

# **Appendix B—Biological Evaluation**

For:

Aquatic Species

Terrestrial Species

Plant Species

Noxious Weeds

# **BIOLOGICAL EVALUATION**

for

Threatened, Endangered, and Sensitive (TES) Fish Species

**Blue Mountain Ranger District  
Malheur National Forest**

**Blue Culverts Project**  
March 5, 2003

Prepared by/s/: \_\_\_\_\_

Date: \_\_\_\_\_

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**I. SUMMARY**

The following table displays the threatened, endangered and sensitive (TES) species considered in the analysis of the Blue Culverts project and the effects of the proposed action.

Species	Scientific Name	Status	Occurrence	Effects Determination*
<b>Aquatic Species</b>				
Columbia River Bull Trout	<i>Salvelinus confluentus</i>	T	D	LAA (BE)
Mid-Columbia River Steelhead <sup>1</sup>	<i>Oncorhynchus mykiss</i> ssp.	T	D	LAA (BE)
Mid-Columbia River Spring Run Chinook Salmon	<i>Oncorhynchus tshawytschaw</i>	S	D	MIIH (BI)
Chinook Salmon <sup>2</sup>	<i>Oncorhynchus tshawytschaw</i>	MS	D	NLAM
Interior Redband Trout	<i>Oncorhynchus mykiss</i> ssp.	S	D	MIIH (BI)

\*Effects in Parentheses are Long Term Effects if different from Short Term Effects

<sup>1</sup>Designated critical habitat for steelhead includes all the John Day River system below Izee Falls.

<sup>2</sup>Chinook salmon waters are designated Essential Fish Habitat by the Magnuson-Stevens Act.

**Status**

E	Federally Endangered
T	Federally Threatened
S	Sensitive species from Regional Forester’s list
C	Candidate species under Endangered Species Act
MS	Magnuson-Stevens Act designated Essential Fish Habitat

**Occurrence**

D	Species <b>Documented</b> in general vicinity of project activities
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**Effects Determinations**

Threatened and Endangered Species

LAA	May Effect, Likely to Adversely Affect
BE	Beneficial Effect

Sensitive Species

MIIH	May Impact Individuals or Habitat, but Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species
BI	Beneficial Impact

Chinook Salmon Essential Fish Habitat (Magnuson-Stevens Act)

NLAM	Not Likely to Adversely Modify
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## **II. INTRODUCTION**

This Biological Evaluation (BE) analyzes the potential effects of the proposed action to replace and reinforce culverts on the Malheur National Forest. This BE satisfies the requirements of Forest Service Manual 2672.4 that requires the Forest Service to review all planned, funded, executed or permitted programs and activities for possible effects on proposed, endangered, threatened or sensitive species.

This Biological Evaluation (BE) documents the review and findings of Forest Service planned programs and activities for possible effects on species (1) listed or proposed for listing by the USDI Fish and Wildlife Service (USFWS) and by the National Marine Fishery Service (NMFS) as Endangered or Threatened; or (2) designated by the Pacific Northwest Regional Forester as Sensitive. It is prepared in compliance with the requirements of Forest Service Manual (FSM) 2630.3, FSM 2672.4, FSM 10.89 R-6 Supplement 47 2670.44, and the Endangered Species Act (ESA) of 1973 (Subpart B; 402.12, Section 7 Consultation).

Proposed, Endangered, Threatened, or Sensitive species considered in this evaluation are those listed in FSM 2670.44, R-6 Interim Directive No. 90-1, March, 1989 as suspected or documented to occur on the Malheur National Forest's Blue Mountain Ranger District.

### **Species Considered in this Assessment**

The following sources of information have been reviewed to determine if PETS (proposed, endangered, threatened, or sensitive) species and their associated habitats may or may not occur within the project area:

- ◆ Regional Forester's Sensitive Species List
- ◆ Forest sensitive species database and the current GIS mapping layers
- ◆ Oregon Natural Heritage Program Data Base records
- ◆ Project area maps, unique habitat data bases, and any historical records
- ◆ Current Regulatory Agency status reports and listed species new releases

Habitats for proposed, endangered, threatened, or sensitive species (PETS) are identified by correlating the physical and biological features found in the project planning area with habitat features in which PETS species are known or suspected to occur. All aquatic Management Indicator Species (MIS) on the Blue Mountain Ranger District of the Malheur National Forest are currently listed as threatened or sensitive. Therefore, MIS species will not be discussed as a separate topic.

## **III. PROJECT DESCRIPTION**

The project will take place in portions of Grant County on the Blue Mountain Ranger District approximately twenty-five air miles northeast of John Day, Oregon in the Galena watershed of the Middle Fork John Day River sub-basin. The project would occur in Vinegar, Vincent, and Granite-Boulder subwatersheds. Reference Chapter 1 of the Blue Aquatics Environmental Assessment for a complete description of the Project area and Chapter 2 for the design criteria for the two alternatives. Alternative 1, the No Action alternative, proposes no culvert replacement. Alternative 2, the Proposed Action proposes to eliminate fish passage barriers for all life stages of fish and reduce erosion/sedimentation. Five culverts would be replaced with single span structures, three culverts would be replaced with low water crossings, and six armored drain dips would be installed over existing culverts. Design criteria and mitigation measures as described in the Environmental Assessment would be implemented under alternative 2. Projects would occur from July 16 and August 15 in Granite

Boulder Creek (bull trout spawning), Vinegar Creek and Blue Gulch (potential bull trout spawning) and July 16 until September 15 in Vincent Creek each year until completed, which is expected by 2006.

#### **IV. EFFECTS ANALYSIS**

##### **A. Aquatic Species**

###### **Species Considered in this Assessment**

The Columbia Basin bull trout and the Mid-Columbia River summer run steelhead are the only two listed species within this watershed. Designated critical habitat has been listed for Mid-Columbia River summer run steelhead. Interior redband trout and Mid-Columbia spring chinook are on the Region's sensitive species and are present in the Analysis Area. A Biological Assessment (BA) for threatened and endangered aquatic species was prepared and is attached, along with this BE, as an appendix to the Blue Culverts EA. Consultation was initiated and verbal agreement from NOAA Fisheries and USFWS was received on the project. The Malheur National Forest is awaiting the Biological Opinion (BO) on this project from both Consultation Agencies.

All Management Indicator Species (MIS) of fish on the Blue Mountain Ranger District of the Malheur National Forest are currently listed as threatened or sensitive. Therefore, MIS species will not be discussed as a separate topic.

Westslope cutthroat trout and Malheur mottled sculpin are not present in the project area and do not have habitat in the project area; therefore, these two species will not be discussed further in this BE. Columbia spotted is analyzed in this BE under Terrestrial Species.

###### **Existing Conditions**

Vinegar Creek, Vincent Creek and Granite Boulder Creek contain summer/winter rearing and spawning habitat for Mid-Columbia summer run steelhead and redband trout. Granite Boulder contains winter/summer rearing and spawning habitat for a population of bull trout. There may be a small population of bull trout in Vinegar Creek but the status is currently unknown. Mid-Columbia River Spring Chinook salmon are found immediately downstream of the project area. Salmon do not spawn in project area streams but rather in the Middle Fork John Day River. There is some very limited potential for spawning in the lower reaches of tributaries with the greatest potential in Granite Boulder Creek and Vinegar Creek.

Vinegar Creek, Granite Boulder Creek and the Middle Fork John Day River are on the state of Oregon 303(d) list for water quality concerns. Vinegar and Granite Boulder Creeks are listed for excessive summer rearing temperature for fish and MFJD is listed for excessive summer rearing temperature and flow modification. Baseline data for project area streams and existing conditions of steelhead, bull trout, and Chinook salmon are described fully in the attached BA for Fisheries for the Blue Culverts Project.

###### **Interior Redband Trout (*O. mykiss gairdneri*)**

**Status: USFS Region 6 Sensitive**

Heritage Status – Global Conservation Status Rank: G5 (25 Sept 1996)

**Rounded Global Conservation Rank: T4**

American Fisheries Society Status: Special Concern

Global Conservation Status Rank Reasons:

Still widespread in interior western North America but with local declines and extirpations. The global range includes the Columbia River basin east of the Cascades to barrier falls on the Kootenay, Pend Oreille, Spokane, and Snake Rivers; the upper Frazier River basin above Hell's Gate; and

Athabasca headwaters of the Mackenzie River basin, where headwater transfers evidently occurred from the upper Frazier River system (Benke 1992). In the Columbia River basin, nearly all upriver and many lower river stocks appear to be improving after having declined (Nehlsen et al. 1991). Many stocks in the Columbia River basin are, however, threatened by mainstem passage problems, habitat damage (due to logging, road construction, mining, and grazing, which decrease water quality and increase siltation), and interactions with hatchery fishes (Nehlsen et al. 1991).

### Environmental Baseline

There are four different populations of redband trout in the Blue Mountains. These are: 1) sympatric populations with steelhead, 2) isolated allopatric populations in anadromous watersheds, 3) allopatric populations in the Great Basin portion of the Blue Mountains, and 4) allopatric populations in watersheds that formally supported anadromous populations (N.F. Malheur and Upper Malheur Rivers). There is little data on current population trends of the redband, however, the four population types do not face the same level of threats from management activities. Subpopulations of the Great Basin redband are probably at the greatest threat of listed as threatened under the ESA. These fish are located in Trout Creek, a tributary to the Silvies River. Redband populations in this project area are primarily of sympatric origin. Overall, the Interior redband trout have the most extensive area of all game fishes in the Blue Mountains. They are in the smallest headwater areas as well as in the largest rivers of the Blue Mountains.

### Redband Bearing Streams in Analysis Area

<b>Subwatershed</b>	<b>Redband Fish Bearing Miles</b>	<b>Perennial Non-fish Bearing Miles</b>	<b>Intermittent/Seasonal Miles</b>	<b>Habitat Type</b>
Vinegar Creek	11.1	10.4	25.3	Rearing, Spawning
Vincent Creek	5.2	3.1	9.1	Rearing, Spawning
Granite Boulder Creek	8.1	12.2	8.5	Rearing, Spawning

Interior redband trout (sensitive) are assumed to be the resident form of the anadromous steelhead. Most redband spawning and rearing occurs in the second to fourth order streams in the forested environment. Even when small streams are not accessible to migrating fish because of barriers or steep gradients, they are vitally important to the quality of downstream habitats. Their distribution within the proposed project area, and habitat needs, are similar to the steelhead. However, redband spawning may occur in areas with insufficient flow for steelhead spawning and with smaller substrate.

The 11 culverts to be treated in this project (Table 1) are likely impacting redband as well as steelhead and bull trout.

Table 1—Project Culverts Existing Condition

<b>Site #</b>	<b>Stream</b>	<b>Road Number</b>	<b>Fish-bearing Segment (Y/N)</b>	<b>Fish Barrier (Y/N)</b>	<b>Reason for barrier</b>	<b>Sized for 100 Year Flow Event (Yes/No)</b>
1	Vinegar	2010618	Y	Y	Slope, velocity & length	N
2	Vinegar	2010618	Y	Y	Outlet jump height & slope	N
3	Blue Gulch	2010618	Y	Y	No resting areas, culvert slope, velocity & length	N

Site #	Stream	Road Number	Fish-bearing Segment (Y/N)	Fish Barrier (Y/N)	Reason for barrier	Sized for 100 Year Flow Event (Yes/No)
4	Blue Gulch	2010873	N	NA	NA	N
5	Vincent	2010159	Y	N	NA	N
6	Vincent	2010292	Y	Y	Jump height	N
7	Vincent	2010101	Y	Y	NA	N
8	Vincent	2010429	Y	N	NA	N
9	Vincent	2010986	N	NA	NA	N
10	Vincent	2010993	N	NA	NA	N
11	Granite Boulder	4559283	Y	Y	No depth at low flows, velocity at high flows	N

### Effects and Determination

The following is a site-specific analysis of the potential effects on bull trout, summer steelhead and summer steelhead designated critical habitat, and redband trout from the no-action alternative (Alternative 1). The effects of Alternative 2 on bull trout, summer steelhead, summer steelhead designated critical habitat and Chinook Salmon Essential Fish Habitat (EFH) are summarized here from the BA for this project (see the BA for the full effects discussion). The effects on redband trout and Chinook salmon are also included here under Alternative 2. Redband trout and steelhead are resident and anadromous life forms of the same species. The potential effects of proposed actions are essentially the same for both species. These are the fish with the widest distribution within the project area. Potential effects to fish and fish habitat will focus on those species most likely affected by activities in the project area. The potential effects to the baseline matrix indicators have been evaluated.

