek and Luman Rd. The proposed section is located under an undeveloped area (i.e., no roadway, residential or commercial development). Removal of this section of culvert would render the lower 100-200 feet of Payne Creek accessible to anadromous fish.

2. Replacement of the existing culvert where Coleman Creek passes under OR 99 in Phoenix. This action would render Coleman Creek accessible to anadromous fish (including listed coho salmon) above the existing barrier.

1. INTRODUCTION

The Natural Resources Technical Report for Aquatic Resources has been prepared to support the Environmental Assessment (EA) for the Fern Valley Interchange (FVI) project. The FVI is located along Interstate 5 (I-5), in Jackson County, near the City of Phoenix (Figure 1).

The purpose of this report is to provide an assessment of the potential impacts to aquatic resources as a result of implementation of the project alternatives. This impact analysis has been conducted pursuant to the requirements of the National Environmental Policy Act (NEPA), the Council of Environmental Quality (CEQ), and the Federal Highway Administration (FHWA).

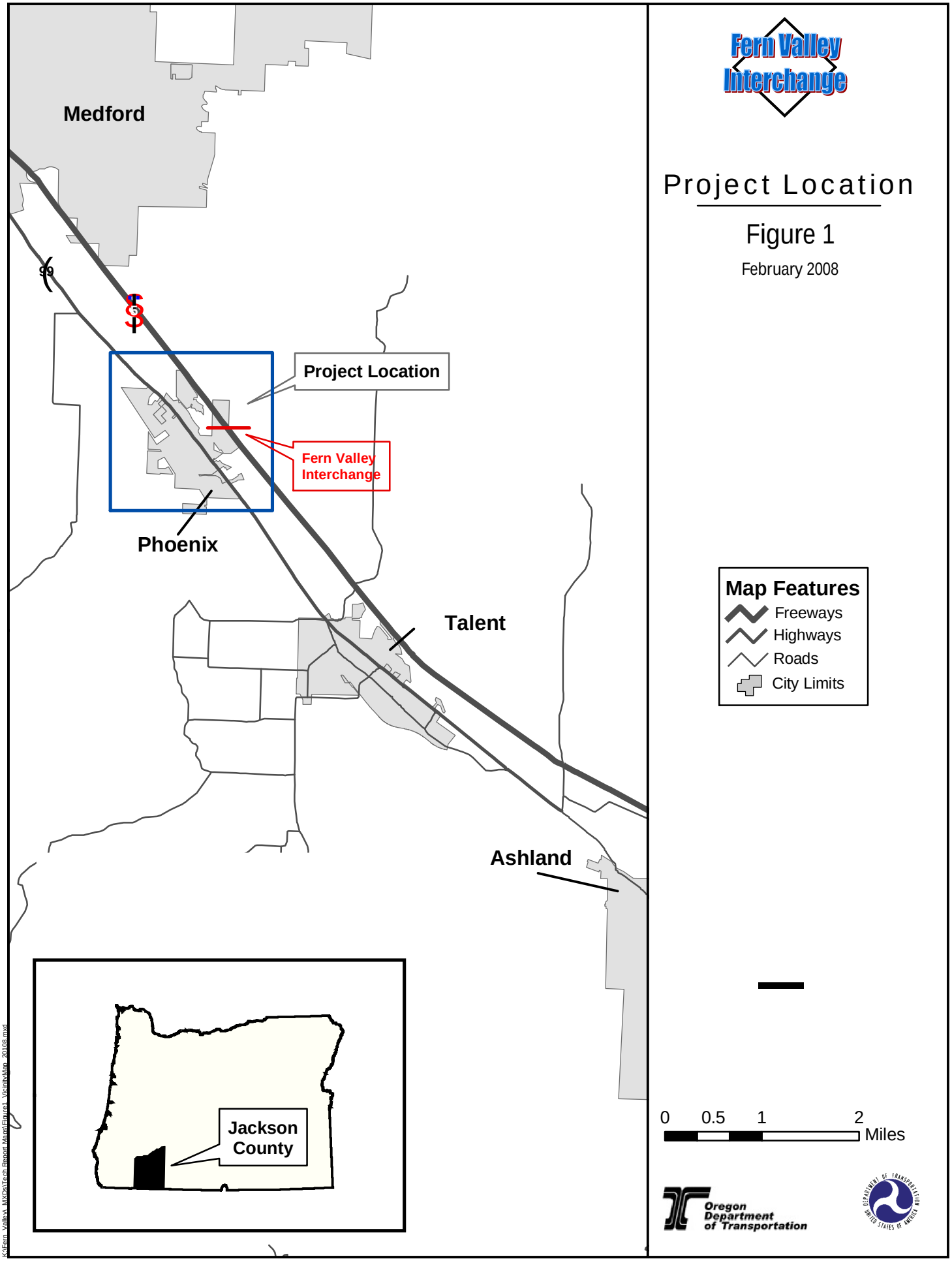
1.1 PURPOSE OF THE PROPOSED ACTION

The purpose of the proposed action is to reduce congestion and improve operational conditions at the I-5 interchange with Fern Valley Road, on Fern Valley Road within the City of Phoenix Urban Growth Boundary, and on OR 99 near its intersection with Fern Valley Road. In addition, the Fern Valley Road Bridge over Bear Creek is proposed for replacement.

1.2 NEED FOR THE PROPOSED ACTION

The I-5 / Fern Valley Road interchange is experiencing increasing congestion due to continued growth in Phoenix and southeast Medford, the status of the Medford-Ashland area as a regional business destination, and a greater amount of through traffic on I-5. Increased use of the interchange by local residents, commuters, heavy trucks and regional traffic causes vehicles at the off-ramps to queue all the way to the freeway during times of heavy peak hour volumes. The capacity of the interchange is degrading rapidly, and traffic safety remains an ongoing concern.

An interim project (Phase 1) has recently been constructed at the I-5 / Fern Valley interchange to improve existing conditions in the short-term, but lacking further improvements, the interchange is projected to degrade to unacceptable levels of congestion (over the 0.85 volume-to-capacity [v/c] ratio standard) within 5 to 10 years. Recent ODOT traffic studies estimate that by 2012, vehicle queues at the ramp terminal intersections along Fern Valley Road would start blocking adjacent intersections and both ramp terminals would have a v/c ratio near or over 1.0. By 2022, if no new improvements are constructed, Fern Valley Road would be at or over capacity. Traffic studies also predict that the queue on the northbound I-5 off-ramp would extend into the northbound through lanes of I-5, creating a much higher risk of rear-end collisions.



Fern Valley Interchange

Project Location

Figure 1

February 2008

Oregon Department of Transportation

k:\Fern_Valley_MXDs\Tech Report Maps\Figure1_VicinityMap_20108.mxd

In 2022, all of the intersections on Fern Valley Road except for Luman Road are projected to have v/c ratios ranging from just over 1.0 to greater than 2.0. Fern Valley Road would be queued in both directions almost the entire distance between OR 99 and N. Phoenix Road. Very long queues would also occur on OR 99, N. Phoenix Road, and Bolz Lane as the over-capacity signalized intersections on Fern Valley Road would meter traffic through this area.

The Fern Valley Road interchange does not meet current interchange design standards. The steepness of the approaches to the Fern Valley Road overcrossing limits the visibility of interchange traffic. This limited "sight distance" forces drivers to make unsafe turns onto Fern Valley Road. In addition, the length of the I-5 ramp tapers and acceleration lanes are substandard (425 feet vs. the ODOT standard of 525 feet), which results in short stopping and acceleration distances.

Fern Valley Road has substandard shoulders (4-foot shoulders on the overcrossing and 6-foot shoulders on the approaches vs. the ODOT standard of 8 feet) and does not have dedicated bicycle lanes. Sidewalks are discontinuous along Fern Valley Road, creating safety concerns for pedestrians. This poses particular problems on the overcrossing and from Bear Creek Bridge to OR 99, where there are no sidewalks, but where pedestrians need to be accommodated.

Fern Valley Road crosses Bear Creek between the I-5 interchange and OR 99. This narrow bridge is already becoming a bottleneck on Fern Valley Road. In addition, the bridge is over 50 years old and is structurally deficient and functionally obsolete. Even if the interchange were to be completely rebuilt, the two-lane bridge would still cause long queues to occur on Fern Valley Road, eventually impacting the ramp terminals and the function of the interchange.

The western terminus of Fern Valley Road, at its intersection with OR 99, is a substandard design with one leg serving a retail business parking lot. There are numerous accesses creating safety issues near the OR 99/Fern Valley Road intersection. The crash rate on OR 99 through the study area is double the published crash rates for primary non-freeway urban facilities. Most of the crashes are because of the closely-spaced driveways and intersections. In addition, OR 99 has no dedicated bike lanes or shoulders; it has 14-foot outside lanes where bikes share the roadway. The center-turn median is 14 feet (vs. the ODOT standard of 16 feet); it was reduced from standard in order to allow room for 14-foot outside lanes. There are no sidewalks on OR 99 north of Fern Valley Road except intermittently on business frontages.

2. DESCRIPTION OF THE ALTERNATIVES

Three alternatives are evaluated in this technical report: a No-Build Alternative and two build alternatives. The proposed build alternative descriptions are based on preliminary design only. Projects normally have minor design changes during the final design phase—after the environmental process are complete, but prior to construction. A full description of the project alternatives is provided in the Environmental Assessment.

2.1 NO-BUILD ALTERNATIVE

The No-Build Alternative is evaluated and documented for the purpose of providing a basis of comparison with the build alternatives. The No-Build Alternative would leave the interchange in place, in its existing condition. Fern Valley Road and OR 99 would not change their current alignment or roadway design. There would be no major changes to the highway. Routine maintenance would be continued; and short-term minor safety improvement activities that support continued operation of the existing roadway would occur.

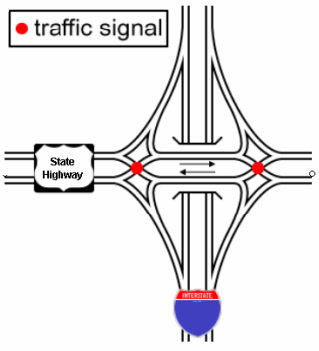
2.2 BUILD ALTERNATIVES

The two build alternatives are almost the same west of I-5. The design of the interchange is also essentially the same. Only minor shifts in alignment would differ at these locations. However, east of I-5, the alternatives are very different in alignment and design.

2.2.1 Fern Valley Thru Alternative

West of I-5, the Fern Valley Thru alternative generally follows the existing alignment of Fern Valley Road (Figure 2). East of I-5, the Fern Valley Thru alternative would run parallel to and about 250 feet north of the existing alignment of Fern Valley Road, reconnecting to Fern Valley Road at Breckinridge Drive. S. Phoenix Road would remain along its existing alignment. N. Phoenix Road would be relocated along an all new alignment northeast of existing N. Phoenix Road, reconnecting with the existing road near Campbell Road.

The interchange would be a new interchange design, the Crossing Diamond Interchange (CDI; also known as the Diverging Diamond Interchange). With this type of interchange, drivers are directed to the left side of the bridge to cross the interstate (see diagram). This allows drivers to make "free" left turns onto the interchange on-ramps. Two traffic lanes would be provided in each direction for eastbound and westbound traffic.



OR 99 would be two lanes in each direction. Fern Valley

Road would also be two lanes in each direction, but would turn into a one-way road just west of Bear Creek—westbound traffic would follow Fern Valley Road and eastbound traffic would use E. Bolz Road. Realigned N. Phoenix Road would be two lanes in direction until it tapers to reconnect to existing N. Phoenix Road near Campbell Road. Existing Fern Valley Road and S. Phoenix Road would remain 2-lane roads.

Signals would be located at the following intersections:

- West and east interchange ramps.
- OR 99/Fern Valley Road.
- OR 99/E. Bolz Road.
- Fern Valley Road/Luman Road/Stores at Exit 24 access.
- Realigned Fern Valley Road/N. Phoenix Road.
- Realigned N. Phoenix Road intersection with Home Depot.

Medians would be installed:

- On OR 99 from about 500 feet north of Cheryl Lane to E. Bolz Road.
- On Fern Valley Road from the southbound ramps to Luman Road and intermittently between Luman Road to OR 99 as needed for access control.
- Between the interchange ramps.
- On realigned Fern Valley Road from the interchange to the signal at N. Phoenix Road.
- On realigned Fern Valley Road from the signal at N. Phoenix Road to Breckinridge Drive.
- On S. Phoenix Road from the realigned Fern Valley Road/N. Phoenix Road signal to Furry Road.

Bikes on OR 99 would be accommodated on 5-foot shoulders. Bike lanes throughout the rest of the project would be at least 6 feet wide, with occasional variations from 5 to 8-feet at some locations. Bike lanes would be designated by pavement markings. Pedestrians would be accommodated by 6-foot sidewalks on both sides of OR 99, E. Bolz Road, and Fern Valley Road west of I-5, realigned Fern Valley Road east of I-5, and realigned N. Phoenix Road.

The following roads would become cul-de-sacs:

- Existing Fern Valley Road west of S. Phoenix Road; however, the cul-de-sac includes connections to the last driveway adjacent to Texaco.
- The east leg of the existing Fern Valley Road/N. Phoenix Road intersection.
- Existing N. Phoenix Road west of the existing Peterbilt access.
- The north end of Pear Tree Lane.

2.2.2 N. Phoenix Thru Alternative

The design of the N. Phoenix Thru Alternative (Figure 3) would be essentially the same as the Fern Valley Thru alternative west of I-5. The only slight difference is that the N.

Phoenix Thru alignment must skew slightly north in order to connect with the new interchange alignment. East of I-5, the N. Phoenix Thru alternative would turn north generally paralleling the existing N. Phoenix Road. The new road would be located just east and then north of Home Depot, and would reconnect with the existing N. Phoenix Road near Campbell Road. Existing Fern Valley Road would be accessed via a new roadway from the existing Fern Valley Road/N. Phoenix Road intersection to a new major intersection at Home Depot.

The design of the CDI would be essentially the same as the interchange for the Fern Valley Thru alternative. The only difference is that the N. Phoenix Thru CDI would be located slightly north of the existing Fern Valley Road interchange structure in order to connect with the new N. Phoenix Road alignment.

The typical roadway sections for this alternative are the same as the Fern Valley Thru alternative west of I-5, for the interchange, and along realigned N. Phoenix Road. East of I-5, existing Fern Valley Road and extended S. Phoenix Road would be one lane in each direction. The Home Depot access road would be two lanes.

Signals would be located at the following intersections:

- West and east interchange ramps.
- OR 99/Fern Valley Road.
- OR 99/E. Bolz Road.
- Fern Valley Road/Luman Road/Stores at Exit 24 access.
- Existing Fern Valley Road/N. Phoenix Road.
- Realigned N. Phoenix Road intersection with Home Depot.

Medians would be installed at the following locations:

- On OR 99 from about 500 feet north of Cheryl Lane to E. Bolz Road.
- On Fern Valley Road from the southbound ramps to Luman Road and intermittently between Luman Road to OR 99 as needed for access control.
- Between the interchange ramps.
- On realigned N. Phoenix Road from the interchange to the Home Depot/extended S. Phoenix Road intersection.

The following roads would become cul-de-sacs:

- Existing Fern Valley Road west of S. Phoenix Road; however, the cul-de-sac includes an access to Pear Tree Lane.
- Existing N. Phoenix Road west of the existing Peterbilt access

3. METHODOLOGY

This chapter describes the methods used to conduct the analyses summarized in this report. This includes a summary of reference literature reviewed and the manner in which field data was collected.

3.1 BASELINE DATA

Available information was reviewed in order to ascertain the geographic extent and character of aquatic resources and water bodies that may exist within the study area prior to the field visit. For the purposes of this report, the study area is defined as the API (Figure 4), which includes the direct impacts of the alternatives and encompasses all

areas within 100 feet of the centerline of Fern Valley Road (including the construction footprint beyond the existing edge of pavement), as well as generally within 100 feet of the centerline of proposed roads and interchanges/ramps and any other areas of construction access and/or staging associated with the project alternatives. The areas described below are included in the Action Area which is defined in 50 CFR Section 402.02 as the areas to be affected directly or indirectly by the action and not merely the immediate area involved in the action.

- The aquatic environment of Bear Creek, extending from the upstream (south) side of the existing bridge (Fern Valley Road), downstream until impacts have attenuated to background levels.

- The aquatic environment of Coleman Creek, extending from the upstream (west) side of the Main Street (OR 99) Bridge, downstream until impacts have attenuated to background levels.

- The aquatic environment of Payne Creek, from the upstream crossing of the Fern Valley Thru proposed alignment, downstream until impacts have attenuated to background levels.

In addition, previous technical reports were reviewed, including the Wetland Determination and Delineation Report and BA completed for Phase I of the Fern Valley Interchange project (ODOT, 2001 and ODOT, 2002, respectively), the Wetland Delineation Report completed for Jackson County for the Bear Creek Greenway Trail project (OBEC, 2002), and the Wetland and Water Resources Baseline Report for the Fern Valley Interchange project (URS, 2004).

Quantifying the specific extent of potential impacts within the API is beyond the scope of this technical report; however it can be assumed that potential impacts to aquatic resources would be largely controlled by flow levels, background conditions, and type of impact.

The API was used as the framework to evaluate potential direct impacts to aquatic resources. Direct impacts were evaluated using qualitative assessment of the following habitat components or measures of change (indicators): (1) Water quality, (2) In-water noise, (3) Incidental take of listed fish, (4) Visual disturbance, (5) Habitat access, (6) Habitat elements, (7) Channel conditions and dynamics (hydraulics), (8) Flow/Hydrology, and (9) Watershed conditions. In addition to direct impacts, the Action Area included areas indirectly affected by the proposed actions and cumulative effects of the proposed actions. Indirect effects occur later in time and are reasonably certain to occur (50 CFR 402.02), and may occur outside of the area directly affected by the action, but would occur within the Action Area as defined above. Cumulative impacts are generally assessed at the watershed scale to have a greater understanding of incremental actions that could affect species and habitat upstream and downstream.

Baseline data and project impacts were assessed through a combination of field reconnaissance, literature, and data review. A field visit was conducted on May 22, 2007, and included an assessment of waterways within the Action Area, including: (1) Bear Creek, (2) Coleman Creek, (3) Payne Creek, and (4) Medford Irrigation District (MID) Canal. Additionally, on December 13, 2007 ODOT volunteers seined on Payne Creek below the I-5 culvert and collected 13 juvenile steelhead. Data and literature review included an assessment of the following sources: (1) Biological Resources Baseline Report: Wildlife, Fish and Plants (URS, 2004), (2) the BA for the Fern Valley Interchange project, Phoenix, Oregon (Hart Crowser, 2002), (3) the National Oceanic and Atmospheric Administration (NOAA) Fisheries internet database for listed species, and (4) correspondence with ODOT and ODFW biologists.

4. AGENCY COORDINATION AND INVOLVEMENT

This chapter includes a description of the coordination with, and involvement of, all local, regional, state, and federal agencies. In addition, proposed meetings and coordination are documented here.

4.1 TECHNICAL REPORT COORDINATION

The United States Fish and Wildlife Service (USFWS) provided a list of federal Endangered Species Act (ESA)-listed species and critical habitat in Jackson County including aquatic species (Appendix A). A list of database records provided by the Oregon Natural Heritage Information Center (ORNHIC) for the 5-mile radius search area also included aquatic species. A species list of federal and state aquatic species that may occur in the vicinity of the FVI project was developed. Species include those that are listed as endangered, threatened, proposed, or candidate under the federal and state ESA. Section 5, Affected Environment, provides a summary of each of these species, their habitat requirements, and whether there is suitable habitat for the species within the project area.

In addition, agency personnel for the ODFW were interviewed for information on fish and wildlife issues. Also, ODOT biologists have completed surveys in the project area in the past.

4.2 REGULATORY REQUIREMENTS

A review of the regulations and policies applicable to aquatic resources is necessary to determine the potential impacts that would require a permit and mitigation. The following table includes those regulations and associated agencies applicable to the regulation of aquatic resources.

TABLE 1: POTENTIAL REGULATORY REQUIREMENTS FOR WETLAND AND OTHER WATER IMPACTS

Regulation/Permit	Responsible Agency	Resource Studies	Regulated Resources
Federal			
National Environmental Policy Act (NEPA)	Federal Highway Administration (FHWA)	NEPA EA addressing natural resource conditions, impacts, and mitigation	All

TABLE 1: POTENTIAL REGULATORY REQUIREMENTS FOR WETLAND AND OTHER WATER IMPACTS

Regulation/Permit	Responsible Agency	Resource Studies	Regulated Resources
Endangered Species Act (ESA)	National Marine Fisheries Service (NOAA Fisheries); U.S. Fish and Wildlife Service (USFWS)	Biological Assessment (BA) addressing project impacts to listed species, species proposed for listing, and candidate species that could be effected by the project (formal or informal consultation)	Wildlife, plants, fisheries, and their habitat
Fish and Wildlife Coordination Act (FWCA)	USFWS; NOAA Fisheries; Oregon Department of Fish and Wildlife (ODFW)	Inter-agency consultation; identify impacts to fish and wildlife resources; and a review of recommend mitigation	Wildlife and fisheries and their habitat
Magnuson-Stevens Fishery Conservation and Management Act	NOAA Fisheries; Pacific Fisheries Management Council (PFMC)	Identify potential impacts to Essential Fish Habitat (EFH)	Commercially significant fisheries
Clean Water Act (CWA) Section 404 Individual Permit; Section 10 (Rivers and Harbors Act)	U.S. Army Corps of Engineers (USACE)	Alternatives analysis; wetland delineation report; wetland functions assessment and impact analysis; mitigation plan	Waters of the U.S., including wetlands
State			
Oregon State ESA	ODFW; Oregon Department of Agriculture (ODA)	Identify project impact to state-listed and candidate species	Wildlife, plants, fisheries, and their habitat
Oregon Fish Passage Law	Oregon Department of Fish and Wildlife (ODFW)	Approval of fish passage plans	Fisheries
Inwater Work Permits	Department of State Lands (DSL); Oregon Department of Fish and Wildlife (ODFW)	Regulation of permits for inwater work, establishment of inwater work periods and fish salvage	Fisheries, waterways, and wetlands
Collaborative Environmental and Transportation Agreement for Streamlining (CETAS)	Various state and federal resource agencies	Environmental stewardship, agency collaboration, project scoping, and NEPA documentation	Environmental resources
CWA Section 401 Water Quality Certification	Oregon Department of Environmental Quality (DEQ); U.S. Environmental Protection Agency (EPA)	Assess project compliance with state water quality standards; implement mitigation measures	Rivers, streams, other bodies of water

TABLE 1: POTENTIAL REGULATORY REQUIREMENTS FOR WETLAND AND OTHER WATER IMPACTS			
Regulation/Permit	**Responsible Agency**	**Resource Studies**	**Regulated Resources**
Local			
Jackson County Land Development Ordinance	Jackson County	Riparian setback of 50 feet; vegetation and tree cover retention standard of 50 feet	Class 1 and 2 streams
City of Phoenix Land Development Code / City Ordinance 751	City of Phoenix Planning Department	Erosion prevention and sediment control plan prior to approval of any building or grading permit that results in land or native vegetation disturbance within 50 horizontal feet of the top of bank of wetlands and other waters; riparian setback of 50 feet; regulation of construction within floodplains	Erosion control plan for all wetlands and other waters; riparian setback for Class 1 streams; floodplain regulations for all streams

4.2.1 Federal

The National Marine Fisheries Service (NMFS) is the regulatory agency for aquatic species under Section 7 of the Endangered Species Act. Additional stormwater requirements may be required by the ESA program, and those requirements would be disclosed in the ESA consultation process. Close coordination with NFMS would be required once a Preferred Alternative is chosen. However, through the Collaborative Environmental and Transportation Agreement for Streamlining (CETAS) process, NMFS has been involved and will continue to provide input into the preliminary process. Additionally, through CETAS and the Fish and Wildlife Coordination Act (FWCA), USFWS, ODFW, Oregon Department of Agriculture (ODA), and Corps of Engineers (Corps) have been included in this process. Additional meetings for the ESA consultation process will be required for the BA for aquatics.