Chinook salmon distribution is generally limited to the main Middle Fork John Day River with limited potential for use in the lower segments of tributary streams. Therefore, the potential effects on Chinook salmon, or salmon habitat, is generally more of an off-site effect. For example, sediment input to a tributary stream could potentially affect redband/steelhead, or their habitat. To affect Chinook salmon, or salmon habitat, that sediment would have to be transported downstream in a quantity sufficient to have an effect downstream or flows/water temperatures modified to the extent to affect Chinook salmon in the Middle Fork John Day River. With limited actions proposed within RHCAs, the threshold for effects to fish and fish habitat will generally be lower for redband/steelhead, than for Chinook salmon. The threshold for effects to bull trout is lower than redband or steelhead where bull trout utilize project area subwatersheds, or 6<sup>th</sup> field HUCs (Habitat Unit Codes) because of bull trout require the lowest water temperature and highest water quality of all species in the project area and because only smaller, more disjunct populations exist of this species.

### Alternative 1, No-action

#### Direct and Indirect Effects

Physical barriers to fish passage would remain at 5 road crossings in Alternative 1. Since no culvert work would happen, passage would continue to be blocked for some life stages of steelhead, bull trout, and redband trout at some flows in fish bearing portions of Vinegar Creek, Blue Gulch, Vincent Creek and Granite Boulder Creek. Growth and survival, and life history diversity and isolation would continue at current levels, which may be reduced from historical levels (ICBEMP).

Roads directly affect streams through channel morphology changes or through runoff characteristic changes in the watershed (ICBEMP). In the short-term, no sediment would be produced by culvert replacement activities; however, undersized or improperly placed culverts and poor drainage features would allow continued sediment inputs in the long-term (Furniss 1991). Surface erosion, drainage functionality, and risk of a large-scale road culvert failure will continue to be long-term concerns.

Alternative 1 would not affect large woody material recruitment, but transport of coarse and small woody debris within the stream channel would continue to be affected by undersized culverts. Undersized culverts are more likely to get plugged by moving instream large woody material and debris. Plugged culverts can lead to washed out road fills, landslides, slumps, or fill slope failures due to channel bank cutting. Sediment inputs from these occurrences would be detrimental to fish and fish habitat by filling in pools and spaces between gravels necessary for spawning and rearing habitat (Furniss 1991)

Alternative 1 would not affect stream temperatures since streamside vegetation would not be removed or planted. There would be no possibility of chemical contamination in Alternative 1. Existing culverts would require continued maintenance, generally at a higher cost than new culvert maintenance.

Overall there would be no short term impacts to fish or fish habitat with the no action alternative. There would long term impacts to fish habitat from chronic sediment production and the potential for road failures and fish populations due to continued existence of migration barriers with this alternative.

### **Cumulative Effects**

As a result of historic activities, both on Forest Service System and private lands in the area, several watershed conditions have been modified. Harvest, road management, grazing, and other management activities have all affected streams on Forest Service System lands. Activities which occur and are expected to occur on private land include: grazing, water withdrawals under State water rights, timber harvest, scattered rural housing and ranches, and use of State, County and private roads. Grazing is expected to continue on private land. Pastures include riparian areas. Most water rights are for irrigation of these pastures. Timber harvest is expected to continue to occur on private lands within the watershed. Commercially valuable timber has been harvested recently, and additional harvest would be expected. Residential buildings are limited to rural houses and ranches located outside the Forest boundary. Typical activities include ranching. Road use on State, county and private roads is expected to continue. Additional road construction is not expected. Additional roadwork would be addressed when these projects are proposed. The recent U.S. Highway 26 reconstruction project is now part of the baseline. No other large construction projects are planned in the area. Activities on non-Forest Service System lands are expected to continue to affect streams (i.e., by contributing sediment, by affecting flows, etc.) in a similar manner and magnitude as past activities.

Foreseeable actions on Forest Service land include: Blue Roads, Blue Vegetation, Blue Large Wood Placement, Blue Riparian Hardwood Planting, Blue Aspen Enhancement, and Crawford Vegetation Management. Overall, the outcome of the No Action Alternative in conjunction with these projects is improvement of fish habitat and fish populations in the project area and downstream in the Middle Fork John Day River

### **Effects Determination and Rationale**

The activities with the highest potential for affecting sediment input to streams are road management activities. Under this alternative, there would be no road management activities other than ongoing routine road maintenance. This can be considered a no effect, or no change from the existing condition, in the short-term. This alternative would do nothing to reduce impacts of the existing road system. Many project area roads are not designed to handle a 100-year event (see Table 1). It would be expected that sedimentation from existing roads would increase over time, unless other projects are implemented to address these impacts. This is a no effect in the short-term, and an adverse effect in the long-term.

In summary, the No Action alternative would have no effect on fisheries, or fish habitat, in the short-term. Future impacts could potentially reach a magnitude of "Likely to Adversely Affect" steelhead and bull trout. It is not likely that the effects would reach a magnitude that they would have a long-term

adverse effect on steelhead designated critical habitat. These impacts would not cover a large enough area to result in a "WIFV" determination for redband trout. It is also unlikely, but possible, that these effects would be of a magnitude to affect Chinook salmon, downstream from most of the potential impacts.

## **Alternative 2, Proposed Action**

### **Direct and Indirect Effects**

The following is a summary of the effects on bull trout, summer steelhead and summer steelhead designated critical habitat and Chinook salmon EFH from the attached BA as well as a discussion of effects on redband trout and Chinook salmon. Alternative 2 is expected to have similar effects on redband trout as on steelhead trout.

Because of the nature of the project, several baseline matrix indicators (NMFS 1996), relating to all the fish species present in the project area, are not likely to be affected by Alternative 2. Subpopulation Size, Persistence and Genetic Integrity, Road Density and Location, Off Channel Habitat, Large Pools, Refugia, Peak/Base Flows, and Drainage Network are not expected to change, either in a positive or negative manner, because of the proposed activities. Activities proposed within RHCAs will not alter existing vegetation cover or open up existing canopy cover sufficiently to adversely affect streamside shading or water temperature. Likewise, planting native vegetation (herbaceous and hardwoods) after culvert work will not likely improve streamside shading or water temperature to any measurable amount due to the small area affected.

For several indicators, proposed activities will have no or negligible short-term impacts but will have long-term beneficial impacts. Removal or replacement of culverts that currently maintain downcut channels with structures set at appropriate channel elevation would improve floodplain connectivity above and below project sites. Road/stream crossing project work on Blue Gulch, Vinegar Creek, Vincent Creek and Granite Boulder Creek will reduce water velocity below the roads during peak and near peak flow events by creating crossings designed to handle 100-year flow events. Projects would incorporate expected width to depth ratios for the geomorphology of the site. Reduced water velocity at high flows will result in a reduction in the width to depth ratio immediately below crossings. Stream crossing improvement projects will not further impact large woody material and its recruitment. The use of larger diameter structures or construction of rock fords at road/stream crossings will allow better transport of coarse and small woody debris within the stream channel. No LWM will be removed as part of this project. If LWM is located immediately upstream of the project site, it may be transported to the stream channel or riparian area below if there is the potential for damage or blocking of the stream crossing structure.

A few of the indicators will have short-term negative impacts, but in the long-term proposed activities will benefit these indicators. The culvert work may cause a temporary blockage during channel and bank work with the application of design measures needed to trap fine sediment. No new permanent physical barriers limiting steelhead, redband, or bull trout movement would be created as a result of this project. The use of straw bales, filter cloth, or sand bags or water diversion through temporary pipe or plastic-lined ditches may affect individuals during project implementation. This sediment control measures will probably be used for a total of up to 3 days then removed when the project is complete. The new crossing structures will accommodate fish passage at all flows to all life stages of steelhead, bull trout, and redband trout where not available now in fish bearing portions of Vinegar Creek, Blue Gulch, Vincent Creek and Granite Boulder Creek. Growth and survival, and life history diversity and isolation for all fish species may be enhanced by the removal of barriers in this alternative.

The proposed actions, both from culvert/ford work and erosion control will put some sediment directly into project area streams. Proposed actions will produce short-term (1-2 years) sediment into project area streams as a result of the culvert replacements. Impacts will be kept at a minimum by following project design criteria and mitigation measures described in the EA and BA. Monitoring and fall back actions will assure that effects remain minimal. There is potential of sediment impacting individual fish at the project site during culvert work. Some sediment will be transported the next spring during peak flows, but expected amounts will not pose a threat to listed fish or fish habitat. Ground disturbance can increase sediment which may in turn reduce pool volume, increase cobble embeddedness, and increase turbidity that may lead to increased water temperature (Meehan 1991). This project will produce some short-term sediment during and after implementation in order to reduce long-term direct and indirect sediment inputs. The short-term increase will be very small in size and scale due to the small area of disturbance at each project point as well as PDCs and Mitigation Measures. No measurable changes are expected outside the project location. This project provides both short and long-term benefits to the riparian zone and its associated steelhead, redband, and bull trout population by lowering cumulative effects. Long-term effects will be beneficial with the elimination of current direct and indirect sediment inputs caused by undersized culverts and poor drainage features. It will lower surface erosion concerns; it improves drainage functionality; it reduces the long-term risk of a large-scale road culvert failure; it provides long-term benefits to fish habitat and passage; it reduces maintenance costs.

The main potential effector for changes in pool frequency and quality from these projects is sediment. The long term effect of this action is a reduction in sediment leading to higher pool frequency and quality. The action alternative would reduce the potential for road failures which would be the highest input of sediment to project area streams.

Substrate embeddedness is a direct effect of sediment loading. Current conditions of 20-35% embeddedness is expected to be at least maintained in the short run and potentially lowered in the long run.

Road/stream crossing projects would have small short term impacts on stream bank condition at project site locations during implementation. These impacts will be mitigated with riparian planting, culvert outlet hardening. The projects will have long term benefits to streambanks immediately downstream of culverts because of lower water velocities at peak and near peak flows will have less energy which can reduce stream bank stability.

Because machinery and trucks would be used in RHCAs, Alternative 2 activities have some potential for chemical contamination of streams. Project Design Criteria and Mitigation Measures described in the EA and BA would minimize the risk of contamination.

Overall, there will be some short term impacts caused by disturbance and localized sediment to individual fish with long term benefits to fish habitat by reducing chronic sediment inputs at road/stream crossings and road failure potential and fish populations by improving habitat connectivity for all life stages of fish at all flows in project area streams.

### **Cumulative Effects**

As a result of historic activities, both on Forest Service System and private lands in the area, several watershed conditions have been modified. Harvest, road management, grazing, and other management activities have all affected streams on Forest Service System lands. Activities which occur and are expected to occur on private land include: grazing, water withdrawals under State water rights, timber harvest, scattered rural housing and ranches, and use of State, County and private roads. Grazing is expected to continue on private land. Pastures include riparian areas. Most water rights are for irrigation of these pastures. Timber harvest is expected to continue to occur on private lands within the

watershed. Commercially valuable timber has been harvested recently, and additional harvest would be expected. Residential buildings are limited to rural houses and ranches located outside the Forest boundary. Typical activities include ranching. Road use on State, county and private roads is expected to continue. Additional road construction is not expected. Additional roadwork would be addressed when these projects are proposed. The recent U.S. Highway 26 reconstruction project is now part of the baseline. No other large construction projects are planned in the area. Activities on non-Forest Service System lands are expected to continue to affect streams (i.e., by contributing sediment, by affecting flows, etc.) in a similar manner and magnitude as past activities.

Forseeable actions on Forest Service land include: Blue Roads, Blue Vegetation, Blue Large Wood Placement, Blue Riparian Hardwood Planting, Blue Aspen Enhancement, and Crawford Vegetation Management. Overall, the outcome of the Blue Culverts Project in conjunction with these projects is improvement of fish habitat and fish populations in the project area and downstream in the Middle Fork John Day River.

## Effects Determination

Table 2: Threatened, Endangered, Proposed, and Sensitive Fish Species  
Summary Conclusion of Effects – Short-term and Long-term Effects (Long-term effects in parenthesis if different from short-term effects)

<b>Threatened(T)/Endangered(E)</b>	<b>Alt 1 No-Action</b>	<b>Alt 2 (PA)</b>
Mid-Columbia River (ESU) Summer-run Steelhead (T)	LAA	LAA (BE)
Columbia River Basin Bull Trout (T)	LAA	LAA (BE)
<b>Designated Critical Habitat</b>		
Mid-Columbia River (ESU) Summer-run Steelhead	NE	NLAM
Spring Chinook Salmon Essential Fish Habitat (EFH)	NE	NLAM
<b>Sensitive Species</b>		
Mid-Columbia River (ESU) Spring Chinook Salmon	MIIH	MIIH (BE)
Interior Redband Trout	MIIH	MIIH (BE)

Listed Species: NE = No Effect, LAA = May Effect – Likely to Adversely Affect, NLAA = May Effect – Not Likely to Adversely Affect, BE = Beneficial Effect

Listed Habitat: NE = No Effect, NLAM = Not Likely to Adversely Modify, LAM = Likely to Adversely Modify

Sensitive Species: NI = No Impact, MIIH = May Impact Individuals or Habitat, but will not likely contribute toward federal listing or loss of viability to the population or species, \* WIFV = Will Impact individuals or habitat with a consequence that the action may contribute to a trend toward Federal listing or cause a loss of Viability to the population or species, BE = Beneficial Impact

\* = Trigger for a Significant Action as defined by NEPA

ESU = Evolutionary Significant Unit – a geographically definable landscape area utilized by a distinct taxa or species population unit, considered reproductively isolated from other conspecific population units, and represents an important evolutionary link in the species genetic legacy.

## Alternative 1

Mid-Columbia Steelhead trout: **May affect, likely to adversely affect.** Determination is due to existing passage barriers that reduce or eliminate connectivity between steelhead populations above and below the culverts as well as chronic sediment/erosion and road failure risk.

Bull Trout: **May affect, likely to adversely affect.** Determination is due to existing passage barriers that reduce or eliminate connectivity between populations above and below the culverts as well as chronic sediment/erosion and road failure risk.

Chinook Salmon: **May impact individuals or habitat, but will not likely contribute to a trend towards Federal listing or loss of viability to the population or species.** Rationale is because Chinook salmon occur downstream of project sites and would be impacted by sediment to be carried to occupied habitat from chronic sediment problems or road failures.

Redband trout: **May impact individuals or habitat, but will not likely contribute to a trend towards Federal listing or loss of viability to the population or species.** Rationale is the same as for steelhead.

## **Alternative 2**

Mid-Columbia Steelhead trout: **May affect, likely to adversely affect.** Determination is due primarily to machinery working in the stream channel where fish are present, thereby increasing the chance a juvenile steelhead could be killed or injured, as well as short term impacts associated with turbidity and fine sediment. **The long-term affect of this project is beneficial.**

Bull Trout: **May affect, likely to adversely affect.** Determination is due primarily to machinery working in the stream channel where fish are present, thereby increasing the chance a juvenile steelhead could be killed or injured, as well as short term impacts associated with turbidity and fine sediment. **The long-term affect of this project is beneficial.**

***A MAY AFFECT - LIKELY TO ADVERSELY AFFECT determination for Middle Columbia River steelhead and Columbia Basin bull trout populations*** has been reached because of the in-stream activities, mainly culvert removal/replacement at live stream crossings, which entails diversion of streams bearing listed fish. Activities in these locations would create more than a negligible likelihood of an ***incidental take of ESA listed species***. Direct and Indirect effects to the pathway indicators, limiting RMO factors, proper functioning condition of the watershed, and the risk of adverse cumulative effects by this proposed action on steelhead and bull trout habitat is determined to be ***MAY AFFECT – NOT LIKELY TO ADVERSELY AFFECT Middle Columbia River Steelhead and Columbia River bull trout critical habitat.***

Chinook Salmon: **May impact individuals or habitat, but will not likely contribute to a trend towards Federal listing or loss of viability to the population or species.** Rationale is because Chinook salmon occur downstream of project sites and would not likely be impacted by short term impacts. **The long-term affect of this project is beneficial** by reducing potential for sediment to be carried to occupied habitat from chronic sediment or road failures.

The proposed project area in this BA occurs within the area designated as EFH for spring Chinook salmon, which was deemed not warranted for listing under ESA on March 9, 1998 (63 FR 11182). EFH for Chinook salmon is considered to be those habitats occupied at present and those historic habitats in the John Day Basin. This includes main stem streams and most tributaries below natural barriers to upstream migration. The proposed actions in this BA are unlikely to adversely affect Chinook salmon EFH based on the rationale presented below for summer steelhead designated critical habitat.

Redband trout: **May impact individuals or habitat, but will not likely contribute to a trend towards Federal listing or loss of viability to the population or species.** Rationale is the same as for steelhead and Bull trout. **The long-term affect of this project is beneficial.**

## **Rationale for Determination**

The vast majority of the proposed activities will occur outside of the wetted width of project area streams. All of the work will occur within the boundaries of a category 1 RHCA zone. The overall

amount of soil disturbance will be fragmented into short segments or spots averaging less than 100 feet in length. This leaves the majority of the riparian zone undisturbed by the project. Seasonal timing restrictions, design criteria, and erosion control measures will be applied helping to minimize the disturbance effects. Follow up effectiveness monitoring conducted immediately after project completion and after the next peak flow period will provide feedback on the success of the project.

Culvert replacements with single span structures or engineered rock fords are the locations most likely to produce short-term (1-2 years) post project sediment directly into project area streams. These projects have short term adverse impacts causing the potential for an incidental take. Long-term effects will be positive and reduce persistent sedimentation caused by under sized structures, while lowering future risks of major storm damage. There will be fish passage where barriers currently exist after project implementation.

The proposed project area in this BA occurs within the area designated as EFH for spring Chinook salmon, which was deemed not warranted for listing under ESA on March 9, 1998 (63 FR 11182). EFH for Chinook salmon is considered to be those habitats occupied at present and those historic habitats in the John Day Basin. This includes main stem streams and most tributaries below natural barriers to upstream migration. The proposed actions in this BA are unlikely to adversely affect Chinook salmon EFH based on the rationale presented in Chapter V for summer steelhead designated critical habitat.

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# ***BIOLOGICAL ASSESSMENT***

## ***For Fisheries***

**(Steelhead, Bull Trout and Chinook Salmon)**

### **Blue Culverts Project**

#### **MIDDLE FORK JOHN DAY SUB-BASIN**

**MALHEUR NATIONAL FOREST, BLUE MOUNTAIN RANGER  
DISTRICT**

3/7/2003

Prepared by:/s/ \_\_\_\_\_

J. Perry Edwards  
Fishery Biologist  
Blue Mountain Ranger District

Date: \_\_\_\_\_

# Chapter I & II

## Environmental Baseline

### Introduction

The Blue Culverts project is in the Galena watershed, within the Middle Fork John Day subbasin. The General Description of the Watershed and Environmental Baseline, Chapters I and II of the 2001 BA for batched ongoing activities in the Middle Fork John Day subbasin is incorporated here by reference.

### Project Area Location

The Blue Culverts project area is located about 25 air miles northeast of John Day, Oregon. Access from John Day is on Highway 26 to the junction of Highway 7, north on Highway 7 to the junction of County Road 20, then west on County Road 20 along the Middle Fork John Day River. The Blue Culverts project is located within the Galena Watershed, one of five watersheds located in the Middle Fork John Day River Sub-basin. The table below lists subwatersheds and land ownership for each. These projects are located in the Vinegar Creek Vincent Creek and Granite Boulder subwatersheds. All streams are tributaries to the Middle Fork John Day River; Blue Gulch is a tributary to Vinegar Creek.

Vinegar Creek, Vincent Creek and Granite Boulder Creek contain summer/winter rearing and spawning habitat for Mid-Columbia summer run steelhead. Granite Boulder contains winter/summer rearing and spawning habitat for a population of bull trout. There may be a small population of bull trout in Vinegar Creek but the status is currently unknown.

Table 1—Subwatersheds & Land Ownership within the Blue Culverts Project Area

<b>Subwatershed (SWS) Name (HUC 6)</b>	<b>SWS Number</b>	<b>SWS Acres (in analysis area)</b>	<b>Malheur NF Acres</b>	<b>Umatilla &amp; Wallowa-Whitman NF Acres</b>	<b>Private Acres</b>
Vinegar Creek	30203	7,585	7,118	411	56
Vincent Creek	30205	3,769	3,758	0	11
Granite Boulder Creek	30213	7,383	6,631	713	39
<b>Total Acres</b>		<b>18,737</b>	<b>17,507</b>	<b>1124</b>	<b>106</b>

## **Project Area Streams—Habitat Overview**

This section describes stream conditions at the time of surveys. Forest Service personnel completed Level II surveys (modified Hankin and Reeves). The map on page 9 shows fish presence in project area streams. These surveys are completed on Category 1 streams (perennial fish bearing). Surveys continue at least ¼ mile above where fish are observed during surveys or where past incidental sightings have occurred. Level II surveys were not completed on Category 2 (perennial fish bearing) or 4 streams (intermittent channels). Oregon Department of Fish and Game (ODF&W) used a different methodology for the survey of the Middle Fork John Day River but results are summarized, as all project area streams are tributaries to the Middle Fork John Day River.

Vinegar Creek and the Middle Fork John Day River are on the state of Oregon 303(d) list for water quality concerns. Vinegar Creek is listed for excessive summer rearing temperature for fish and MFJD is listed for excessive summer rearing temperature and flow modification.

### Middle Fork John Day River

The Middle Fork John Day River, into which Vinegar Creek, Vincent Creek and Granite Boulder Creek flow, is listed on the Oregon Department of Environmental Quality 303(d) list for temperature and flow modification.

ODF&W personnel completed habitat surveys in 1992 and 1996. Much of this river is on private land so Forest Service surveys were not completed. Stream temperatures ranged from 52-70°F in August and September. Pools frequency ranged from 1.72 to 5.80 per mile. Pool spacing ranged from 9 channel widths distance in Reach 10 to 28.5 in Reach 9. Pools greater than 3 feet deep ranged from 0.13 to 2.28 per mile. Unstable banks ranged from 10% to 32%. Wetted width to depth ranged from 42.2 to 49.8. Shade ranged from 18 to 42%. Large woody debris ranged from 3.2-9.6 per mile. All wood present was movable at peak or near peak flows.

### Vinegar Creek

#### 1991 Level II Stream Survey Results

August stream temperatures obtained from hand held thermometers ranged from 42° to 72°F. The difference in stream temperatures was observed from the lower (higher temps) to the upper reaches (lower temps). Instream woody debris counts of pieces >12" diameter at breast height (DBH) ranged from 0 /mile in Reach 1 to 243/mile in Reach 12. Stream sediment was excessive in all reaches. Pools/mile ranged from 0 in Reach 17 to 36 in Reach 10.

#### 2000 Habitat Survey Results

Fisheries personnel conducted a habitat stream survey on the first 4 miles from the mouth in 2000. Results of the survey showed this stream channel is in active recovery on portions with low gradients and wide valley bottoms (expected Rosgen "C" or "E" channel types). Sometime in the past, the stream had downcut 2-3 feet and formed a Rosgen "B" channel type within the old channel. Currently, stream sinuosity is increasing and stream gradient is decreasing. Width to depth ratios are improving but are still high relative to expected for the geomorphology of the stream reaches. Quantity and quality of pool habitat is currently increasing but is not at optimum levels. Some areas are actively cutting new channels where the current channel was entrenched by 2-3 feet. Floodplains are reconnecting and water tables rising in these sections. Shade from deciduous trees and shrubs was still inadequate to maintain temperatures for resident and anadromous fish.

## Blue Culvert Replacement Project – Activity BA

Vinegar Creek is the only stream in the project area listed on the Oregon Department of Environmental Quality 303 (d) list (1998) for temperature. Summaries of stream temperature data collected in Vinegar Creek between 1995-2000 listed 7-day maximum temperatures ranged from 53.5°F to 74.8°F. This stream rates as Functioning at Unacceptable Risk for this indicator using the bull trout or steelhead matrix. Upper reaches of Vinegar Creek met temperature standards for “Functioning at Risk” for steelhead even when lower reaches did not.

### Vincent Creek

#### 1991 Level II Stream Survey Results

Adult and juvenile redband trout inhabit the lower 5.0 miles of Vincent Creek. Juvenile steelhead and juvenile Chinook possibly inhabit the same stream habitats. July stream temperatures obtained from hand held thermometers ranged from 54° to 70°F. Instream woody debris counts of pieces >12” DBH ranged from 0.0 /mile in Reach 1 to 91.6/mile in Reach 3. Reach 1 was a livestock pasture. Stream sediment was excessive in all reaches. Pools/mile ranged from 45 in Reach 1 to 96.6 in Reach 2. Vincent Creek stream survey listed several areas of habitat degradation caused from mining activities.

Summaries of stream temperature data collected in Vincent Creek between 1995-2000 listed that 7day maximum temperature averages ranged from 61.2°F to 71.4°F. This stream rated as Functioning at Unacceptable Risk for this indicator for the steelhead matrix. Upper reaches of Vincent commonly did not meet standards when lower reaches failed.

## **Project Area Fish—Steelhead, Bull Trout and Chinook Salmon**

### **Mid-Columbia River Summer-run Steelhead (*Oncorhynchus mykiss gairdneri*)**

**Status: Federal – Threatened (24 March 1999)**

Heritage Status – Global Conservation Status Rank: G5T2Q (22 Oct 1999)

**Rounded Global Conservation Rank: T2**

Generally, adult steelhead spawn in smaller tributaries not larger streams such as the Middle Fork John Day River. Specific to this project area, steelhead spawning and rearing habitat are found in Vinegar Creek, Vincent Creek and Granite Boulder Creek. Steelhead use The Middle Fork John Day River for winter rearing, some summer rearing habitat and migratory habitat.