The Federal Emergency Management Agency (FEMA) regulates construction within floodplains. These regulations and water-related areas that might have an effect on or be affected by aquatic resources are discussed further in the Water Resources Technical Report and the Wetlands Technical Report (URS, 2007b).

4.2.2 State

The Clean Water Act (CWA) regulates in-stream water quality. The Environmental Protection Agency (EPA) has authorized the DEQ to administer and implement the CWA policies and regulations. Section 401 of the CWA authorizes state water quality programs to certify that federal actions involving the award of licenses or permits will not violate applicable state water quality requirements. These water quality requirements are regulated by DEQ through its 303(d) Water Quality Limited program. Issues related to

the quantity of stormwater are regulated by DEQ through the National Pollutant Discharge Elimination System (NPDES) program in the CWA. Water quality and quantity regulations and wetland permitting and fill are discussed further in the Water Resources and Wetlands Technical Report (URS, 2007b).

ODFW and DSL regulate permits for in-water work, establishment of in-water work periods and fish salvage. ODFW administers the Oregon Fish Passage Law. An approved fish passage plan from ODFW is required for any action that may affect fish passage. DSL regulate those permits through the removal/fill permit application.

4.2.3 County

A riparian setback and vegetation and tree cover retention standard of 50 feet for Class 1 or 2 streams (fish-bearing streams, e.g., Bear Creek) are required by Sections 8.6.1 and 8.6.4 of the Jackson County Land Development Ordinance (Jackson County, 2007). In addition, according to Section 8.6.3, all bridge and stream crossings and removal or fill operations may require a review for compliance with Section 7.1.2, Floodplain Overlay, of the Jackson County Land Development Ordinance (Jackson County, 2007) prior to issuance of any development permits. Any required state or federal permit must be obtained prior to issuance of County development permits.

4.2.4 City

The City of Phoenix requires setbacks of 50 feet for buildings and 50 feet for overstory vegetation and 75 feet for understory vegetation along Class 1 streams (those that provide habitat for fish, e.g., Bear Creek and Coleman Creek) and setbacks of 25 feet for buildings and 50 feet for riparian vegetation along Class 2 streams (those that contain water at least 6 months of the year, e.g., Payne Creek). The City also requires an erosion prevention and sediment control plan prior to approval of any building or grading permit that results in land or native vegetation disturbance within 50 horizontal feet of the top of bank of wetlands and streams. The City also regulates construction within floodplains (City of Phoenix, 2004).

5. AFFECTED ENVIRONMENT

The Fern Valley Interchange project lies within the Bear Creek watershed Hydrologic Unit Code 1710030801(HUC# 1710030801) in the Klamath Mountain physiographic province, and includes three aquatic resources: Bear Creek, and two if its tributaries, Coleman Creek and Payne Creek. The action area affected environment will be discussed at the HUC-level scale. The affected environment included in the API will be discussed in three geographically distinct sub-areas: (1) west of I-5, (2) the interchange area, and (3) east of I-5. The API is shown in Figure 4.

5.1 WEST OF I-5

For the purposes of this analysis, the area "West of I-5" includes the API extending from: (1) Luman Road to the west side of OR 99 (including areas where the alignment enters Ray's parking lot, and E. Bolz Road), (2) north to the intersection of OR 99 and Coleman Creek, and (3) south to the southern terminus of the proposed alignment along OR 99. The environment located west of I-5 primarily consists of developed urban areas, and includes 3 aquatic resources: Coleman Creek, Bear Creek, and Payne Creek. A riparian reserve (Bear Creek Greenway) exists along Bear Creek for the entire length of the API.

5.1.1 Bear Creek

Bear Creek is located in a wide alluvial valley, flowing northwest approximately 28 River-Miles (RM) from its headwaters at Emigrant Creek through the cities of Ashland and Medford, to its mouth at the Rogue River. The Rogue River-Bear Creek confluence is approximately 15.0 RMs downstream of the project area (StreamNet, 2004). The Bear Creek sub-basin drains approximately 384 square miles. Elevations within the watershed range from 1,160 feet above sea level at the confluence of Bear Creek with the Rogue River to 7,533 feet at the summit of Mt. Ashland. Because of its proximity to I-5 and other urban features, the Bear Creek channel and associated floodplain have been manipulated and the stream is generally confined to a narrow meander (Figure 4).

The uplands of the Bear Creek watershed consist of highly erodible soils that result in high natural suspended sediment loads (MB&G, 2001). Extensive agricultural and urban development in the watershed have contributed additional sediment load. The cumulative result of these practices is poor water quality caused by elevated turbidity, and embedded substrates that have become generally unsuitable for spawning salmonids and incubating eggs. Within the API, Bear Creek in-stream substrate is composed primarily of bedrock, cobble, and gravel, with local concentrations of highly embedded small boulders and cobbles that limit spawning and rearing habitat for fish (RVCOG, 1995) Off-channel habitat in Bear Creek is non-existent in the API, and in-stream LWD is lacking in sufficient quantities to create stream channel complexity and adequate refugia for juvenile salmonids (RVCOG, 1995).

Along Bear Creek, riparian zones have been narrowed and/or degraded to the extent that LWD recruitment potential is very low, and shading and other riparian functions are compromised system-wide (MB&G, 2001). Riparian areas within the vicinity of the project are generally narrow, typically one to three mature trees in width, with agricultural fields or development encroaching on the edges. Many reaches have only Himalayan blackberry thickets growing immediately adjacent to the active channel (Shapiro, 2001). In the API, Bear Creek flows through linear Bear Creek Greenway, which was intended to provide an unbroken riparian corridor along approximately 30 miles of Bear Creek (MB&G, 2001), and which may serve to provide long-term protection of the riparian zone. The creek is constrained and channelized upstream of the API for approximately 3,000 feet by a trailer park to the north and Bear Creek Drive to the south.

The Bear Creek system is subject to irrigation diversion, upland and riparian vegetation clearing, and the addition of impervious surface, resulting in substantial changes to natural flow regimes (Shapiro, 2001). Analysis of a storm hydrograph for Bear Creek at a downstream gauging station reveals flashy flows following precipitation events. High flows occur in the summer as water is released from Emigrant Reservoir, and in the spring and summer, irrigation diversions can cause water levels to drop below normal base flow levels. This results in a highly variable flow regime, which can reduce habitat quality as high flows scour the stream channel, and limit habitat availability as low flows de-water habitat components

Bear Creek is currently on the DEQ 303(d) List of Water Quality Limited Water Bodies from its mouth to RM 26.3 (including the API) for fecal coliform, *E. coli*, and temperature (DEQ, 2004). Monthly average maximum water temperatures often approach or exceed lethal levels for sustaining aquatic species, of 77°F in Bear Creek.

5.1.2 Coleman Creek

Coleman Creek is located in the northwest section of the API, where it crosses OR 99 in the town of Phoenix (Figure 4). Coleman Creek is characterized by heavily armored or eroding banks as it travels through residential areas to its confluence with Bear Creek. Mature riparian trees are present above the intersection of OR 99 and Coleman Creek, and downstream to the confluence with Bear Creek. Coleman Creek is currently on the Oregon DEQ 303(d) List of Water Quality Limited Water Bodies from its mouth to RM 6.9 (including the API) for fecal coliform (year around) and temperature (summer) (DEQ, 2004).

5.1.3 Payne Creek

Payne Creek flows from the northeast through roadside ditches, and through culverts under I-5 and several industrial areas (Figure 4). The creek flows under Fern Valley Road through a newly lengthened culvert, then enters approximately 2,000 feet of pipes and culverts running underneath a truck stop, I-5, secondary roads, and finally outfalls to a channel through a grass field. These pipes and culverts are a barrier to fish passage

upstream in Payne Creek (Hart Crowser, 2002). The area west of I-5 includes approximately 350 feet of Payne Creek, located directly upstream of it's confluence with Bear Creek.

Payne Creek is currently DEQ 303(d) listed from its mouth to its headwaters for temperature (summer) and fecal coliform from RM 0-2.1 (including API) (DEQ, 2004). The Total Maximum Daily Load (TMDL) for dissolved O_2 has been approved for RM 1-2.1 (upstream of API). The frequency of pool occurrence in Payne Creek in the project vicinity is very low, and sedimentation in the lower Payne Creek basin has severely limited the quality of those pools.

5.2 INTERCHANGE AREA

For the purposes of this analysis, the interchange area includes a 100-foot buffer around the proposed alignments, and is essentially the same with both alternatives, extending: (1) west to the intersection of Luman Road and Fern Valley Road, (2) east to the intersection of N. Phoenix Road, (3) south along I-5 to the southern terminus of the proposed alignment, and (4) north along I-5 to the northern terminus of the proposed alignment (Figure 4).

The interchange area consists of developed urban areas, agriculture, and one aquatic resource: Payne Creek. The API extends from the east side of the northbound off-ramp to the confluence with Bear Creek. The project impacts would be within the ODOT right-of-way, which has previously been developed with the existing interchange. The majority of Payne Creek included in the interchange area is contained within an underground pipe.

5.3 EAST OF I-5

For the purposes of this analysis, the area east of I-5 includes a 100-foot buffer around the proposed alignments which is the same for both alternatives, extending: (1) east of I-5 to Breckenridge Road, (2) south to the southern terminus of the proposed alignment south of the intersection of Payne Creek and South Phoenix Road, and (3) north to the northern terminus of the proposed alignment where it re-enters existing North Phoenix Road (Figure 4).

The API in east of I-5 consists primarily of agriculture and commercial land, and includes two aquatic resources: Payne Creek and Medford Canal. Payne Creek is located in the southern portion of the project area and Medford Canal is located in the eastern portion of the project area. The area has been rapidly developing recently with commercial interests stemming from growth in Phoenix and Medford areas. The Terrestrial Resource Report provides a full discussion of the vegetation and wildlife species present in the areas (URS, 2007)

5.4 ENDANGERED SPECIES ACT CONSULTATION

Table 2 below details the aquatic species identified as potentially occurring in proximity to the API or within the Action Area. The proposed action has the potential to impact ESA listed coho salmon and designated critical habitat for coho. The project could also affect steelhead and Chinook salmon, which are not listed species. A BA will be completed when the preferred alternative has been selected. These species, critical habitat, and Essential Fish Habitat (EFH) will be examined in detail in that assessment.