Table 2—Steelhead Bearing Streams in Project Area

<b>Subwatershed</b>	<b>Steelhead Fish Bearing Miles</b>	<b>Perennial Non-fish Bearing Miles</b>	<b>Intermittent/ Seasonal Miles</b>	<b>Habitat Type</b>
Vinegar Creek	7.3	10.4	25.3	Rearing, Spawning
Vincent Creek	4.5	3.1	9.1	Rearing, Spawning
Granite Boulder Creek	4.1	12.2	8.5	Rearing, Spawning

**Columbia River Basin Bull Trout (*Salvelinus confluentus*)**

**Status: Federal – Threatened (10 June 1998)**

**Proposed Critical Habitat (14 November 2002)**

Heritage Status – Global Conservation Status Rank: G3T2Q (27 Oct 1999)

**Rounded Global Conservation Rank: T2**

Current spawning and rearing habitat use by bull trout within the project area appears to be limited to Granite Boulder Creek. There was an individual adult found in Vinegar Creek during an electroshocking study conducted by ODF&W in 2000 but it is unknown if this was stray fluvial fish or part of a small population. There is migratory/seasonal use in the mainstem Middle Fork John Day River; all project area streams flow into this river.

Table 3—Bull Trout Bearing Streams in Project Area

Subwatershed	Bull Trout Fish Bearing Miles	Perennial Non-fish Bearing Miles	Intermittent/Seasonal Miles	Habitat Type
Granite Boulder Creek	4.1	12.2	8.5	Rearing, Spawning
Vinegar Creek	Historic; currently, extent of population and habitat use is unknown			

**Mid-Columbia River Spring Chinook Salmon (*O. tshawytscha*)**

**Status: USFS Region 6 Sensitive**

Heritage Status – Global Conservation Status Rank: G5Q

Mid-Columbia River spring Chinook salmon (sensitive) are found within the project area. Spawning is not in project area streams but rather in the Middle Fork John Day River (see table below). There is some very limited potential for spawning in the lower reaches of tributaries with most potential in Granite Boulder Creek and Vinegar Creek. Adult holding and juvenile rearing also occur in these same general areas. Two adult Chinook were once observed several miles upstream in Vinegar Creek during summer 1995 but this is not likely common due to low flows creating physical barriers to upstream migration into tributaries when adults are in the vicinity.

Table 4—Chinook Bearing Streams in Project Area

Subwatershed	Chinook Fish Bearing Miles	Perennial Non-fish Bearing Miles	Intermittent/Seasonal Miles	Habitat Type
Vinegar Creek	0.25	10.4	25.3	Rearing
Granite Boulder Creek	0.25	12.2	8.5	Rearing

**Roads**

The table below shows the baseline road information for the project area. Open and closed road miles are not differentiated.

Table 5—Existing Roads in Project Area

	Vinegar	Vincent	Granite Boulder
Total Road Miles	42.1	30.6	40.1
RHCA Road Miles	8.8	7.1	9.8
Total Road Density (mi/mi <sup>2</sup> )	3.55	5.20	3.48

One other update to the baseline for this area is that road closure and decommissioning work, which was identified in the Summit EA and Decision Notice (1995) is being done, but has not been included in the baseline. This includes about 7.5 miles of road closure, and 12.5 miles of road decommissioning. It also includes upgrading existing closures on about 15.5 miles of road.

**Existing Condition—Site Specific for Project Points**

The following section lists project sites (displayed on Map, page 9) and describes existing conditions at each site. A Forest-wide culvert survey was completed in 2002 by MNF Engineering personnel. This is part of Region 6 program to assess fish passage conditions at road crossing. The survey measures and compares bankfull width of the stream to culvert to determine ability of the culvert to pass a 100 year flow event, as well as culvert slope, distance, water velocities and culvert bottom roughness. These surveys identified 14 culverts potential barriers to some life stage of fish at some flow.

The Blue Culverts Interdisciplinary Team (IDT) went out and field verified culverts noted with potential problems. Some culverts were determined to be functioning appropriately. The table below lists info about each site where problems exist.

Table 6—Project Culverts Existing Condition

Site #	Stream	Road Number	Fish-bearing Segment (Y/N)	Fish Barrier (Y/N)	Reason for barrier	Sized for 100 Year Flow Event* (Yes/No)
1	Vinegar	2010618	Y	Y	Slope, velocity & length	N
2	Vinegar	2010618	Y	Y	Outlet jump height & slope	N
3	Blue Gulch	2010618	Y	Y	No resting areas, culvert slope, velocity & length	Y
4	Blue Gulch	2010873	N	NA	NA	Y

Blue Culvert Replacement Project – Activity BA

Site #	Stream	Road Number	Fish-bearing Segment (Y/N)	Fish Barrier (Y/N)	Reason for barrier	Sized for 100 Year Flow Event* (Yes/No)
5	Vincent	2010159	Y	N	NA	N
6	Vincent	2010292	Y	Y	Jump height	Y
7	Vincent	2010101	Y	Y	NA	Y
8	Vincent	2010429	Y	N	NA	Y
9	Vincent	2010986	N	NA	NA	Y
10	Vincent	2010993	N	NA	NA	Y
14	Granite Boulder	4559283	Y	Y	No depth at low flows, velocity at high flows	??

\*Based on Regional culvert survey methods

Site 1- FS Road 2010618 at lower crossing with Vinegar Creek.

Currently, this culvert blocks fish passage due to the length and velocity with no slow water for fish to rest during upstream movement. There are nearly 2 miles of good summer rearing and spawning habitat upstream of this site.

Site 2 - FS Road 2010618 at upper crossing with Vinegar Creek

There is over ½ mile of cold water, summer rearing habitat upstream of this culvert. Currently, the jump height at the culvert outlet and the slope of the culvert limit fish passage upstream. The individual bull trout found during electroshocking surveys was captured less than ½ mile downstream of this location. This culvert is reducing summer rearing habitat available for bull trout and steelhead.

Site 3 – FS Road 2010618 at crossing on Blue Gulch (Vinegar Creek Tributary)

This site is in the fish-bearing portion of Blue Gulch, albeit less than ½ mile of low quality summer rearing habitat. The high gradient and length of the culvert create an upstream passage barrier to fish. The size of the culvert is somewhat inadequate to handle high flows but there were no signs of water overtopping the culvert and flowing across the road. Failure of the culvert to handle high flows could cause rilling/gullyng across road surface and fill slope or mass failure of road prism. Sediment would be transported downstream due to stream gradient, potentially impacting fish and fish habitat.

Site 4 – FS Road 2010873 at crossing on Blue Gulch (Vinegar Creek Tributary)

This site is above the fish-bearing portion of Blue Gulch. Site shows signs of past overflows and engineering personnel have seen water run over road during high flows. Failure of the culvert to handle high flows could cause rilling/gullyng across road surface and fill slope or mass failure of road prism. Sediment would be transported downstream due to stream gradient, potentially impacting fish and fish habitat.

Site 5 – FS Road 2010159 at crossing on Vincent Creek

This structure is undersized for 100-year flow events and may present a barrier under some flow conditions as well as potential culvert failure. MNF engineering and hydrology personnel have

## Blue Culvert Replacement Project – Activity BA

observed ponding upstream of culvert on several locations. This section is heavily channelized from historic mining activities and commonly goes dry during drought years (including 2002).

### Site 6 – FS Road 2010292 at crossing on Vincent Creek

This crossing is located on private land and contains 2 culverts on the fish-bearing portion of Vincent Creek. One culvert is failing and water is running alongside the structure underground (chronic sediment producer). The culverts are undersized posing a risk of failure at high flows that could impact fish and fish habitat downstream. Both culverts have jump heights that are barriers to upstream migration of fish.

### Site 7 – FS Road 2010292 (101) at crossing on Vincent Creek

The culvert is undersized for high flow events as evidenced by signs of ponding above the culvert and rilling/gulling (chronic sediment producer) of the road surface over the culvert. This poses a risk of failure at high flows that could impact fish and fish habitat downstream.

### Site 8 – FS Road 2010429 at crossing on Vincent Creek

The culvert is undersized for high flow events based on bankfull measurements. This poses a risk of failure at high flows that could impact fish and fish habitat downstream.

### Site 9 – FS Road 2010986 at crossing on Vincent Creek

This culvert is upstream of a barrier falls for anadromous fish. The culvert is undersized for 100 year events therefore posing a risk of failure at high flows that could impact fish and fish habitat downstream.

### Site 10 – FS Road 2010993 at crossing on Vincent Creek

This site is above the fish-bearing portion of Vincent Creek. The culvert is undersized for high flow events. Failure of the culvert to handle high flows could cause rilling gullying across road surface and fill slope or mass failure of road prism. Sediment would be transported downstream due to stream gradient, potentially impacting fish and fish habitat.

### Site 14 – FS Road 4559283 at crossing on Granite Boulder Creek

This site is on the fish-bearing portion of Granite Boulder Creek; habitat provided includes summer/winter rearing and spawning for bull trout and steelhead. The culvert is a passage barrier to fish during low flows when the water in the structure is less than 1 inch deep and several feet wide, and a barrier at high flow due to high stream velocity. MNF personnel have noted rubble-sized material moving downstream of the culvert implying high velocities during peak flow periods.

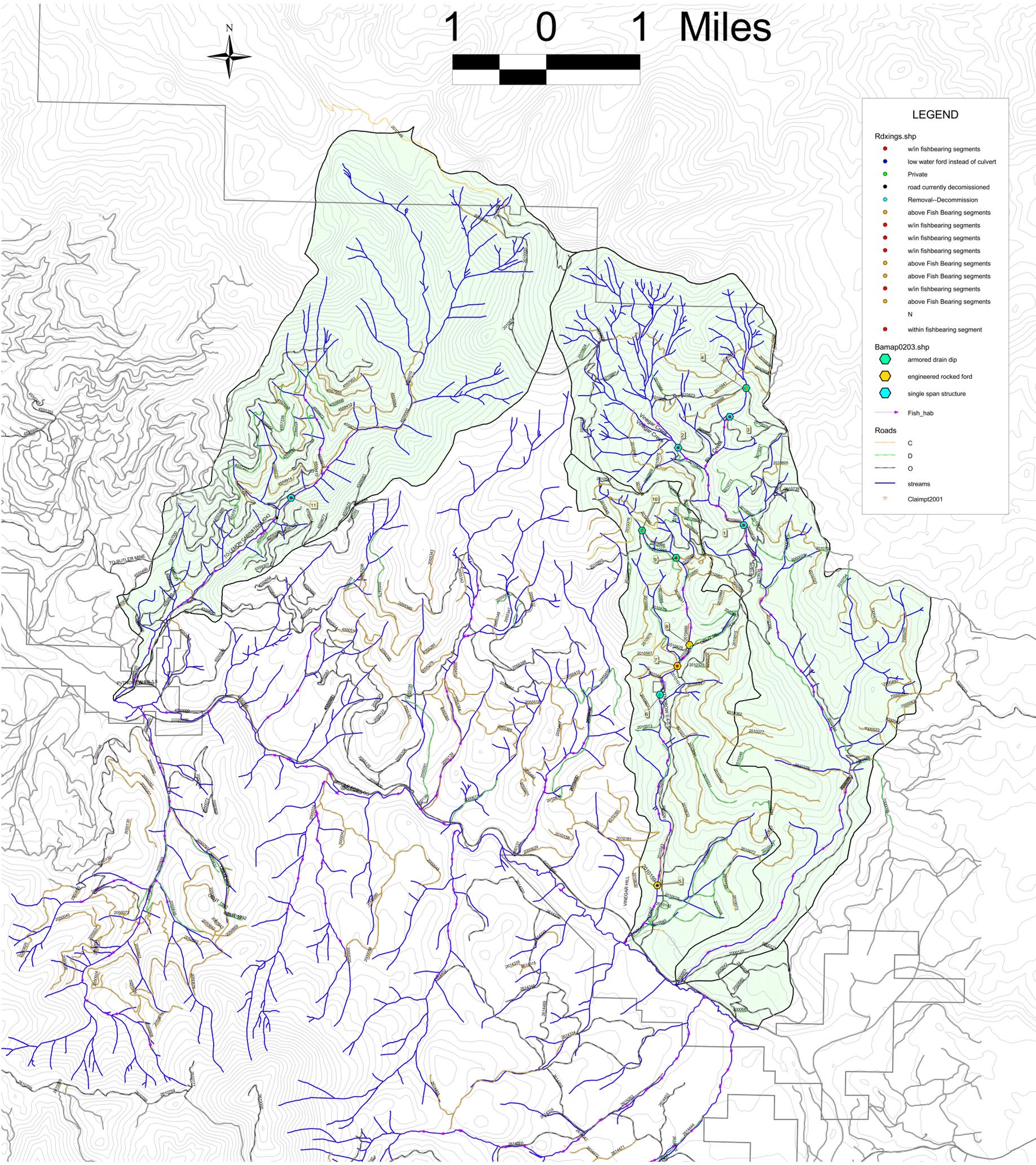


1 0 1 Miles



LEGEND

- Rdxings.shp
  - win fishbearing segments
  - low water ford instead of culvert
  - Private
  - road currently decommissioned
  - Removal-Decommission
  - above Fish Bearing segments
  - win fishbearing segments
  - win fishbearing segments
  - win fishbearing segments
  - above Fish Bearing segments
  - above Fish Bearing segments
  - above Fish Bearing segments
  - win fishbearing segments
  - above Fish Bearing segments
  - N
  - within fishbearing segment
- Bamap0203.shp
  - armored drain dip
  - engineered rocked ford
  - single span structure
  - Fish\_hab
- Roads
  - C
  - D
  - O
  - streams
  - Clamp12001



# CHAPTER III —DESCRIPTION of PROPOSED IMPROVEMENT ACTION(S)

## PURPOSE AND NEED FOR ACTION

Vincent, Vinegar and Granite Boulder Creeks host threatened species of steelhead, Columbia River bull trout, and a sensitive species, Chinook salmon. Currently, 1 road crossing on Granite Boulder Creek, 2 road crossings Vinegar Creek, 2 road crossings on Blue Gulch and 6 road crossings on Vincent Creek are passage barriers to various life stages of fish at several stream flow conditions; and/or these crossings do not meet current Regional and State guidance (for 100-year flow events). A need exists to correct road crossings identified as passage barriers which reestablishes stream connectivity for all life stages of protected and threatened fish species. A further need exists in these subwatersheds to ensure high water flow relief at crossings that exhibit a potential of erosion and sedimentation. These projects would also reduce the need for maintenance of the culverts, which can be a disturbance to the stream.

## PROPOSED ACTION

The proposal includes the following activities on Vinegar Creek, Blue Gulch, Vincent Creek and Granite Boulder Creek (see table 7 below and map on page 9):

- 1) Replacing 5 culverts with single span structures such as bottomless arches
- 2) Replace 3 culverts with low water rock crossings (engineered rocked fords)
- 3) Install 6 armored drain dips in roads over existing culverts upstream of fish bearing reaches

Table 7— Proposed Actions by subwatershed.

Subwatershed	Replace Culvert with Single Span Structure	Replace Culvert with Engineered Rock Ford	Reinforce culvert by creating armored overflow drain dips
Vinegar Creek	3	0	1
Vincent Creek	1	3	2
Granite Boulder Creek	1	0	0

## Blue Culvert Replacement Project – Activity BA

The projects are listed here by treatment:

- 1) Culvert replacement with single span structures,
- 2) Culvert replacement with engineered low water rock ford,
- 3) Culvert reinforcement by constructing armored overflow drainage dip at crossing.

### **1) Replace Culverts with Single Span Structures**

This action proposes activities on 5 culverts in Blue Gulch, Vinegar, Vincent and Granite Boulder Creeks. Project Site locations and numbers are displayed on Map, page 9.

- Site 1 – FS Road 2010618 at lower crossing with Vinegar Creek
- Site 2 – FS Road 2010618 at upper crossing with Vinegar Creek
- Site 3 – FS Road 2010618 at crossing on Blue Gulch (Vinegar Creek Tributary)
- Site 6 – FS Road 2010292 at crossing on Vincent Creek
- Site 14 – FS Road 4559283 at crossing on Granite Boulder Creek

Existing culverts would be removed using an excavator. New structures, likely bottomless arches, will be aligned with stream channel profile (vertical and horizontal) and be designed to handle 100-year flow events. Site will be prepared for installation including widening location for new structure and excavation for footings. Installation will include rocking the inlet and outlet ends and catch basin, and stabilizing the fill slope with straw mulch and short-term grass seeding as needed. Structures would include use of native materials for natural stream bottom simulation to mimic natural conditions upstream and downstream of the project site. Sites would be backfilled with materials removed from existing road fill.

### **2) Remove Culvert and Install engineered rock ford**

This action proposes activities on 3 culverts in Vincent. Project Site locations and numbers are displayed on Map, page 9.

- Site 5 – FS Road 2010159 at crossing on Vincent Creek. This road will remain closed to motor vehicles.
- Site 7 – FS Road 2010292 (101) at crossing on Vincent Creek. The road closure device will be moved to block vehicle access to the road/stream crossing.
- Site 8 – FS Road 2010429 at crossing on Vincent Creek. The road closure device will be moved to block vehicle access to the road/stream crossing.

Culverts would be removed, and crossings widened to match natural channel width upstream/downstream and accommodate 100-year flow events within the channel and floodplain. The approach, stream banks and stream bottom would be hardened using grid-rolled or pit run rock to allow high clearance vehicle passage and reduce potential for erosion and sedimentation.

### **3) Reinforce culvert by constructing armored overflow drainage dip at crossing.**

This action proposes activities on 3 culverts in Vincent Creek and Blue Gulch. Project Site locations and numbers are displayed on Map, page 9.

- Site 4 – FS Road 2010873 at crossing on Blue Gulch
- Site 9 – FS Road 2010986 at crossing on Vincent Creek
- Site 10 – FS Road 2010993 at crossing on Vincent Creek

## Blue Culvert Replacement Project – Activity BA

Armored overflow drainage dips would be constructed on the road prism with a backhoe or excavator at stream crossings to direct excess flows and channel back into streams. Drainage dips and road fills would be hardened using grid-rolled or pit run rock to allow high clearance vehicle passage and reduce potential for erosion and sedimentation. No instream work would be associated with these actions but activities would occur on the streambank where the overflow ditch and rock would come down to the stream.

### Standards and Guidelines

The following items describe PACFISH, Regional, state or Forest direction for implementing these projects and design criteria.

- PACFISH RF-4 -- "Construct new, and improve existing, culverts, bridges, and other stream crossings to accommodate a 100-year flood..."
- PACFISH RF-5 -- "Provide and maintain fish passage at all road crossings of existing and potential fish-bearing streams."
- PACFISH RA-2 -- "Trees may be felled in RHCAs when they pose a safety risk. Keep felled trees on site when needed to meet woody debris objectives."
- PACFISH RA-4 -- "Prohibit storage of fuels and other toxicants within RHCAs. Prohibit refueling within RHCAs unless there are no other alternatives. The Forest Service must approve refueling sites within a RHCA and have an approved spill containment plan."
- Best Management Practices R-3 -- "... Contractors are to schedule and conduct operations to minimize erosion and sedimentation..."
- Best Management Practices R-14 -- "...Excavation is a common requirement for the installation of bridges, culverts, ... excavated materials shall be kept out of live streams unless they are designed to be placed there... sediment producing materials will not be left within reach of anticipated flood flows... it is sometimes necessary to divert flowing water around work sites to minimize erosion and downstream sedimentation... culverts will be installed only during flow periods specified in the project plan..."
- Best Management Practices R-18 -- "...maintain roads in a manner which provides for water quality protection by controlling the placement of waste material, keeping drainage facilities open, and by repairing ruts and failures to reduce sedimentation and erosion..."
- Forest Plan, MA3B standard 42 -- "Design and maintain roads to protect fisheries values and riparian area habitat."
- Forest Plan, MA3B standard 45 -- "Apply erosion seeding on... all disturbed soil that occurs within 100-200 feet of... stream or where eroded material could reach a stream..." Note: Straw mulching will be used as a ground cover and some short-term grass seeding applied. Follow up seeding or transplanting of native grasses and shrubs is planned within one year.

## Project Design Criteria & Mitigation Measures

Throughout the project, BMPs will be used to minimize adverse impacts to aquatic habitat. Some of those not previously completely disclosed in this document are listed below:

- Operate machinery in road prism.
- Install temporary structures to protect the creek from construction sediment. Sediment filter fences or sediment traps will be installed at the downstream end of all culverts prior to beginning culvert installations, catch basin cleaning, and inlet/outlet ditch cleaning or construction. Sediment devices will remain in place until soils become stabilized. Soils may be stabilized by natural seed processes or promoted by artificial methods.
- A Forest Service employee qualified/certified in road construction will monitor the construction activities to ensure work is conducted in a workman-like manner and resource objectives are met.
- Require a delivery/storage/application plan to prevent petroleum products or other deleterious materials from entering water systems.
- Excess and unsuitable material will be taken to an upland disposal area.
- Areas of streambank disturbance will be seeded or planted. Existing vegetation will be retained, as possible, and replanted to promote vegetation.
- An oil and hazardous substance spill contingency plan will be in place.
- Accomplish any instream work between July 15 and August 15 in Granite Boulder Creek (bull trout spawning), Vinegar Creek and Blue Gulch (potential bull trout spawning) and July 15 until September 15 in Vincent Creek.
- There is an existing borrow pit on FS Road 2010 that will be used to get grid-rolled or pitrun rock for project sites. No waste sites have been identified if there is excess soil at project sites after implementation.

In addition to the above BMPs, the following standard Regional BMPs (General Water Quality Best Management Practices, Pacific Northwest Region 1988) to protect water quality will be implemented (see Appendix B for a complete description of BMPs):

- R-1. General Guidelines for the Location and Design of Roads
- R-2. Erosion Control Plan
- R-3. Timing of Construction Activities
- R-4. Road Slope Stabilization (Planning)
- R-5. Road Slope and Waste Area Stabilization (Preventive)
- R-7. Control of Surface Road Drainage Associated with Roads
- R-10. Construction of Stable Embankments (Fills)
- R-11. Control of Sidecast Material
- R-12. Control of Construction in Streamside Management Units
- R-13. Diversion of Flows Around Construction Sites
- R-14. Bridge and Culvert Installation and Protection of Fisheries
- R-15. Disposal of Right-of-Way and Roadside Debris
- R-16. Specifying Riprap Composition
- R-17. Water Source Development Consistent with Water Quality Protection
- R-18. Maintenance of Roads
- R-19. Road Surface Treatment to Prevent Loss of Materials
- R-22. Restoration of Borrow Pits and Quarries

## Monitoring Plan

The following monitoring will be conducted to determine the effectiveness of mitigation measures:

1. Monitor fine sediment in project streams before and after road/stream crossing work is implemented—Wolman pebble counts will be completed 100 feet downstream of project sites. Sites will be located using Global Positioning Satellite Equipment (GPS) and flagged to revisit after work is completed. Sampling will be completed before project, immediately after project implementation and the following year after implementation.
2. Photopoints will be created upstream and downstream of road crossings to document, streambank, channel and vegetation conditions before and after implementation.

### *Fall Back Action*

Failure of the standards, guidelines, Best Management Practices or design measures will result in halting of the proposed activity out of compliance. This action would be effective until such time as measures to eliminate any adverse affects to steelhead or bull trout and their critical habitat are taken.

## Chapter IV—Analysis of Potential Effects

### Evaluation Criteria

The following is a site-specific analysis of the potential effects on bull trout, summer steelhead, and summer steelhead designated critical habitat from the proposed activities. The potential effects to the baseline matrix indicators have been evaluated.

The Columbia Basin bull trout and the Mid-Columbia River summer run steelhead are the only two listed species within this watershed. Designated critical habitat has been listed for Mid-Columbia River summer run steelhead. Interior redband trout and Mid-Columbia spring chinook are on the Region's sensitive species and are present in the Analysis Area. This project is within a high priority watershed. A watershed assessment, the Galena WA, has been written. The proposed actions respond to some of the recommendations in the watershed assessment.

Chinook salmon Essential Fish Habitat (EFH) analysis is included in a separate section. Public Law 104-267, the Sustainable Fisheries Act of 1996, amended the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) to establish new requirements for "Essential Fish Habitat" (EFH) descriptions in Federal fishery management plans and to require federal agencies to consult with NMFS on activities that may adversely affect EFH. "Essential Fish Habitat means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" (Magnuson-Stevens Act §3). Therefore, EFH for the ground fish, coastal pelagic, and Pacific salmon fishery (which includes Chinook salmon, but not steelhead at the present time) means those waters and substrate necessary to ensure the production needed to support a long term sustainable fishery (i.e., properly functioning habitat conditions necessary for the long term survival of the species through the full range of environmental variation).

### B. Effects of Actions Using the Diagnostic Pathways Indicators

#### Subpopulation Characteristics

**Subpopulation Size:** This indicator is not likely to be affected by this action. *The projects are expected to maintain the current condition for steelhead (Functioning at Risk) and bull trout (Functioning at Unacceptable Risk).*

**Growth and Survival:** Growth and survival may be enhanced by this action. The culvert work in fish bearing portions of Vinegar Creek, Blue Gulch, Vincent Creek and Granite Boulder Creek will provide passage for all life stages of steelhead and bull trout present. *The proposed culvert activities are expected to maintain the current condition for steelhead (Functioning at Risk), and bull trout (Functioning at Unacceptable Risk) and move the indicators toward an improved condition.*

**Life History Diversity and Isolation:** Life history diversity and isolation may be enhanced by this action. The culvert work in fish bearing portions of Vinegar Creek, Blue Gulch, Vincent Creek and Granite Boulder Creek will provide passage for all life stages of steelhead and bull trout present. *The proposed culvert activities are expected to maintain the current condition (Functioning at Risk) and move the indicator toward Functioning appropriately*

**Persistence and Genetic Integrity:** This indicator is not likely to be affected by this action. *The proposed culvert activities are expected to maintain the current condition (Functioning at Risk).*

### *Water Quality*

**Temperature:** Activities proposed within RHCAs will not alter existing vegetation cover or open up existing canopy cover sufficiently to adversely affect streamside shading or water temperature. Likewise, planting of native vegetation (herbaceous and hardwoods) after culvert work will not likely improve streamside shading or water temperature due to the small area affected. *Therefore, effects from this project would maintain the current temperature matrix call of not properly functioning.*

**Sediment:** Design criteria measures of deferring the action until after the July 15th timing restriction would allow steelhead alevin time to emerge from the gravels and become mobile. Stream flows after mid July will have dropped to base flow levels. Operating in the dry season reduces the risk of storm related overland surface runoff. The soils within the project area have rapid infiltration rates and highly permeable. Under dry conditions they tend to absorb rather than shed moisture. The annual precipitation in the area is less than 25 inches per year and occurs mostly as snow during the winter. Dry season thunderstorms occasionally produce more than ½ an inch of rainfall in this area, but design criteria will be adequate to contain effects of a 25-year event and activities would be postponed until flows receded to reduce potential impacts.