TABLE 2: ESA LISTED AQUATIC RESOURCES OCCURRING IN THE PROJECT VICINITY

Common Name ***Scientific Name*** **Aquatic Species Table 1**	**Federal Status[1]**	**State Status[2]**	**Runs Present**	**Critical Habitat Designated**	**Critical Habitat Present in Project Vicinity (type)[3]**	**Location of project Actions**
Coho Salmon *Oncorhynchus kisutch* **(S. Oregon / N. California Coast)**	LT	--	NA	Yes	Yes[4] Bear, Coleman, and Payne Creeks	Coleman Creek, Bear Creek (West of I-5)
Steelhead *Oncorhynchus mykiss* **(Klamath Mountains Province)**	--	--	Summer	No	No	Coleman Creek, Bear Creek (West of I-5)
Chinook Salmon *Oncorhynchus tshawytscha* **(S. Oregon / N. California Coast ESU)**	--	--	Fall	No	No	Bear Creek (West of I-5)

[1] Federal Listings: LE = Endangered, LT = Threatened, C = Candidate Species,
[2] State Listings: LE = Endangered, LT = Threatened
[3] StreamNet 2007, USFWS Multnomah County List 2007, ORNHIC Project Species List 2007
[4] While Critical Habitat has been designated for coho salmon, spawning / rearing habitat is not mapped in the project vicinity.

5.4.1 Bear Creek

Bear Creek supports several anadromous fish species, including coho salmon (*Oncorhynchus kisutch)*, winter and summer steelhead (*Oncorhynchus mykiss ssp)*, and fall chinook (*Oncorhynchus tshawytscha*). Neither summer steelhead (Klamath Mountain Province DPS) nor fall Chinook (Southern Oregon Coastal and Northern California Coastal ESU) are listed under the ESA. Coho salmon (Southern Oregon/Northern California Coast ESU) are currently listed as threatened under the Federal ESA but are

not listed under the State ESA. Bear Creek is designated Critical Habitat for the Southern Oregon/Northern California Coasts coho salmon ESU.

Coho salmon enter the Bear Creek watershed in November and December and spawn in available habitat from the mouth of Bear Creek to its headwaters near Emigrant Creek (MB&G, 2001). The first 10 miles of Bear Creek function primarily as a migration corridor, providing passage to spawning and rearing areas above the former Jackson Street Dam, which was removed. Coho salmon have been known to occur up to approximately RM 27 of Bear Creek (StreamNet, 2004). Spawning of coho salmon occurs primarily in Ashland Creek, a tributary to Bear Creek upstream of the project area (MB&G, 2001). The ODFW Salmon and Trout Enhancement Program (STEP) released approximately 8,000 coho salmon from hatch boxes in upper Bear Creek for 7 years and discontinued the practice in 1999. Observations suggest that approximately 25 percent of Bear Creek's returning adult coho salmon originated from the STEP program during this period (MB&G, 2001). Spawning typically occurs in low-gradient (less than 3 percent) tributary streams with gravel size ranging from 1.5 to 5 inches in diameter and a water depth that averages approximately 7 inches (Sandercock, 1991).

5.4.2 Coleman Creek

Coleman Creek supports summer steelhead trout and listed coho salmon. Coleman Creek is designated Critical Habitat for the Southern Oregon/Northern California Coasts coho salmon ESU.

5.4.3 Payne Creek

Payne Creek has historically supported anadromous salmonids, (including cutthroat trout (*O. clarki*), steelhead, and coho salmon). Today, only the lower reaches of Payne Creek between the I-5 Culvert and the confluence of Bear Creek are known to support salmonids. Payne Creek is designated as critical habitat by the NMFS. The absence of fish in Payne Creek is likely due to the presence of barriers that prevent fish from entering the stream. LWD is not present in Payne Creek within the API, and riparian zones have been depleted of sources for LWD. These reduced or lacking habitat elements limit the potential to support resident or anadromous fish if passage were to be re-established in the system.

The ODFW in-water work period for Bear Creek, Payne Creek, and Coleman Creek is June 15 to September 15 (ODFW, 2000).

5.4.4 Medford Canal

The Medford canal is a man-made feature used for irrigation water conveyance. The canal runs adjacent to the east side of the proposed interchange, and intersects Payne Creek to the north of Fern Valley Rd. There are no ESA-listed fish present in Medford canal.

5.4.5 Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) includes a mandates that NMFS must identify essential fish habitat (EFH) for federally managed marine fish. EFH for the Pacific coast salmon fishery means those waters and substrate necessary for salmon production needed to support a long-term sustainable salmon fishery and salmon contributions to a healthy ecosystem. To achieve that level of production, EFH includes all those streams, lakes, ponds, wetlands, and other currently viable water bodies and most of the habitat historically accessible to salmon in Washington, Oregon, Idaho, and California. In the estuarine and marine areas, salmon EFH extends from the nearshore and tidal submerged environments within state territorial waters out to the full extent of the exclusive economic zone (EEZ; 230 miles) offshore of Washington, Oregon, and California north of Point Conception. Freshwater EFH for Pacific salmon includes all those streams, lakes, ponds, wetlands, and other water bodies currently, or historically accessible to salmon in Washington, Oregon, Idaho, and California, except areas upstream of certain impassable man-made barriers, as identified by the Pacific Fishery Management Council (PFMC), and longstanding, naturally-impassable barriers (i.e., natural waterfalls in existence for several hundred years). Bear, Coleman, and Payne Creeks are considered freshwater EFH areas for Pacific salmon.

6. ENVIRONMENTAL CONSEQUENCES

This chapter discusses the direct, indirect, cumulative, and construction (i.e., temporary) impacts associated with the project. In evaluating the impact of the project on aquatic resources, the impacts were assessed based on:

- Direct effects occur within the footprint of the API, including construction-related activities that are short-term. Indicators for effects on aquatic resources were measured by changes in water quality, in-water noise, harassment, habitat access, habitat elements, channel hydraulics, flow hydrology, and overall watershed conditions. Where possible, a quantitative assessment of changes in the baseline using the indicators described above was disclosed, and a qualitative assessment assigned based on the metrics outlined in Table 3.

- Indirect effects focus on changes to ecological systems resulting in long-term habitat alterations and anticipated changes in human activities, including changes in land use.

- Cumulative impacts focus on the incremental contribution of this project to the past, present, and future foreseeable actions in the Action Area.

TABLE 3: IMPACT INTENSITY THRESHOLD CRITERIA

Small	Environmental effects would not be detectable or would be so minor that they would neither destabilize nor noticeably alter any important attribute of the resource.
Medium	Environmental effects would be sufficient to alter noticeably, but not to destabilize, important attributes of the resource.
Large	Environmental effects would be clearly noticeable and would be sufficient to destabilize important attributes of the resource.

In addition, a comparison of the impacts associated with the two design alternatives is summarized in table format (Tables 4 through 6) at this end of this section. Due to the similarities of the impacts associated with the alternatives, this report is organized in a manner to mimic the affected environment section and compare the differences in the alternatives. This section is organized to compare the alternatives west of I-5, in the interchange area, and east of I-5.

Project-related impacts on water quality are assessed in a separate water resources technical report (URS, 2007b). Project-related impacts to wildlife, including further information on vegetation and habitat quality for Bear and Payne Creeks, are assessed in a separate terrestrial biological resources report (URS, 2007a).

6.1 NO-BUILD ALTERNATIVE

The No-Build Alternative would have no temporary impacts to current biological baseline conditions for aquatic species or habitat. Additionally, no long-term changes to current biological baseline conditions for aquatic species or habitat would occur as a result of the No-Build Alternative. Growth and development are expected to continue in the API without construction of the interchange. Direct impacts to aquatic resources and their functions from this growth are probable.

6.2 N. PHOENIX THRU AND FERN VALLEY THRU ATERNATIVES

Project actions associated with both the N. Phoenix Thru and Fern Valley Thru Alternatives have the potential for similar direct effects to both Bear Creek and Coleman Creek (located west of I-5 and in the interchange area). Potential effects to Payne Creek differ for each alternative in areas east of I-5, with a greater likelihood of impacts occurring from the Fern Valley Thru Alternative. For this analysis, disclosure of those impacts that are common to the alternatives are examined. The differences in the area east of I-5 are disclosed and the difference in the alternatives compared by alternative and geographic area.

6.2.1 Project Actions West of I-5 and the Interchange Area

Project actions that may result in temporary and long-term impacts to aquatic resources west of I-5 and in the interchange area for both build alternatives are discussed below. Potential temporary impacts are those generally associated with construction actions, whereas potential long-term impacts are associated with stormwater-related effects or replacement of the existing bridge, which are permanent in nature. Project design features listed below are common for both build alternatives and the two geographic areas (west of I-5 and the interchange area). General mitigation measures are included in the following discussion, and then are expanded in Section 7, Summary of Biological Mitigation and Conservation Measures.

Bear Creek

Removal of the Existing Bridge. The existing Bear Creek Bridge does not span the OHW or the 100-year floodplain. Two bridge bents are located below OHW. Two bridge bents located on the west side of Bear Creek are located within the 100-year floodplain, and also function as a retaining wall for the Bear Creek Greenway. Four piles located on the east side of Bear Creek are also located within the 100-year floodplain.

Removal of the two existing bents within the channel would require in-water work isolation. The in-water work area for each bent would be completely isolated from streamflow using diversion structures such as sandbags, biobags, or coffer dams. The bents would either be cut flush to bedrock, or if in an area characterized by the presence of alluvial material, cut 2 feet below the stream bottom and backfilled with native

substrate. The potential disturbance to the creek channel would be limited to the existing footing and surrounding work area of each bent.

Temporary Work Structures. Removal of the existing bridge would require both the installation of piles to support a demolition/containment platform, and a temporary work bridge. Temporary work structures would require installation of piles below OHW. Consequently, all work would be conducted during the in-water work period (June 15-September 15, ODFW, 2000), and within in-water work isolation areas.

Construction of New Bridge. The new bridge would not span the 100-year floodplain of Bear Creek; however, preliminary design indicates that the bents of the new bridge would be located outside the OHW mark of Bear Creek. Minimal amounts of trees (less than 8 inches in diameter) may be removed in the construction of the temporary and new bridge.

No in-water work would occur during the installation of the new bridge; however, upon completion, all temporary work structures (with piles located below OHW) would be removed. Removal of temporary work structures would occur during the in-water work period (June 15-September 15, ODFW, 2000). All upland work areas would be contained with appropriate erosion control measures (Section 7). An ODFW-approved fish passage plan for both the new bridge and any temporary bridges would be required.

It is anticipated that a detour bridge would ***not*** be needed.

Reconstruction of the Bear Creek Greenway Access Ramps connecting the Greenway Trail to Fern Valley Road. Due to the new Bear Creek Bridge rising to a new level, the access ramps to the Bear Creek Greenway Trail would have to be reconstructed to accommodate the additional rise. No riparian trees would likely be removed to accommodate the minor expansion of the access ramps. It is not known whether the realignment of access ramps would result in an increase of net impervious surface, but is expected to be a no net gain. All work areas would be contained with appropriate erosion control measures (Section 7).

Moving Power lines. Power lines in the vicinity of the Bear Creek Bridge may have to be moved as a result of the proposed actions. Unless power lines can be located on the new bridge structure, riparian trees would have to be removed.

Coleman Creek

Construction of Access Road near Coleman Creek. Construction of a new road to access the mobile home park would occur approximately 50 feet from Coleman Creek. All work would be conducted at a distance from the waterway sufficient to assume the potential for affects from these actions is low. Additionally, water quality in Coleman Creek would be protected during construction through implementation of an Erosion and Sediment Control Plan (ESCP).

Widening of OR 99. The widening of OR 99 to the intersection of Coleman Creek would entail roadwork adjacent to the waterway. No changes would be made to the existing culvert as a result of this work. Consequently, compliance with Oregon State Fish Passage Law is not required.

Payne Creek

Expansion of north-bound off-ramp and south-bound on-ramp. All construction actions would occur in areas where Payne Creek is conveyed to an underground pipe. No project actions are expected to affect Payne Creek in the area West of I-5 and the Interchange for either action alternatives.