Proposed actions will produce short-term (1-2 years) sediment into project area streams as a result of the culvert replacements. Rocking over disturbed soils will help in protecting soil particle displacement in turn reducing sedimentation risks. Inlet and outlet collars will be rocked. The fill slopes straw mulched and grass seeded as needed. The proposed action will put some sediment directly into project area streams. The type of actions most likely to produce short-term direct or indirect sediment effects on local steelhead or bull trout populations are prioritized:

- 1) Culvert replacements with single span structures on stream crossing sites will dig up and remove old culverts, prepare the site for larger structures, and then install them followed by erosion control measures of rocking or mulching with grass seeding. The road fill covering culverts would be removed as much as possible before pulling the pipes. Culvert removals and replacements with rock fords would dig up and remove old culverts, widen channel to contain 100 year peak flows and place grid-rolled rock on approaches, stream banks and channel bottom to minimize sediment in the short and long term. Project Design Criteria are listed in a section above. Most years all identified streams reach base flows or are dry by mid July. Sediment traps using straw bales, sand bags, or filter cloth would be temporarily placed just downstream to catch fine sediments and prevent it from moving downstream of project sites. There is potential of sediment impacting individual fish at the project site during culvert work. Some sediment will be transported the next spring during peak flows, but expected amounts will not pose a threat to listed fish or bull trout habitat. Post project effectiveness sediment monitoring (Wolman pebble counts) will be completed after project implementation and the following year under base flow conditions. Photo points will document changes and problems as the streams adjust to the new structures.

- 2) Erosion control applications, riparian planting, waste area soil stabilization, and rock armoring around culvert inlets and outlets and rock fords will disturb the ground and may present a small risk

## Blue Culvert Replacement Project – Activity BA

in producing surface sediment. All design criteria measures mentioned above would apply. The instream work will be done with only the bucket of the heavy equipment in the stream. Flow conditions will be at their base flow level. Stream bank cover vegetation will not be adversely impacted. Many stream crossing sites currently have little or no vegetation. The small areas of disturbance would have negligible impacts to the stream. Photo points and sediment monitoring will document changes and/or problems as the streams adjust to new structures.

Ground disturbance can increase sediment which may in turn reduce pool volume, increase cobble embeddedness, and increase turbidity that may lead to increased water temperature (Meehan 1991). This project will produce some short-term sediment during and after implementation in order to reduce long-term direct and indirect sediment inputs. The short-term increase will be very small in size and scale due to the small area of disturbance at each project point. No measurable changes are expected outside the project location. This project provides both short and long-term benefits to the riparian zone and its associated steelhead and bull trout population by lowering cumulative effects. Long-term effects will be beneficial with the elimination of current direct and indirect sediment inputs caused by undersized culverts and poor drainage features. It will lower surface erosion concerns; it improves drainage functionality; it reduces the long-term risk of a large-scale road culvert failure; it provides long-term benefits to fish habitat and passage; it reduces maintenance costs. ***Beneficial effects from this project would move the current sediment matrix call of functioning at risk towards functioning appropriately through its restoration effort.***

**Chemical Contaminations/Nutrients:** Equipment diesel, gas, and oil lubricant are the only chemical (fuel) grouping that would be found within the project area. All three of these items have the potential to adversely affect steelhead or bull trout, if allowed to enter project area streams. Most of the work will employ the use of machinery and trucks to dig or pick up, as well as, move in or remove rock and soil material. All of the proposed activities will occur within RHCAs. Malheur National Forest safety measures relative to the use, storage, and handling of these petroleum products will be adhered to. Fuels and lubricants will not be stored in RHCAs. Traffic accidents with fuel spills are a potential risk with increased truck rock hauling. Temporary road closures are planned during culvert replacement. Traffic control flagging, signing, and having absorbent pads available on site will help to control the risk and facilitate immediate action, should a spill occur. The Malheur Forest has a spill plan in place for emergencies. ***The proposed actions are expected to maintain the current condition of Functioning at Risk.***

### ***Habitat Access***

**Physical Barriers:** No new physical barriers limiting steelhead or bull trout movement would be created as a result of this project. The culvert work may cause a temporary blockage during channel and bank work with the application of design measures needed to trap fine sediment. The use of straw bales, filter cloth, or sand bags or water diversion through temporary pipe or plastic-lined ditches may affect individuals during project implementation. This sediment control measure will probably be used for a total of up to 3 days then removed. The new crossing structures will accommodate fish passage at all flows to all life histories where not available now. This is the main purpose and need for the action. ***Beneficial effects from this project would move the current habitat access matrix call of functioning at unacceptable risk towards functioning at risk through its restoration effort.***

### *Habitat Elements*

**Substrate Embeddedness:** Substrate embeddedness is a direct effect of sediment loading. See sediment section above as proposed actions will directly input some sediment into project area streams. Monitoring using photo points, and Wolman pebble counts to measure embeddedness may help quantify these short-term direct/indirect effects. Current conditions of 20-35% embeddedness is expected to be at least maintained in the short run and potentially lowered in the long run. ***Beneficial effects from this project would move the current habitat access matrix call of functioning at unacceptable risk towards functioning at risk through its restoration effort.***

**Large Woody Material (LWM):** Stream crossing improvement projects will not further impact large woody material and its recruitment. The use of larger diameter structures or construction of rock fords at road/stream crossings will allow better transport of coarse and small woody debris within the stream channel. No LWM will be removed as part of this project. If LWM is located immediately upstream of the project site, it may be transported to the stream channel or riparian area below if there is the potential for damage or blocking of the stream crossing structure. ***The culvert replacement will maintain the current condition of Functioning at Risk.***

**Pool Frequency and Quality:** The quality and quantity of pools in a system are affected largely by substrate size and movement; LWM amounts; peak flow events (water yield); and the amount of sediment loading in the stream system. Pools can be lost or their biologic function impaired by floods; moving bedload material around and aggregating up the substrate level, moving instream LWD that can catch and create a debris jam, which then changes the flow hydraulics allowing deposition, creating complete channel shifts that then turn primary channels into secondary side channels, or by eroding banks and floodplain deposits increasing sediment loading into the system. "Roads modify natural drainage networks and accelerate erosional processes. These changes can alter physical processes in streams leading to changes in stream flow regimes, sediment transport and storage, channel bank and bed configurations, substrate composition, and the stability of adjacent slopes" (Furniss, Roelofs, Yee, 1991). Road related failures most likely to contribute to high sediment inputs would be plugged culverts leading to washed out road fills, landslides, slumps, or fill slope failures due to channel bank cutting. Roads directly affect streams through channel morphology changes or through runoff characteristic changes in the watershed. Adverse affects from these activities can be reduced by observing best management practices (BMP's), performing regularly scheduled maintenance, designing and locating roads properly, using the appropriate type of structure and size on crossings, and by avoiding critical or sensitive sites.

See the above discussions on sediment and LWD. ***Implementation of road/stream crossing projects is expected to maintain current pool frequency and existing conditions (Functioning at Unacceptable Risk).***

**Large Pools:** See the above discussions on Sediment, LWM and Pool Frequency and Quality. The potential to affect large pools is mostly related to the potential to affect the supply, condition, and future sources of LWM. As described above, the potential for a short term loss of LWM is negligible. There are no potential effects to listed fish populations or their habitat as a result from the loss of large pool habitat. Large pool habitat, limited in project area streams due to small size, will not be affected by this project.

***Implementation of road/stream crossing projects is expected to maintain the current conditions of Functioning at Unacceptable Risk.***

**Off Channel Habitat:** Existing off-channel habitat within the Blue Culverts Project Area is very limited. The potential for off-channel habitat along the small streams in this area is also quite limited. This project will not impact the floodplain of project area streams backwater areas. ***Implementation of road/stream crossing projects is expected to maintain the current conditions of Functioning at Risk in project area streams.***

**Refugia:** The project area is not located in a wilderness area or a roadless area. ***Current refugia in the Middle Fork John Day River system will be maintained.***

### ***Channel Condition and Dynamics***

**Wetted Width/Maximum Depth Ratio:** Road/stream crossing project work on Vinegar Creek, Vincent Creek and Granite Boulder Creek will reduce water velocity below the roads during peak and near peak flow events by creating crossings designed to handle 100-year flow events. Projects would incorporate expected width to depth ratios for the geomorphology of the site. Reduced water velocity at high flows will result in a reduction in the width to depth ratio immediately below crossings. Overall, there would likely be negligible short term impacts with long term benefits with implementation of all projects ***The current condition of Functioning at Risk for project area streams will be maintained with the implementation of these projects.***

**Stream Bank Condition:** See above sections on wetted width/maximum depth ratio and sediment. Road/stream crossing projects would have small short term impacts on stream bank condition at project site locations during implementation. These impacts will be mitigated with riparian planting, culvert outlet hardening. The projects will have long term benefits to streambanks immediately downstream of culverts because of lower water velocities at peak and near peak flows will have less energy which can reduce stream bank stability. ***The current condition of Functioning at Risk for project area streams will be maintained with the implementation of these projects.***

**Floodplain Connectivity:** Removal or replacement of culverts that currently maintain downcut channels with structures set at appropriate channel elevation would improve floodplain connectivity above and below project sites. There will likely be no adverse short term effects and a long term beneficial effect on floodplain connectivity. ***Overall, the current condition of Functioning at Risk for project area streams will be maintained with the implementation of these projects.***

### ***Hydrology/Flow***

**Change in Peak/Base Flows:** Roads modify timing and magnitude of peak flows and changes base stream discharge by diverting and channeling surface runoff through ditch relief systems. No work is planned that would modify parameters that would change peak/base flows. Therefore, there are no potential effects to steelhead and bull trout populations or their habitat caused by changes in peak/base flows as a result of implementation or road/stream crossing projects.

**Drainage Network Increase:** Roads increase drainage networks by diverting and channeling surface runoff through ditch relief systems. No work is planned to modify parameters that would affect the drainage network. *Current conditions (Functioning at Risk) are expected to be maintained under these projects.*

### *Watershed Conditions*

**Road Density and Location:** Implementation of road/stream crossing projects will not change road density or location. *This indicator will be maintained (Functioning at Unacceptable Risk) because these parameters will remain the same.*

**Disturbance History:** The proposed action would have a limited effect on features of the disturbance history within this watershed. As a result of historic activities in the area, several watershed conditions have been modified. Road/stream crossing projects will have the net result of reducing the effects of the existing road system. The magnitude of these beneficial effects is relatively small, when compared to the subbasin. *Therefore, this indicator will be maintained (Functioning at Risk) with implementation of these projects.*

**Riparian Conservation Areas:** The Upper Middle Fork John Day Watershed is covered by the PACFISH riparian conservation strategy. The proposed actions follow the standards and guidelines in PACFISH. *The current condition of Functioning at Risk for project area streams will be maintained with the implementation of these projects.*

### **C. Interrelated and Interdependent Actions**

All known interrelated and interdependent actions are included in this assessment. No known additional effects are expected.

### **D. Cumulative Effects (State and Private Actions)**

Activities which occur and are expected to occur on private land include: grazing, water withdrawals under State water rights, timber harvest, scattered rural housing and ranches, and use of State, County and private roads.

Grazing is expected to continue on private land. Pastures include riparian areas. Most water rights are for irrigation of these pastures.

Timber harvest is expected to continue to occur on private lands within the watershed. Commercially valuable timber has been harvested recently, and additional harvest would be expected.

Residential buildings are limited to rural houses and ranches located outside the Forest boundary. Typical activities include ranching.

Road use on State, county and private roads is expected to continue. Additional road construction is not expected. Additional roadwork would be addressed when these projects are proposed.

The recent U.S. Highway 26 reconstruction project is now part of the baseline. No other large construction projects are planned in the area.