6.2.2 East of I-5

Payne Creek

Construction of new roadway adjacent to Payne Creek. Only the Fern Valley Thru Alternative proposes construction of a new roadway adjacent to a waterway east of I-5 (Payne Creek).

Widening of roadway north of Payne Creek on S. Phoenix Road. This is proposed for both build alternatives.

Removal of box culvert at the Fern Valley Road crossing of Payne Creek. This action only pertains to the Fern Valley Thru Alternative. Removal of the existing culvert would require impoundment and conveyance of flow around the dewatered work area, and fish salvage (non-listed species). Removal of the existing culvert would require compliance with the Oregon State Fish Passage Law.

Installation of a box culvert north of Fern Valley Road and east of N. Phoenix Road. This action would require compliance with the Oregon State Fish Passage Law and an ODFW approved fish passage plan would be required. This action only pertains to the Fern Valley Thru Alternative. Installation of the new box culvert would require impoundment and conveyance of flow around the dewatered work area and fish salvage (non-listed species).

No ESA-listed fish are present in Payne Creek. Conservation measures would still be implemented, and project actions would comply with Oregon State Fish Passage Law. An analysis of potential impacts is provided below. A summary of potential impacts is provided in Table 6.

6.2.3 Direct Impacts

Bear Creek

The presence of coho salmon in Bear Creek would invoke an ESA Section 7 consultation to determine to what extent the alternatives may affect species protected under ESA. Additionally, Bear Creek is designated as Critical Habitat for the Southern Oregon/Northern California Coasts ESU. An analysis of potential temporary and long-term direct impacts to aquatic resources, including listed coho and designated critical habitat is provided below. A summary and comparison of potential impacts by alternative is provided in Table 4 at the end of this Section. The direct and indirect impacts would be disclosed quantitatively and qualitatively using Table 4 and the indicators discussed in Section 6.0.

Water Quality. Effects on water quality from the construction activities both short- and long-term for aquatic resources are temperature, sedimentation, turbidity, chemical contamination, and construction related impacts. Both alternatives would affect water quality the same in the I-5 West and Interchange area. An overall effect to water quality for both alternatives is expected to have a small direct impact that would be construction-related.

Stream Temperature. Vegetation removal along the riparian corridor has the potential to alter stream temperatures by increasing direct solar radiation on to the waterbody. These affects are temporary in nature, and expected to attenuate as the riparian community becomes reestablished. Minor removal of riparian vegetation may occur as a result of any actions pertaining to the Bear Creek Bridge.

Potential direct effects of project actions on stream temperature are expected to be negligible to small and short-term construction-related, and would likely not be detectable from background temperature. No indirect effects on water temperature that would result in long-term habitat alteration are expected due to the short-term and minimal effect the alternatives would have on stream temperature (see discussion on indirect impacts below).

Sedimentation / Turbidity. Temporary increases in sedimentation and turbidity may result from disturbance of bottom substrates and mobilization of sediments. Potential effects may result from installation of piles to support a demolition/ containment platform, removal of the existing bridge piles within OHW, and the installation of a temporary work bridge, also below OHW. Disturbance of bottom substrates and mobilization of sediments may occur from installing work area isolation equipment (i.e., sandbags, bio-bags, or coffer dams). Additional increases in sedimentation may result from precipitation-induced run-off from exposed soils in riparian or upland habitat.

The potential net increase of impervious surface resulting from bridge width expansion may result in increased stormwater and sediment transport to Bear Creek. These affects are long-term; the extent to which would be determined by the amount of new impervious surface, and potential increase in untreated run-off. The project stormwater treatment goal is to have a net zero water quality impact to Bear Creek. It is assumed that potential long-term impacts from increased impervious surfaces would be negligible to small with mitigation.

Increases in sediment/turbidity would generally be of limited duration, intensity and severity, and would be restricted to areas directly downstream of the action and associated with construction activities.

Potential direct and indirect effects of project actions on sediment and turbidity are expected to be short-term and negligible to small with no indirect effects, and likely not be detectable from baseline conditions over the long term (see

Construction-Related Debris. Because of the amount of over-water work required for removal and replacement of the Bear Creek Bridge, it is possible that construction-related debris could enter Bear Creek. These effects have the potential to be temporary or long-term, depending on the specific material entering the waterway. However, with the use of BMPs and mitigation (Section 7), this impact is not expected to occur.

discussion on indirect impacts below).

Chemical Contamination. Chemical contamination resulting from gasoline, fuel, or hydraulic fluid leaking from heavy machinery operating below OHW or in riparian areas may occur. These effects have the potential to be temporary or long-term, depending on the toxicity of material entering the waterway. It is expected that Best Management Practices (BMPs) would reduce the likelihood that any chemical contamination would occur in the streams.

Additional chemical contamination may result from a net increase of impervious surface. These effects are long-term; the extent to which would be determined by the amount of new impervious surface, and potential increase in untreated run-off. The project stormwater treatment goal is to have a net zero water quality impact to Bear Creek. It is assumed that potential long-term impacts from increased impervious surfaces would be negligible to small.

In-Water Noise. The removal of bridge piles located below OHW may result in temporary noise-related disturbance to aquatic species within the stream channel. Even though all work performed below OHW would be conducted within isolated areas, the potential to affect aquatic habitat remains due to the proximity to the waterbody. Work area isolation measures should prevent such construction-related disturbance from rising to the level of take.

Although replacement of the bridge would not require installation of bridge piles below OHW, the proposed actions would likely require construction measures capable of producing noise sufficient to disturb aquatic species. The proposed action would include the use of heavy machinery within 25 feet of the waterbody and would constitute a potential effect to aquatic habitats. However, based on the magnitude and duration (timing) and the implementation of BMPs and mitigation (sound pressure wave abatement), noise is expected to be a negligible to small impact.

Visual Disturbance (Harassment). The presence of equipment, people, and activities related to the removal and replacement of the Bear Creek Bridge has the potential to influence behavior or cause disturbance to aquatic species. Construction-related visual disturbance is expected to be temporary and limited to the duration of construction activities, and is expected to have a direct or potential indirect effect on the species.

Habitat Access (Physical Barriers). No barriers to fish passage currently exist in Bear Creek downstream of the Fern Valley Road crossing. The construction of a new bridge and temporary work bridge would include the development and submittal of a Fish Passage Plan as required by the Oregon Fish Passage Law. Installation of footings to support temporary work platforms and dewatering of the work area may temporarily affect habitat access or fish passage temporarily. Minimization measures would be implemented to reduce potential impacts. These impacts would be short-term and construction-related. No long-term direct or indirect impacts are expected beyond those already occurring in the API.

With the removal of old bridge piles below OHW, the proposed actions would decrease the number of footings and pilings that could be viewed as barriers to fish passage.

Habitat Elements. Habitat elements consist of those elements that provide functioning habitat for aquatic species. The baseline conditions for Bear Creek are not expected to be altered from implementation of either alternative, and impacts to habitat elements are expected to be small and short-term, construction-related.

> **Substrate.** Removal of the two bridge bents located below OHW would result in localized modifications to existing substrate. The bents would either be cut flush to bedrock, or if in the area is characterized by the presence of alluvial material, cut 2 feet below the stream bottom and backfilled with native substrate. Bear Creek in-stream substrate is composed primarily of bedrock, cobble, and gravel, with local concentrations of highly embedded small boulders and cobbles that limit spawning and rearing habitat for fish. The proposed action would not be restorative of previously degraded substrate function; however, the potential does exist to replace native substrate in areas previously occupied by bridge bents.
>
> The proposed actions have the potential for beneficial long-term effects as a result of the removal of bridge piles below OHW.

LWD. Project actions would not affect existing levels of LWD or refugia within the channel. Large woody debris is presently lacking in sufficient quantities to create channel complexity and adequate refugia for juvenile salmonids. Project actions would not be restorative of lost function, as current plans do not include placement of LWD within the steam channel.

Pool Frequency / Quality. The proposed project would not affect pool frequency or quality in Bear Creek. Because the bridge bents located below OHW are in riffle habitat, their removal would not result in the creation of pool habitat.

Off-Channel Habitat. The proposed actions would not affect off-channel habitat in Bear Creek. Off-channel habitat is not present within the action area, and project actions would not include the creation of off-channel habitat.

Channel Conditions and Dynamics (Hydraulics). Channel conditions and dynamics may be affected by installation of new bridge bents, rip rap, or a retaining wall placed within the 100-year floodplain. It is not known at this design stage what elements would be present that could result in impacts to channel conditions and dynamics at high flows. In order to minimize potential effects to channel conditions and dynamics, bridge design and installation would be in compliance with Oregon State Fish Passage Law. The effects on channel conditions and dynamics include changes in width-to-depth ratios, streambank conditions, and floodplain connectivity. Neither alternative would directly or indirectly change the channel conditions or dynamics.

Width-to-Depth Ratio and Streambank Condition. A beneficial long-term effect to channel conditions and dynamics could result from the removal of bridge piles below OHW; however, quantification of hydraulic or velocity changes resulting from bent removal is beyond the scope of this technical report.

In addition to structural elements, potential net increase in stormwater runoff may result in long-term effects to channel conditions and dynamics. The project stormwater treatment goal is to have a net zero water quality impact to Bear Creek. Stormwater detention would be provided to control stormwater quantity impacts to Bear Creek. It is assumed that potential long-term impacts from increased impervious surfaces would be negligible.

Floodplain Connectivity. No alteration of floodplain connectivity or fragmentation of the existing floodplain along Bear Creek would result from the implementation of either build alternative.

Flow / Hydrology - Peak / Base Flows and Drainage Network Increase. The project would result in a net increase of impervious surface. The project stormwater treatment goal is to have a non-detectable impact to Bear Creek with respect to water quality and changes to flow regime. Stormwater treatment and detention/retention/infiltration features would be used to manage stormwater runoff from the project area. Even without these features, stormwater runoff from the project area is small with respect to storm flows in Bear Creek, so impacts to water quality or quantity

from stormwater runoff are not likely to be detectable. Reduction in infiltration volumes from the project area that could affect summer baseflow is expected to be the primary residual impact; however, this impact is also not expected to be detectable because of the relative difference between contributing area from the Bear Creek watershed vs. the project area.

Watershed Conditions. Overall watershed conditions are affected by direct effects of the alternatives on all of the above parameters. The project is not expected to directly affect the watershed conditions based on the scale and intensity of the project. Indirectly, some small effect on the watershed conditions could be expected, but not to the point of affecting the long-term watershed ecological conditions (see discussion of indirect impacts below).

Road Density and Location. Project actions, such as new bridge and roadway construction, could affect this parameter; however, data on the extent of new roadway and resulting net increase of impervious surface is expected to be small. Indirect effects of the interchange and expansion of access could effect how people use the area and change land uses. This indirect effect is expected to be small (see discussion on indirect impacts below).

Disturbance History. The proposed actions would occur within lands that have been previously disturbed, and are now primarily residential or industrial. Temporary and long-term project effects to baseline conditions would be negligible.

Riparian Reserves: Project actions would include minimal removal of riparian trees within the Bear Creek Greenway. This direct effect is considered small, and mitigation to restore the area would make it negligible.

Coleman Creek

Project actions that may affect Coleman Creek include the construction of a new access road connecting a mobile home park (Coleman Creek Estates, Tax Lot #805) to OR 99, and the widening of OR 99 to the edge of the Coleman Creek crossing (excluding the bridge) to accommodate new bike lanes. Effects on Coleman Creek are the same for both build alternatives.

Water Quality. Both alternatives would affect water quality the same west of I-5. Overall effects to water quality in Coleman Creek for both alternatives are expected to have a small direct impact that would be construction-related. Table 5 compares alternative differences for aquatic indicators in Coleman Creek.

Stream Temperature. Implementation of either build alternative would not have an effect on stream temperature in Coleman Creek based on the fact that no removal of vegetation, minimal construction-related sedimentation/turbidity, no chemical contamination, and no construction debris are expected with implementation of BMPs and construction mitigation.

Sedimentation / Turbidity. No sedimentation/turbidity impacts to Coleman Creek are anticipated for either build alternative.

Construction-Related Debris. No construction-related debris impacts to Coleman Creek are anticipated for either build alternative.

Chemical Contamination. No impacts from chemical contamination with implementation of BMPs are expected.

In-Water Noise. No noise-related effects to species within Coleman Creek are expected because this project does not include in-water work in this stream.

Visual Disturbance. No visual effects or species harassment is expected due to the limited work anticipated in the area around Coleman Creek and the negligible increase in short-term, construction-related noise.

Habitat Access (Physical Barriers). The culvert that passes Coleman Creek under OR 99 is currently listed as a complete (impassible) fish barrier. No in-water or over-water work is planned for this project. Consequently, no improvements per Oregon State Fish Passage Law would be made to the existing culvert at this time. Impacts to habitat access in Coleman Creek are expected to be negligible.

Habitat Elements (Large Woody Debris). No effect to the habitat elements in Coleman Creek are expected that would change the habitat elements from the existing conditions.

Substrate. Project actions would not affect existing substrate in Coleman Creek.

Large Woody Debris. Project actions would not affect existing levels of LWD within the channel.

Pool Frequency / Quality. The proposed project would not affect pool frequency or quality in Coleman Creek.

Off-Channel Habitat. The proposed actions would not affect the availability or quality of off-channel habitat in Coleman Creek.

Channel Conditions and Dynamics (Hydraulics). No structural elements that could potentially affect channel conditions and dynamics would result from the two build alternatives.

Width/Depth Ratio and Streambank Condition. No impacts anticipated to Coleman Creek.

Floodplain Connectivity. No substantial alteration of floodplain connectivity or fragmentation of the existing floodplain along Coleman Creek would result from the two build alternatives.

Flow / Hydrology - Peak / Base Flows and Drainage Network Increase. No effect to the hydrology or drainage in Coleman Creek is anticipated based on the activities of the build alternatives, which avoid any ground disturbing or in-water work in or around Coleman Creek.

Watershed Conditions.

Road Density and Location. Project actions in the vicinity of Coleman Creek could affect this parameter; however, data on the extent of new roadway and resulting net increase of impervious surface is expected to be small. Indirect effects of the interchange and expansion of access could effect how people use the area and change land uses. This indirect effect is expected to be small (see discussion of indirect impacts below).

Disturbance History. The proposed actions would occur within lands that have been previously disturbed and are now primarily residential or industrial. Temporary and long-term effects to baseline watershed conditions would be negligible.

Riparian Reserves. Project actions would not include the removal of riparian trees near Coleman Creek.

Payne Creek

Impacts to Payne Creek would be similar for both build alternatives in the west of I-5 and in the interchange area as described above and in Table 6. Although roadway expansion and new impervious surface is proposed for both build alternatives, all road work west of I-5 and in the interchange area would occur where Payne Creek has already been conveyed through an underground culvert.

East of I-5, potential impacts from the Fern Valley Thru Alternative would be greater due to construction of a new crossing over Payne Creek. Where impacts differ between the alternatives, the aquatic indicators have been pointed out in the discussion below and in Table 6 following this section.

Water Quality. Both build alternatives would affect water quality in Payne Creek similarly, except that the Fern Valley Thru Alternative could impact more aquatic indicators than the N. Phoenix Thru Alternative east of I-5. Still, the overall effect to water quality for both alternatives is expected to be a small direct impact that would be construction-related. Discussion of how these attributes can be affected by the alternatives is provided above and not repeated from the previous discussion.

Stream Temperature. East of I-5, roadway and bridge construction associated with the Fern Valley Thru Alternative would likely require vegetation removal during installation of box culvert and construction of new roadway adjacent to Payne Creek. The N. Phoenix Thru Alternative would not require removal of vegetation in or near Payne Creek.

Sedimentation / Turbidity. Temporary increase in sedimentation and turbidity may result from mobilization of substrates due to roadway construction, and removal and replacement of the existing box culvert associated with the Fern Valley Thru Alternative. These effects, which would be of limited duration, intensity and severity, and would be restricted to areas directly downstream of the action, are expected to be negligible or small and short-term.

Construction-Related Debris. Because of the proximity of road construction to Payne Creek with the Fern Valley Thru Alternative, and the extent of in-water and over-water work, construction-related debris may enter the waterway. The effects have the potential to be temporary or long-term, depending on the specific material entering the waterway, but are expected to be no effect with implementation of BMPs and mitigation (See Section 7).

Chemical Contamination / Nutrients. The potential for chemical contamination resulting from gasoline, fuel, or hydraulic fluid from heavy machinery operating on or adjacent to Payne Creek and below OHW does exist. These effects have the potential to be temporary or long-term, depending on the toxicity of material entering the waterway, but are expected to have no impact with implementation of BMPs.

In-Water Noise. No effects from noise are expected in Payne Creek due to absence of species.

Visual Disturbance. Visual disturbance would not occur due to the absence of fish in Payne Creek.

Habitat Access (*Physical Barriers).* Although a complete fish passage barrier exists in Payne Creek downstream of the proposed actions, the new box culvert would comply with Oregon State Fish Passage law and would provide fish passage in the event that fish passage is restored downstream.

Habitat Elements. The Fern Valley Thru Alternative is expected to have a minor impact on the loss of vegetation for the construction along Payne Creek for this indicator. The N. Phoenix Thru Alternative would not affect the habitat elements of Payne Creek.

Substrate. Removal of the existing culvert in Fern Valley Thru Alternative would temporarily disturb bottom substrates. The new box culvert would comply with Oregon State Fish Passage Law, which would ensure that bottom substrates in both the area where the culvert is removed and replaced are maintained or improved.

Potential long-term benefits to localized substrates would likely result from construction of the Fern Valley Thru Alternative.

Pool Frequency / Quality. It is not known at this time whether the proposed actions associated with the Fern Valley Thru Alternative would affect pool

frequency or quality in Payne Creek. Because access to private property where the proposed action would occur was not possible, channel conditions at the exact location where the culvert would be placed are not known. However a negligible effect to pool frequency and quality would be anticipated for the Fern Valley Thru Alternative and no effect would be associated with the N. Phoenix Thru Alternative.

Off-Channel Habitat. The proposed actions would not affect off-channel habitat in Payne Creek due to the type of construction and the area specific to the API.

Channel Conditions and Dynamics (Hydraulics).

Width/Depth Ratio and Streambank Condition. Channel conditions and dynamics may experience long-term effects from the removal of existing box culvert and installation of new box culvert in the Fern Valley Thru Alternative. Installation of structural elements, such as culverts, would likely simplify habitat and could increase stream velocity along the structure. In order to minimize potential affects resulting from the installation of a new culvert, this action would follow design standards compliant with Oregon State Fish Passage Law.

The project stormwater treatment goal is to have a net zero water quality impact to Payne Creek. Stormwater detention would be provided to control stormwater quantity impacts to Payne Creek. It is assumed that potential long-term impacts from increased impervious surfaces would be negligible for both alternatives even though there would be a greater amount of impervious surface for the Fern Valley Thru Alternatives.

Floodplain Connectivity. No substantial alteration of floodplain connectivity or fragmentation of the existing floodplain along Payne Creek would result from either of the build alternatives.

Flow / Hydrology.

Peak / Base Flows / Drainage Network Increase. Either of the build alternatives would result in a net increase of impervious surface (higher for the Fern Valley Thru Alternative); however, it is assumed that potential long-term impacts from increased impervious surfaces would be negligible with implementation of stormwater treatment.

Watershed Conditions.

Road Density and Location. Project actions, such as roadway construction could affect this parameter. This would be a negligible to small impact for both alternatives.

Disturbance History. The proposed actions would occur within lands that have been previously disturbed through agriculture. Land use changes from

implementation of either alternative are expected to be small and considered indirect.

Riparian Reserves. The Fern Valley Thru Alternative would require the removal of riparian trees along Payne Creek, but would result in a small impact. There would be no impacts to Payne Creek riparian reserves associated with the N. Phoenix Thru Alternative.

TABLE 4: POTENTIAL EFFECTS TO BEAR CREEK RESULTING FROM THE FERN VALLEY THRU AND N. PHOENIX THRU ALTERNATIVES*

Impact Type	Indicators for Measure of Change	Fern Valley Thru Impacts	N. Phoenix Thru Impacts
	Water Quality		
Temporary	Increase in Stream Temperature	Negligible-Small	Negligible-Small
Temporary	Increase in Sedimentation / Turbidity	Negligible-Small	Negligible-Small
Temporary	Construction-related Debris	Negligible-Small	Negligible-Small
Temporary	Chemical Contamination	Negligible-Small	Negligible-Small
Temporary	**In-Water Noise**	Negligible-Small	Negligible-Small
Temporary	**Visual Disturbance (Harassment)**	Negligible-Small	Negligible-Small
Temporary	**Habitat Access**	Small	Small
	Habitat Elements		
Temporary	Substrate	No Impact	No Impact
Temporary	LWD	No Impact	No Impact
Temporary	Pool Frequency & Quality	No Impact	No Impact
Temporary	Off-Channel Habitat	No Impact	No Impact
	Channel Conditions and Dynamics (Hydraulics)		
Temporary	Width to Depth Ratio /Streambank	No Impact	No Impact
Temporary	Floodplain Connectivity	No Impact	No Impact
Temporary	**Flow/Hydrology/Peak Base Flows**	Negligible	Negligible

TABLE 4: POTENTIAL EFFECTS TO BEAR CREEK RESULTING FROM THE FERN VALLEY THRU AND N. PHOENIX THRU ALTERNATIVES*			
Impact Type	**Indicators for Measure of Change**	**Fern Valley Thru Impacts**	**N. Phoenix Thru Impacts**
	Watershed Conditions		
Temporary	Road Density and Locations	Small	Small
Temporary	Disturbance History	Negligible	Negligible
Temporary	Riparian Reserve	Negligible	Negligible
Temporary	**Take of Fish**	Small	Small
	Water Quality		
Long-term	Increase in Stream Temperature	No Impact	No Impact
Long-term	Increase in Sedimentation / Turbidity	No Impact	No Impact
Long-term	Construction-related Debris	No Impact	No Impact
Long-term	Chemical Contamination	No Impact	No Impact
Long-term	**In-Water Noise**	No Impact	No Impact
Long-term	**Visual Disturbance (Harassment)**	No Impact	No Impact
Long-term	**Habitat Access**	No Impact	No Impact
	Habitat Elements		
Long-term	Substrate	No Impact	No Impact
Long-term	LWD	No Impact	No Impact
Long-term	Pool Frequency & Quality	No Impact	No Impact
Long-term	Off-Channel Habitat	No Impact	No Impact
	Channel Conditions and Dynamics (Hydraulics)		
Long-term	Width to Depth Ratio /Streambank	No Impact	No Impact
Long-term	Floodplain Connectivity	No Impact	No Impact

TABLE 4: POTENTIAL EFFECTS TO BEAR CREEK RESULTING FROM THE FERN VALLEY THRU AND N. PHOENIX THRU ALTERNATIVES*

Impact Type	Indicators for Measure of Change	Fern Valley Thru Impacts	N. Phoenix Thru Impacts
Long-term	**Flow/Hydrology/Peak Base Flows Increase in Impervious Surface**	No impact **15.8 Total**	No impact **15.2 Total**
	Watershed Conditions		
Long-term	Road Density and Locations	Small	Small
Long-term	Disturbance History	Negligible	Negligible
Long-term	Riparian Reserve	Negligible	Negligible
Long-term	**Take of Listed Fish**	None	None

* Potential impacts to Bear Creek would be the same with either of the build alternatives.