**E. Chinook Salmon Essential Fish Habitat (EFH)**

The Pacific Fisheries Management Council (PFMC) is one of eight regional fishery management councils established under the Magnuson-Stevens Act. PFMC develops and carries out fisheries management plans for salmon, groundfish and coastal pelagic species off the coasts of Washington, Oregon, and California, and recommends Pacific halibut harvest regulations to the International Pacific Halibut Commission.

As required by the Magnuson-Stevens Act, PFMC described and identified Essential Fish Habitat (EFH) in each of its fisheries management plans. EFH includes “those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity.” All streams, lakes, ponds, wetlands, and other water bodies currently, or historically accessible to salmon in Washington, Oregon, Idaho, and California are designated as EFH for affected salmon stocks with management plans.

The Magnuson-Stevens Act (MSA) also established an EFH consultation process. Federal agencies are required to consult with NMFS on all actions that may adversely affect EFH. The NMFS interprets the scope of these consultations to include actions by Federal agencies that occur outside designated EFH, such as upstream or upslope, but which nonetheless may have an adverse effect on habitat conditions necessary for the long term survival of the species within EFH. The NMFS must provide conservation recommendations for any Federal or State activity that may adversely affect EFH. Within 30 days of receiving EFH conservation recommendations from the NMFS, Federal agencies must conclude EFH consultation by responding to NMFS with a written description of conservation measures the agency will use to avoid, mitigate or offset the impact of its action on EFH. If the Federal agency selects conservation measures which are inconsistent with the conservation recommendations of NMFS, the Federal agency must explain in writing its reasons for not following NMFS recommendations.

The proposed project area in this BA occurs within the area designated as EFH for spring Chinook salmon, which was deemed not warranted for listing under ESA on March 9, 1998 (63 FR 11482). EFH for Chinook salmon is considered to be those habitats occupied at present and those historic habitats in the John Day Basin. This includes main stem streams and most tributaries below natural barriers to upstream migration. The proposed actions in this BA are unlikely to adversely affect Chinook salmon EFH based on the rationale presented in Chapter V for summer steelhead designated critical habitat.

Blue Culvert Replacement Project – Activity BA

**Table 8—WATERSHED(S): Middle Fork John Day River Sub-basin**

**CHECKLIST FOR DOCUMENTING ENVIRONMENTAL BASELINE AND EFFECTS OF ACTIVITIES ON RELEVANT INDICATORS**

<u>DIAGNOSTICS/ PATHWAYS</u>	POPULATION AND ENVIRONMENTAL BASELINE			EFFECTS OF THE ACTION(S)			
	INDICATORS	Functioning Appropriately	Functioning At Risk	Functioning at Unacceptable Risk	Restore	Maintain	Degrade
<b>Subpopulation Characteristics:</b>		St	BuT		X		YES
Subpopulation Size		St	BuT		X		YES
Growth and Survival		St, BuT			X		YES
Life History Diversity and Isolation		St, BuT			X		YES
Persistence and Genetic Integrity		St, BuT			X		YES
<b>Water Quality:</b>			X		X		YES
Temperature					X		YES
Sediment		X		X <sup>1</sup>	X		YES
Chem. Contam./Nutrients		X			X		YES
<b>Habitat Access:</b>			X	X <sup>1</sup>	X		YES
Physical Barriers			X		X		YES
<b>Habitat Elements:</b>			X		X		YES
Substrate Embeddedness					X		YES
Large Woody Debris		X			X		YES
Pool Frequency and Quality			X		X		YES
Large Pools			X		X		YES
Off-channel Habitat		X			X		YES
Refugia		X			X		YES
<b>Channel Cond. &amp; Dynamics:</b>		X		X <sup>1</sup>	X		YES
Wetted Width/Max. Depth Ratio					X		YES
Stream bank Condition		X			X		YES
Floodplain Connectivity		X			X		YES
<b>Flow/Hydrology:</b>		X			X		YES
Change in Peak/Base Flows					X		YES
Drainage Network Increase		X			X		YES
<b>Watershed Conditions:</b>			X		X		YES
Road Density & Location					X		YES
Disturbance History		X			X		YES
Riparian Conservation Areas		X			X		YES
Disturbance Regime		X			X		YES
<b>Integration of Species and Habitat Conditions</b>		X			X		YES

x<sup>1</sup> Projects are designed to move parameter toward restore in the area of direct/indirect and cumulative effects

## Chapter V—Determination

### *Summary*

***A MAY AFFECT - LIKELY TO ADVERSELY AFFECT determination for Middle Columbia River steelhead and Columbia Basin bull trout populations*** has been reached because of the in-stream activities, mainly culvert removal/replacement at live stream crossings, which entails diversion of streams bearing listed fish. Activities in these locations would create more than a negligible likelihood of an ***incidental take of ESA listed species***. Direct and Indirect effects to the pathway indicators, limiting RMO factors, proper functioning condition of the watershed, and the risk of adverse cumulative effects by this proposed action on steelhead and bull trout habitat is determined to be ***MAY AFFECT – NOT LIKELY TO ADVERSELY AFFECT Middle Columbia River Steelhead and Columbia River bull trout critical habitat.***

### *Rationale*

The vast majority of the proposed activities will occur outside of the wetted width of project area streams. All of the work will occur within the boundaries of a category 1 RHCA zone. The overall amount of soil disturbance will be fragmented into short segments or spots averaging less than 100 feet in length. This leaves the majority of the riparian zone undisturbed by the project. Seasonal timing restrictions, design criteria, and erosion control measures will be applied helping to minimize the disturbance effects. Follow up effectiveness monitoring conducted immediately after project completion and after the next peak flow period will provide feedback on the success of the project.

Culvert replacements with single span structures or engineered rock fords are the locations most likely to produce short-term (1-2 years) post project sediment directly into project area streams. These projects have short term adverse impacts causing the potential for an incidental take. Long-term effects will be positive and reduce persistent sedimentation caused by under sized structures, while lowering future risks of major storm damage. There will be fish passage where barriers currently exist after project implementation.

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# **WILDLIFE BIOLOGICAL EVALUATION**

for

Threatened, Endangered, and Sensitive (TES) Species

**Blue Mountain Ranger District  
Malheur National Forest**

**Blue Culverts Project**

March 5, 2003

Prepared by: /s/

Date:

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Cheri Miller  
Wildlife Biologist

**I. SUMMARY**

Table 1--Threatened, endangered and sensitive (TES) species considered in the analysis of the Blue Culverts project and the effects determination for the preferred alternative.

Species	Scientific Name	Status	Occurrence	Effects of Preferred Alternative
<b>Terrestrial Species</b>				
Northern Bald Eagle	<i>Haliaeetus leucocephalus</i>	T	HD/D	NE
Gray Wolf	<i>Canis lupus</i>	E	HD/S	NE
North American Lynx	<i>Lynx canadensis</i>	T	HD/S	NE
California Wolverine	<i>Gulo gulo luteus</i>	S	HD/S	NI
Pygmy Rabbit	<i>Brachylagus idahoensis</i>	S	HN	NI
Pacific Fisher	<i>Martes pennanti</i>	S	HD/N	NI
American Peregrine Falcon	<i>Falco peregrinus anatum</i>	S	HN	NI
Western Sage Grouse	<i>Centrocercus urophasianus phaios</i>	S	HN	NI
Gray Flycatcher	<i>Empidonax wrightii</i>	S	HN	NI
Bobolink	<i>Dolichonyx oryzivorus</i>	S	HN	NI
Upland Sandpiper	<i>Bartramia longicauda</i>	S	HN	NI
Tricolored Blackbird	<i>Agelaius tricolor</i>	S	HD/N	NI
Bufflehead	<i>Bucephala albeola</i>	S	HN	NI
Spotted Frog	<i>Rana pretiosa</i>		HD/S	NI

**Status**

E	Federally Endangered
T	Federally Threatened
S	Sensitive species from Regional Forester's list
C	Candidate species under Endangered Species Act

**Occurrence**

HD	<b>Habitat Documented</b> or suspected within the project area or near enough to be impacted by project activities
HN	<b>Habitat Not</b> within the project area or affected by its activities
D	Species <b>Documented</b> in general vicinity of project activities
S	Species <b>Suspected</b> in general vicinity of project activities
N	Species <b>Not documented</b> and not suspected in general vicinity of project activities

**Effects Determinations**

Threatened and Endangered Species

NE	No Effect
NLAA	May Effect, Not Likely to Adversely Affect
LAA	May Effect, Likely to Adversely Affect
BE	Beneficial Effect

Sensitive Species

NI	No Impact
MIIIH	May Impact Individuals or Habitat, but Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species
WIFV	Will Impact Individuals or Habitat with a Consequence that the Action May Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the

	Population or Species
BI	Beneficial Impact

## **II. INTRODUCTION**

This Biological Evaluation (BE) analyzes the potential effects of the proposed action for the replacement of eight culverts and installation of six drain dips within the Blue Culvert Environmental Assessment area on the Malheur National Forest. This BE satisfies the requirements of Forest Service Manual 2672.4 that requires the Forest Service to review all planned, funded, executed or permitted programs and activities for possible effects on proposed, endangered, threatened or sensitive species.

The following sources of information have been reviewed to determine which TES species, or their habitats, occur in the project area:

- Regional Forester’s Sensitive Species List
- Forest or District sensitive species database(s) and the GIS mapping layer(s)
- Oregon Natural Heritage Program, Rare, Threatened and Endangered Plants and Animals of Oregon
- Project area maps and aerial photos.

## **III. PROJECT DESCRIPTION**

The project will take place on the Blue Mountain Ranger District approximately twenty-five air miles northeast of John Day, Oregon in the Galena watershed of the Middle Fork John Day River sub-basin. Reference Chapter 1 of the Blue Aquatics Environmental Assessment for a complete description of the Project area and Chapter 2 for the design criteria for the two alternatives. **Alternative 1**, the **No Action** alternative, proposes no culvert replacement. **Alternative 2**, the **Proposed Action** proposes to replace culverts at eight road crossings and install six drain dips in Blue, Granite-Boulder, Vincent, and Vinegar Creeks. To eliminate fish passage barriers for all life stages of fish and reduce erosion five culverts would be replaced with single span structures, three culverts would be replaced with low water crossings, and six armored drain dips would be installed over existing culverts. Design criteria and mitigation measures as described in the Environmental Assessment would be implemented under alternative 2. Project would occur July 15 through September 15 each year until completed, which is expected by 2006.

## **IV. EFFECTS ANALYSIS**

Three subwatersheds were evaluated to determine which TES species might occur based on the presence of probable habitat types, known sightings and the biological requirements of each species involved.

Pygmy rabbit, Pacific fisher, American peregrine falcon, Western sage grouse, gray flycatcher, bobolink, upland sandpiper, tri-colored blackbird, and bufflehead are not present in the project area and will not be discussed further in this BE. Pacific fisher has habitat within the project area but the species is considered extirpated from this area (Oregon Natural Heritage Program 2001). Tri-colored blackbirds habitat is present within the project area but there are no sightings of this species on the Malheur National Forest. There would be no alteration or effect to either species potential habitat with this project.

## **LISTED SPECIES**

The effects of past and ongoing activities are considered a part of the existing condition. Cumulative effects are the same for all listed and sensitive species. There has been no analysis for individual actions and the cumulative effects are unknown at this time. All past, ongoing and reasonably foreseeable Federal actions are attached as an appendix to the Environmental Analysis. Design criteria and mitigation measures will be included if needed to protect species and habitat to reduce potential effects of future projects.

### **Northern Bald Eagle**

#### **Status**

Federal Status: Threatened (list 1-7-00-SP-588) Federal Status is categorized by State/Region, rather than by subspecies.

USDA-Forest Service (Region 6) Status: Threatened

State Status: Threatened (last revised 12/1998) (ODFW 2000)

Oregon Natural Heritage Program Status: List 1-contains taxa that are threatened with extinction or presumed to be extinct throughout their entire range (ORNHP 2000).

#### **Major Threats**

Habitat loss is the most significant long-term threat to bald eagle populations and species recovery. Shooting, impact injuries, electrocution, and poisoning also threaten recovery. Reproduction has improved with decreased use of DDT and organochlorine pesticides over most of the species range except for the Pacific Recovery Area. DDT-related problems may still threaten bald eagle populations in this region (USFWS 1986).

#### **Existing Condition**

Bald eagles have been sighted along the Middle Fork of the John Day River. District database records have two sightings of bald eagles within four miles of the project area from the early 1990's. The Middle Fork is considered a winter foraging area as long as carrion is present. Temporary winter roosts are possible within the project area but none have been documented. In 2001 a potential bald eagle nest was located 11 miles west of the Blue Culvert project area.

There are no bald eagles or critical habitat necessary for their recovery within the project area. According to the Pacific Bald Eagle Recovery Plan (USFWS 1986), key areas nearest the project area occur as winter roost sites along the John Day River, fourteen miles south.