TABLE 5: POTENTIAL EFFECTS TO COLEMAN CREEK RESULTING FROM THE FERN VALLEY THRU AND N. PHOENIX THRU ALTERNATIVES

Impact Type	Indicators for Measure of Change	Fern Valley Thru Impacts	N. Phoenix Thru Impacts
	Water Quality		
Temporary	Increase in Stream Temperature	No Impact	No Impact
Temporary	Increase in Sedimentation / Turbidity	Small Impact	No Impact
Temporary	Construction-related Debris	No Impact	No Impact
Temporary	Chemical Contamination	Small Impact	Small Impact
Temporary	**In-Water Noise**	No Impact	No Impact
Temporary	**Visual Disturbance (Harassment)**	No Impact	No Impact
Temporary	**Habitat Access**	No Impact	No Impact
Temporary	**Habitat Elements**	No Impact	No Impact

TABLE 5: POTENTIAL EFFECTS TO COLEMAN CREEK RESULTING FROM THE FERN VALLEY THRU AND N. PHOENIX THRU ALTERNATIVES

Impact Type	Indicators for Measure of Change	Fern Valley Thru Impacts	N. Phoenix Thru Impacts
Temporary	Substrate	No Impact	No Impact
Temporary	LWD	No Impact	No Impact
Temporary	Pool Frequency & Quality	No Impact	No Impact
Temporary	Off-Channel Habitat	No Impact	No Impact
	Channel Conditions and Dynamics (Hydraulics)		
Temporary	Width to Depth Ratio /Streambank	No Impact	No Impact
Temporary	Floodplain Connectivity	No Impact	No Impact
Temporary	**Flow/Hydrology/Peak Base Flows**	No Impact	No Impact
	Watershed Conditions		
Temporary	Road Density and Locations	Small	Small
Temporary	Disturbance History	Negligible	Negligible
Temporary	Riparian Reserve	No Impact	No Impact
Temporary	**Take of Fish**	None	None
	Water Quality		
Long-term	Increase in Stream Temperature	No Impact	No Impact
Long-term	Increase in Sedimentation / Turbidity	No Impact	No Impact
Long-term	Construction-related Debris	No Impact	No Impact
Long-term	Chemical Contamination	No Impact	No Impact
Long-term	**In-Water Noise**	No Impact	No Impact
Long-term	**Visual Disturbance (Harassment)**	No Impact	No Impact
Long-term	**Habitat Access**	No Impact	No Impact

TABLE 5: POTENTIAL EFFECTS TO COLEMAN CREEK RESULTING FROM THE FERN VALLEY THRU AND N. PHOENIX THRU ALTERNATIVES			
Impact Type	**Indicators for Measure of Change**	**Fern Valley Thru Impacts**	**N. Phoenix Thru Impacts**
	Habitat Elements		
Long-term	Substrate	No Impact	No Impact
Long-term	LWD	No Impact	No Impact
Long-term	Pool Frequency & Quality	No Impact	No Impact
Long-term	Off-Channel Habitat	No Impact	No Impact
	Channel Conditions and Dynamics (Hydraulics)		
Long-term	Width to Depth Ratio /Streambank	No Impact	No Impact
Long-term	Floodplain Connectivity	No Impact	No Impact
Long-term	**Flow/Hydrology/Peak Base Flows**	No Impact	No Impact
	Watershed Conditions		
Long-term	Road Density and Locations	Small	Small
Long-term	Disturbance History	Negligible	Negligible
Long-term	Riparian Reserve	No Impact	No Impact
Long-term	**Take of Listed Fish**	None	None

TABLE 6: POTENTIAL EFFECTS TO PAYNE CREEK RESULTING FROM THE FERN VALLEY THRU OR N. PHOENIX THRU ALTERNATIVES			
Impact Type	**Indicators for Measure of Change**	**Fern Valley Thru Impacts**	**N. Phoenix Thru Impacts**
	Water Quality		
Temporary	Increase in Stream Temperature	Small	No Impact
Temporary	Increase in Sedimentation / Turbidity	Small	Small
Temporary	Construction-related Debris	Small	No Impact

TABLE 6: POTENTIAL EFFECTS TO PAYNE CREEK RESULTING FROM THE FERN VALLEY THRU OR N. PHOENIX THRU ALTERNATIVES			
Impact Type	**Indicators for Measure of Change**	**Fern Valley Thru Impacts**	**N. Phoenix Thru Impacts**
Temporary	Chemical Contamination	No Impact	No Impact
Temporary	**In-Water Noise**	No Impact	No Impact
Temporary	**Visual Disturbance (Harassment)**	No Impact	No Impact
Temporary	**Habitat Access**	No Impact	No Impact
Temporary	**Habitat Elements**		
Temporary	Substrate	No Impact	No Impact
Temporary	LWD	No Impact	No Impact
Temporary	Pool Frequency & Quality	Negligible	No Impact
Temporary	Off-Channel Habitat	No Impact	No Impact
	Channel Conditions and Dynamics (Hydraulics)		
Temporary	Width to Depth Ratio /Streambank	Negligible	Negligible
Temporary	Floodplain Connectivity	Small	No Impact
Temporary	**Flow/Hydrology/Peak Base Flows**	No Impact	No Impact
	Watershed Conditions		
Temporary	Road Density and Locations	Small	Small
Temporary	Disturbance History	Negligible	Negligible
Temporary	Riparian Reserve	Negligible	Negligible
Temporary	**Take of Listed Fish**	None	None
	Water Quality		
Long-term	Increase in Stream Temperature	Small	No Impact

TABLE 6: POTENTIAL EFFECTS TO PAYNE CREEK RESULTING FROM THE FERN VALLEY THRU OR N. PHOENIX THRU ALTERNATIVES			
Impact Type	**Indicators for Measure of Change**	**Fern Valley Thru Impacts**	**N. Phoenix Thru Impacts**
Long-term	Increase in Sedimentation / Turbidity	Small	Small
Long-term	Construction-related Debris	Small	No Impact
Long-term	Chemical Contamination	No Impact	No Impact
Long-term	**In-Water Noise**	No Impact	No Impact
Long-term	**Visual Disturbance (Harassment)**	No Impact	No Impact
Long-term	**Habitat Access**	No Impact	No Impact
	Habitat Elements		
Long-term	Substrate	No Impact	No Impact
Long-term	LWD	No Impact	No Impact
Long-term	Pool Frequency & Quality	Negligible	No Impact
Long-term	Off-Channel Habitat	No Impact	No Impact
	Channel Conditions and Dynamics (Hydraulics)		
Long-term	Width to Depth Ratio /Streambank	No Impact	No Impact
Long-term	Floodplain Connectivity	No Impact	No Impact
Long-term	**Flow/Hydrology/Peak Base Flows**	Small	No impact
	Watershed Conditions		
Long-term	Road Density and Locations	No Impact	No Impact
Long-term	Disturbance History	No Impact	No Impact
Long-term	Riparian Reserve	No Impact	No Impact
Long-term	**Take of Listed Fish**	None	None

Indirect Impacts

Indirect effects caused by the proposed action are those that are later in time and are reasonably certain to occur (50 CFR 402.02). Indirect effects can occur outside of the area directly affected by the action. Potential indirect effects that are reasonably certain to occur after the proposed construction is completed include the following:

- Increased human activity
- Ecological recovery in the construction area
- Behavioral changes resulting from elevated turbidity level
- Impacts to prey base.

No-Build Alternative. Indirect impacts to aquatic resources and species due to the No-Build Alternative could potentially include the deterioration of the bridge structure over Bear Creek and erosion of adjacent supporting embankments. This erosion could, over time, result in higher sediment loads in Bear Creek. Increases in growth, traffic, and interchange use are expected to continue. As a result, traffic movements and safety would become more complicated adding to the potential for species harassment and additional water quality implications from storm water discharge.

Fern Valley Thru Alternative. An increase in the rate of development in the rural area within the API may be considered an indirect effect of the interchange project. However, this area has experienced and is likely to continue to experience increased development regardless of the construction of the one of the alternatives. Possible indirect effects of the proposed project include a net loss of infiltration that would increase surface flows, and possible failure of stormwater facilities. These factors could affect water quality and quantity in receiving streams and have a negative effect on aquatic species.

N. Phoenix Thru Alternative. Indirect impacts for the N. Phoenix Thru Alternative are expected to be the same or similar to the Fern Valley Thru Alternative.

Cumulative Impacts

Cumulative impacts are defined by NEPA as the environmental impacts that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time (40 CFR § 1508.7).

The City of Phoenix, Jackson County, ODOT, and private landowners are planning both short-range (2005-2009) and medium-range (2010-2015) future projects and development in the vicinity of the FVI project. City plans include several road projects, including the provision of bicycle lanes and/or sidewalks and bike lane striping and sidewalk construction along several existing roads near the FVI project. Some of these would require widening of the existing roads, while some would not. County plans include completing the County portions of the Bear Creek Greenway trail between Talent and

Medford and widening Old Stage Road. ODOT plans include widening a portion of OR 99 and relocating and constructing a new interchange at the South Medford Interchange along I-5. Development of vacant lands in the northeast quadrant of the interchange is anticipated to include highway-oriented commercial businesses, hotels, and multi-family residential development.

Long-range projects (2016-2030) are not included in this cumulative impact analysis.

No Build Alternative. In general, urbanization in the surrounding vicinity would likely cause increased water quality issues from increased impervious surfaces and potential for additional stream crossings and riparian losses. In addition, waterways such as Bear Creek would likely experience increased stormwater flows and decreased water quality regardless of construction of the FVI project.

Fern Valley Thru Alternative. The majority of the projects summarized above would impact aquatic resources and other waters that are located outside the FVI project API. However, the following projects could cumulatively impact aquatic resources within the FVI project API:

- The Jackson County Bear Creek Greenway Trail completion would further increase impervious area draining to Bear Creek (upstream and downstream of FVI project API).

- The ODOT I-5 South Medford Interchange would further increase impervious area draining to Bear Creek (downstream of FVI project API).

The incremental cumulative contribution of the FVI project to the past, present, and future foreseeable actions described above would likely be small for water quality parameters and aquatic species habitat parameter impacts. It should be noted that current regulations require that new impervious surface area improvements require updated stormwater treatment, and mitigation for habitat loss. As such, existing, untreated runoff in many areas would likely become treated prior to entering waterways as a result of this project, and loss of wetland acres and functions would be mitigated. For this reason, cumulative impacts associated with either alternative are assumed to be similarly negligible to other waters within the API. Collectively, all projects, when reviewed together, could have a small impact on aquatic habitat and species. All of the impacts associated with these projects would be mitigated, and residual cumulative impacts would therefore be considered negligible.

7. SUMMARY OF BIOLOGICAL MITIGATION AND CONSERVATION MEASURES FOR AQUATIC RESOURCES

Conservation Measures would be implemented to minimize or avoid potential temporary and long-term environmental impacts to listed fish species or critical habitat. Most conservation measures would be applied to actions taking place in, or adjacent to, Bear, Coleman, and Payne Creeks, and would follow practices outlined in ODOT's Standard Specifications for Highway Construction (2002d). Standard Specifications would be amended in the Special Provisions to include any additional conservation measures that may be applicable to specific project actions. Because the Fern Valley Interchange project is in the early stages of design, all obligations that appear in this section are non-binding and subject to change as design progresses.

Avoidance, minimization, and conservation measures are intended to minimize or avoid environmental impacts to listed species or critical habitat. Avoidance, minimization, and conservation measures for this project would follow practices outlined in ODOT's Standard Specifications for Highway Construction (2002) Section 00290.00 Environmental Protection and the Supplemental Standard Specifications for Highway Construction (1998). Standard Specifications would be amended in the Special Provisions for the project to include additional conservation measures as they appear in Section 7.2 of this document.

ODOT will coordinate with NMFS on potential effects of the proposed projects, and may alter and refine the project design to address concerns or conditions in the BA. The specifications provided below are the same for either alternative but would be modified to be more site-specific once the Preferred Alternative is selected.

7.1 STANDARD SPECIFICATIONS

The following sections of the ODOT Standard Specifications for Highway Construction serve to minimize impacts to stream habitat and fish would be incorporated into the FVI project.

Section 00280 - Erosion and Sediment Control

This section requires the Contractor to implement ODOT's ESCP developed to comply with Federal, State, and local laws, rules and regulations, and the NPDES General Construction Permit regarding erosion prevention and sediment control for on-site construction activities. Typically included in this section are soil and slope protection and stabilization measures, and site restoration specifications, including planting materials and methods.

Section 00290 – Environmental Protection

This section directs the Contractor to implement measures and comply with laws and regulations designed to protect sensitive environmental resources. This section addresses hazardous waste and hazardous substances (00290.20); minimum required measures (00290.30); protection of fish, wildlife, and plants (00290.31); protection of wetlands (00290.41); and protection of sensitive cultural sites (00290.51); as well as other applicable safety, health, and human resources issues.

Section 00320 - Clearing and Grubbing

This section directs the Contractor on clearing operations (00320.40), including clearing, preserving, and trimming trees and other vegetation, as well as grubbing operations (00320.41), including providing limits on the Contractor's area of approved activity and scope of actions. This section provides protection to vegetation both within and outside of the approved work areas.

Section 01040 – Planting

This section provides the Contractor with guidelines for furnishing, planting and establishing specified plant materials in planting areas shown or directed in the project plans. This section includes directions for specific planting seasons, layout and preparation of planting areas. In addition, methods for preparation of planting materials and requirements for establishment are presented to assure satisfactory growth and survival.

7.2 AMENDMENTS TO STANDARD SPECIFICATIONS

Due to the early phase of project design at which this consultation is being conducted, no amendments to the ODOT Standard Specifications can be developed. As stated below in Section 7.3, the NMFS would be provided the opportunity to review the designs at a later phase, after which amendments may be appropriate for inclusion in the bid solicitation package.

The following Environmental Performance Standards for avoidance and minimization of impacts for fish species are included here as excerpts from the Programmatic Biological Assessment (PBA) ODOT OTIA III Statewide Bridge Delivery Program (ODOT, 2004). These standards were developed through close coordination with the NMFS, and are specifically applicable to bridge construction projects. They are included here only as reference and to provide context for future amendments to the ODOT Standard Specifications. They are not intended as binding obligations for the Fern Valley project.

Environmental Performance Standards

Developed through close coordination between ODOT and the Services, the environmental performance standards represent the criteria that individual bridge

replacement and repair projects must meet in order to be included in this consultation and receive coverage for incidental take. The proposed action (predominately bridge construction activities) was divided into dominant construction activities, which were further divided into construction elements. The potential effects of each construction element were identified, and this list was used to identify needed environmental performance standards. The Bridge Repair/Replacement Activities section references these standards to illustrate which criteria apply to which construction activities and elements.

SPECIES AVOIDANCE

1. Fish Avoidance. Minimize incidental take of listed fish and adverse effects to fish species from in-water work activities.

a. Timing of In-water Work. Complete work below the OHW elevation during the preferred in-water work period, unless otherwise approved in writing by the Services and the appropriate Regulatory Authorities.

b. Cessation of Work. Cease project operations under high flow conditions that may result in inundation of the project area, except for efforts to avoid or minimize resource damage.

c. Fish Screens. Have a fish screen installed, operated, and maintained according to NMFS' fish screen criteria on each water intake used for project construction, including pumps used to isolate an in-water work area. Screens for water diversions or intakes that would be used for irrigation, municipal or industrial purposes, or any use besides project construction are not authorized.

d. Fish Passage. Provide passage for any adult or juvenile fish species present in the project area during and after construction, for the life of the project, unless otherwise approved in writing by the Services and the appropriate Regulatory Authorities. Upstream passage is not required during construction if it did not previously exist.

e. Hydro-Acoustic. Prepare and implement a Noise Attenuation Plan (NAP) for steel piles driven with an impact pile driving hammer through water when listed fish may be present.

i. The NAP would illustrate how sound pressure levels would be maintained below 150 dB (re: 1 micro Pascal) for a minimum of 50% of the impacts and peak sound pressure levels would be maintained below 180 dB (re: 1 micro Pascal) for all impacts in areas of potential fish presence.
ii. ODOT/FHWA would review and approve the NAP prior to steel pile driving activities in the water column.
iii. During hydroacoustic measurements, the hydrophone(s) shall be positioned at mid-depths, 30 feet from the pile being driven or

following the most recent NMFS guidance, as directed by contract with ODOT.

iv. Acoustic measurements (monitoring) are not necessary assuming at least one of the following conditions are met:
    (1) The pile is driven with a vibratory pile driving hammer.
    (2) The pile is acoustically isolated from the water using measures including, but not limited to; dewatering, flow diversion, confined bubble curtains (unconfined bubble curtains may be used if contractor demonstrates that currents are less than 1.7 miles per hour), and other means, as approved by ODOT/FHWA.
    (3) The best available science shows that sound pressure levels would not reach the impact thresholds identified above under the stream conditions at the time of pile driving (e.g., channel substrate, water velocity and depth).

f. Isolation of In-water Work Area. If adult or juvenile fish are reasonably certain to be present, or if the work area is within 300 feet upstream of reasonably likely spawning habitats, completely isolate the work area from the active flowing stream using inflatable bags, sandbags, sheet pilings, or similar materials, unless otherwise approved in writing by the Services and the appropriate Regulatory Authorities. Prepare a Work Area Isolation Plan for all work below the bankfull elevation requiring flow diversion or isolation. Include the sequencing and schedule of dewatering and re- watering activities, plan view of all isolation elements, as well as a list of materials to adequately provide appropriate redundancy of key plan functions (e.g., an operational, properly sized backup generator). Pile driving may occur without isolation during the in-water work period, providing compliance has been achieved with all other relevant performance standards.

g. Capture and Release. Before, intermittently during, and immediately after isolation and dewatering to isolate an in-water work area, attempt to capture and release fish from the isolated area using trapping, seining, electrofishing, or other methods as are prudent to minimize risk of injury.

i. The entire capture and release operation must be conducted or supervised by a fishery biologist experienced with work area isolation and competent to ensure the safe handling of all fish.
ii. Do not use electrofishing if water temperatures exceed 64° F, unless no other fish capture method is feasible or successful.
iii. If electrofishing equipment is used to capture fish, comply with NMFS' electrofishing guidelines.
iv. Handle all fish with extreme care, keeping fish in water to the maximum extent possible during seining and transfer procedures to prevent the added stress of out-of-water handling.
v. Ensure water quality conditions, including dissolved oxygen levels, within fish transport systems (e.g., buckets) are sufficient to promote

fish recovery. Brief holding times; clean, cold, and circulated water; and aerators may be used to maintain water quality conditions.

vi. Release fish into a safe release site as quickly as possible, and as near as possible to capture sites.

vii. In the event of mortalities, do not transfer Federally listed fish to anyone except the Services, unless otherwise approved in writing by the Services and the appropriate Regulatory Authorities.

viii. Obtain all other Federal, State, and local permits necessary to conduct the capture and release activity, such as an ODFW Incidental Take Permits and/or a Scientific Taking Permits.

ix. Allow the Services and the appropriate Regulatory Authorities to accompany the capture team during the capture and release activity, and to inspect the team's capture and release records and facilities.

x. Report salvage effort results, as called for in relevant permits, including the name and address of the supervisory fish biologist, methods used to isolate the work area and minimize disturbances to fish, stream conditions before and following placement and removal of barriers, the means of fish removal, the number and species of fish removed, the condition of all fish released, and any incidence of observed injury or death.

7.3 NON-CONTRACTUAL OBLIGATIONS AND AGREEMENTS

1. Prior to the pre-construction conference, environmental inspection staff shall review the appropriate environmental documents and permits, and additional containment measures.

2. A copy of the BA and Biological or Conference Opinion would be available at the Construction Project Manager's field office.

3. Upon completion of preliminary plan sets for the project, the NMFS would be contacted and provided with review copies for comment. A minimum of one (1) pre-construction meeting would be held to review concerns and questions regarding potential effects that may be different from those presented in this document.

Additional avoidance, minimization, and conservation measures may be agreed upon by state and federal government representatives, as conditions of the resulting federal Letter of Concurrence or Biological Opinion. Failure to meet these conditions may have repercussions to the project. These measures would be incorporated into the contract document and would be treated as non-contractual obligations (Section 9.3) for ODOT.

In addition to standard ODOT conservation measures, ODFW has expressed support for two mitigation measures which will be reviewed by ODOT and finalized when the Preferred Alternative is selected. These include:

1. Removal of a 100 to 200-foot section of the existing culvert in Payne Creek between Bear Creek and Luman Road. The proposed section is located under an undeveloped area (i.e., no roadway, residential or commercial development). Removal of this section of culvert would render the lower 100-200 feet of Payne Creek accessible to anadromous fish. The culvert passing under I-5 is not a part of the proposed mitigation opportunity.

2. Replacement of the existing culvert where Coleman Creek passes under OR 99 in Phoenix. The existing culvert is considered a barrier, as the structure constitutes a velocity barrier during high flows and an impassable drop during summer months. This action would render Coleman Creek accessible to anadromous fish (including listed Coho salmon) above the existing barrier.

8. LIST OF PREPARERS

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9. REFERENCES AND INFORMATION SOURCES

9.1 AGENCY CONTACTS

NMFS, U.S. Fish and Wildlife Service, and the Oregon Department of Fish and Wildlife were contacted for species lists of federal, state, and local ESA-listed species. ESA consultation meetings would be required once the preferred alternative is selected and the BA can be completed.

9.2 REFERENCES

Hart Crowser, 2002. Biological Assessment for the Fern Valley Interchange Project, Phoenix, Oregon. Prepared for Oregon Department of Transportation.

Mason, Bruce, and Girard, Inc., 2001. Biological Assessment: Highway 62 Corridor Solutions Project, North Medford Interchange. Prepared for the Oregon Department of Transportation.

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Oregon Department of Fish and Wildlife, 2000. Oregon Guidelines for Timing of In-Water Work to Protect Fish and Wildlife Resources.

Rogue Valley Council of Governments (RVCOG). 1995. Bear Creek Sub-Basin Watershed Assessment and Action Plan. Version 1. 121 pp.

Sandercock, F.K., 1991. Life History of Coho Salmon *(Orcorhyncus kisutch*). In Pacific Salmon Life Histories, C. Groot and L. Margolis, eds. UBC Press. Vancouver, British Columbia, Canada.

Shapiro and Associates, Inc., 2001. Biological Assessment for Coho Salmon and Steelhead Under national Marine Fisheries Service Jurisdiction for the Proposed Replacement of the Bear Creek (Kirtland Rd) Bridge, Jackson County, Oregon. Prepared for Sverdrup Civil, Inc., Lake Oswego, Oregon.

StreamNet, 2004. Bear Creek Subbasin: Coho [data online]. URL:,http://www.streamnet.org.

APPENDIX A

1. Federally Listed Threatened, Endangered, Proposed, Candidate Species and Species of Concern which May Occur within Jackson County, Oregon

2. NOAA Fisheries Northwest Region Critical Habitat Designations for West Coast Salmon and Steelhead in Oregon—August 2005

3. State of Oregon, Division of State Lands, Essential Salmon Habitat, Jackson County