#### **Effects and Determination**

Bald eagle presence is transitory in the project area and eagles would not be affected in either the Alternative 1 or 2. There would be no direct, indirect, or cumulative effects to bald eagles. Any reasonably foreseeable Federal action will be consistent with protection and enhancement of potential bald eagle habitat. There is **NO EFFECT (NE)** to bald eagles.

### **Gray wolf**

## Status

Federal Status: Endangered (list 1-7-00-SP-588). The northern Rocky Mountain gray wolf was listed as endangered on June 4, 1973, and a recovery plan was released in 1987.

USDA-Forest Service (Region 6) Status: Endangered (USFS 2000)

State Status: Endangered (last revised 12/1998) (ODFW 2000)

Oregon Natural Heritage Program Status: List 2-extirpated (ONHP 2001)

## Major Threats

Human-caused mortality is the major factor limiting the recovery of wolves with the majority of losses due to shooting, trapping and vehicle accidents. In addition, wolves, particularly juveniles, are susceptible to canine parvovirus and distemper.

Roads negatively affect this species by increasing human presence in wolf habitat and increase the likelihood of negative contacts. A disproportionate number of human-caused mortalities occur near roads. These mortalities are mostly legal but some illegal shootings result from human access provided by roads. Vehicle collisions account for additional mortalities.

## Existing Condition

Historically, wolves occupied all habitats on this Forest (Wisdom et al. 2000), but are currently considered extirpated.

In 1999, a collared wolf (B-45-F) from the experimental, non-essential Idaho population traveled to the three Blue Mountain National Forests and stayed until it was captured and returned to Idaho. Another wolf was found dead near Baker City in the spring of 2000.

Blue Mountain Ranger District Wildlife Sighting database has two records from 2001. One was an unconfirmed track nine miles north west of the project area. The other record was an unconfirmed scat found four miles east of the project area.

## Effects and Determination

Wolves are limited by prey availability and are threatened by negative interactions with humans. Generally, land management activities are compatible with wolf protection and recovery, especially actions that manage ungulate populations. Habitat and disturbance effects are of concern in denning and rendezvous areas.

No such habitat is currently occupied in Oregon.

At this time, the determination for almost all project activities on the Malheur National Forest is **NO EFFECT (NE)** for the following reasons:

- No populations currently occupy the Malheur National Forest.
- No denning or rendezvous sites have been identified on the Malheur National Forest.
- There is an abundance of prey on the forest, therefore prey availability is not a limiting factor.

There would be no direct, indirect, or cumulative effects to gray wolves with either the Alternative 1 or 2.

## Canada lynx

### Status

Federal Status: Threatened (list 1-7-00-SP-588)

USDA-Forest Service (Region 6) Status: Threatened

State Status: N/A

Oregon Natural Heritage Program Status: List 2-extirpated (ONHP 2001)

### Major Threats

Lynx distribution at southern latitudes, including mountainous regions in Northeast Oregon, represent marginally suitable habitat that decreases in quality and availability continuing southward. Habitat loss, fragmentation and susceptibility to overharvest (trapping) are major concerns across its range (TNC 1999). Factors contributing to these concerns include; forest management activities, fire suppression, landscape level wildfire, roads, developments that destroy habitat, grazing, predator control and trapping, competition with other predators, and human disturbances (winter recreation travel and highways) that displace lynx from their habitat (Wisdom et al. 2000, Ruediger et al 2000).

### Existing Condition

In Oregon there are twelve verified records of lynx documented between 1897-1993, six of which were taken from the Blue Mountains (Ruggiero et al. 1999, Verts and Carraway 1998). Three of the six specimens were taken in the Blue Mountains were collected near the town of Granite, approximately 10 miles northeast of the project area.

Surveys using a hair sampling protocol that targets lynx were conducted on the Malheur National Forest in 1999, 2000 and 2001. One of the 1999 surveys included habitat just south of the project area. The surveys did not determine lynx presence. District records have two unconfirmed sightings from 1996 and 1999 ten miles east and three miles northwest of the project area. Based on the limited information, the Fish and Wildlife Service cannot substantiate the historic or current presence of a resident lynx population in Oregon (USDI, FWS 2000). Verts and Carraway (1998) conclude that there is no evidence of a self-maintaining populations in Oregon and USDIF&WS (1997) considered the lynx “extirpated” from Oregon. Additional surveys and research are warranted before lynx are considered to have a self-maintaining populations in Oregon.

Until survey results supply better information, analysis for this Environmental Assessment assumes that the project area currently supports reproductive lynx and assesses the effects due to management actions accordingly. Effects have been analyzed using project-level standards and guidelines in the conservation measures contained in the “Canada Lynx Conservation Assessment and Strategy” (Ruediger et al. 2000).

### Effects and Determination of Alternative 1

Under this Alternative, there would be no culvert replacement; therefore, there should be no direct or indirect effects to lynx or their habitat. There would be **NO EFFECT (NE)** to Canada lynx.

## Effects and Determination for Alternative 2

This project area falls within the Indian Rock Lynx Analysis Unit (LAU), one of three LAUs designated on the Malheur National Forest. Lynx habitat within the LAU was classified as denning, foraging or unsuitable using remote sensing data and field reconnaissance. Lynx habitat classification within the Indian Rock LAU is 28% denning, 25% foraging, 43% unsuitable, and 4% created unsuitable. Most of the unsuitable habitat is due to the Summit wildfire of 1996. A complete description of habitat is included in the Baseline Data for the Indian Rock LAU (FS files 03/13/02).

Four culvert replacements fall within lynx habitat along Vinegar Creek and Blue Gulch. Culverts 1, 3 and 4 are within foraging habitat. Culvert 2 is on the border of foraging and denning habitat. This project is consistent with the Project Design Criteria for Canada Lynx.

The proposed action will replace culverts 1, 2 and 3 with a single span structure. Existing culverts would be removed with an excavator. New structures, likely bottomless arches, will be aligned with stream channel profiles and be designed to handle 100-year flow events. The sites will be prepared for installation by widening the location and installing footings. Installation will include rock on the inlet, outlet and catch basin, stabilizing the fill slope with straw mulch and native grass seeding as needed. The structures would include the use of native materials for the stream bottom to mimic conditions upstream and downstream of the project sites. Sites would be backfilled with materials removed from the existing road fill.

Culvert 4 will be reinforced with an armored overflow drainage dip at the stream crossing. The drainage dip would be constructed on the road prism with a backhoe or excavator at the stream crossing to direct excess flows and channel back into streams. Drainage dips and road fills would be hardened using rock to allow high-clearance vehicle passage and reduce the potential for erosion and sedimentation. All activities would occur on the stream bank where the overflow ditch and rock come down to the stream. There is an existing borrow pit on FS Road 2010 that will be used to provide rock.

There would be **NO EFFECT (NE)** to Canada lynx based on the following reasons:

Open road density will not be affected by this project.

Activities will occur outside of the denning period (after July 15) at culvert 2. Large woody material would not be removed with this project.

Many stream site crossings have little or no vegetation. The project does not retard the attainment of a mid-seral or higher condition for riparian communities and foraging habitat will not be altered.

Culvert removals are anticipated to take three days. Because of the limited duration and intensity of the action there would be no effect to lynx.

Any reasonably foreseeable Federal action will be consistent with protection and enhancement of potential lynx habitat.

## SENSITIVE SPECIES

### California wolverine

#### Status

Federal Status: Species of Concern (list 1-7-00-SP-588)

USDA-Forest Service (Region 6) Status: Sensitive

State Status: Threatened (ODFW 2000)

## **Major Threats**

Status is not well known in many portions of the range and extirpated from most of its historic range in the contiguous 48 states. Wolverines are showing promising signs of semi-recovery in selected western states (TNC 1999).

Wolverine populations are suspected to be small, especially sensitive to disturbance, and vulnerable to local extinction (Ruggerio et al. 1994). Past declines in populations may have been due primarily from fur trapping, but habitat alteration (e.g. agriculture, oil exploration, cattle grazing, rural settlement, timber harvest, road construction, and ski area development) and general human disturbance are contributing factors (TNC 1999, Witmer et al. 1998).

## **Habitat**

A denning habitat model developed primarily by Jeff Copeland, Idaho Department of Fish and Game (Edelmann and Copeland 1997), was used to identify potential wolverine denning habitat on the Malheur National Forest. Key habitat components were queried to produce a forest level coverage of potential denning habitat. Key elements included topographic relief with flat to concave curvature, slopes with north to northeast aspects, areas above 5,000-foot elevation, and rock or snow covertypes. Large areas of potential denning habitat were identified in the Strawberry Wilderness, Monument Rock Wilderness, and in some northern portions of the Malheur National Forest. No denning habitat was identified within the project area.

## **Existing Condition**

Wolverines were always rare in Oregon, although recent sightings, tracks, and collected remains document their continued presence at low densities in the state (Csuti et al. 1997). Current distribution appears to be restricted to isolated wilderness areas. Verts and Carraway (1998) believe that while there is a possibility of self-maintaining population of wolverine in the state, most animals seen or collected are likely dispersers from Washington and Idaho populations. Confirmed observations on Malheur National Forest include a partial skeleton and tufts of fir found near Canyon Mountain, Grant County (1992) and tracks and a probable denning site found in the Strawberry Wilderness (1997). Nine unconfirmed sightings of wolverine are recorded in the District database within 15 miles of the project area.

The forest types that are present within the project area may provide marginal foraging habitat for wolverines. High levels of human disturbance (recreational use, firewood cutting, and management activities) and development make most of this area unsuitable for wolverine for summer foraging habitat. Winter foraging habitat is limited due to elevation of the project area which is above big game winter range. Some scavaging for carrion is possible in winter months though.

The likelihood of wolverine using or frequenting the area is expected to be very low due to high road densities.

## **Effects and Determination**

Under this Alternative, there would be no culvert replacement; therefore, there should be no direct or indirect effects to wolverine or potential habitat. There would be no effect to wolverine or habitat with Alternative 2 as there would be no alternation of movement corridors or habitat from the current condition.

Any reasonably foreseeable Federal action will be consistent with protection and enhancement of potential wolverine habitat.

Due to the nature of Alternative 1 and 2 there would be **NO IMPACT (NI)** to wolverines or their habitat.

## **Columbia Spotted Frog**

### **Status**

Federal Status: None  
USDA-Forest Service (Region 6) Status: Sensitive  
State Status: Undetermined (ODFW 2000)

### **Major Threats**

Spotted frogs are moderately threatened range wide. The Great Basin population has been adversely affected by habitat degradation resulting from mining, grazing, road construction, agriculture and predation by non-native fish and bullfrogs (NatureServe 2001).

### **Existing Condition**

The spotted frog is considered present in all subbasins on the Malheur National Forest. There have been no specific habitat surveys in the project area. Habitat is likely exists along most perennial streams and some intermittent streams. District records record spotted frogs in perennial streams south of the project area. Habitat is similar to the streams within the project area. The assumption is that spotted frogs are present in Granite-Boulder and Vinegar Creeks.

### **Effects**

Under the Alternative 1, there would be no culvert replacement; therefore, there should be no direct or indirect effects to spotted frogs or their habitat. In Alternative 2 pools associated with the culverts would be surveyed to determine possible presence of breeding habitat. Timing of the activity would be outside the breeding season but tadpoles may still be present dependent weather conditions each year. Ongoing and proposed activities are expected to maintain the quality and quantity of potential spotted frog habitat. It is possible that human disturbance could cause short-term movements of adults and tadpoles. Because of the limited duration and intensity of Alternative 2 frogs would likely move either upstream or downstream from the culverts during replacement.

### **Determination**

Any reasonably foreseeable Federal action will be consistent with protection and enhancement of potential spotted frog habitat. Due to the nature of Alternative 1 and 2 there would be **NO IMPACT (NI)** to spotted frogs.

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# **APPENDIX A. Region 6 General Water Quality BMPs.**

Available in Hardcopy form only

# **PLANT BIOLOGICAL EVALUATION**

for

Threatened, Endangered, and Sensitive (TES) Species

## **Blue Mountain Ranger District Malheur National Forest**

### **Blue Culverts**

March 4, 2003

Prepared by:/s/

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Date:

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## I. SUMMARY

Table 1--Threatened, endangered and sensitive (TES) species considered in the analysis of the Blue Culverts project and the effects determination for the preferred alternative.

Plant Species	Scientific Name	Status	Occurrence	Effects of Preferred Alternative
<b>Dainty Moonwort</b>	<i>Botrychium crenulatum</i>	S	D	NI
<b>Mingan Moonwort</b>	<i>Botrychium minganense</i>	S	D	NI
<b>Northwestern Moonwort</b>	<i>Botrychium pinnatum</i>	S	D	NI
<b>Inland Sedge</b>	<i>Carex interior</i>	S	D	NI/MIH
<b>Clustered Lady Slipper</b>	<i>Cypripedium fasciculatum</i>	S	D	NI
<b>Northern Twayblade</b>	<i>Listera borealis</i>	S	D	NI
<b>Least Phacelia</b>	<i>Phacelia minutissima</i>	S	D	NI

### Status

E	Federally Endangered
T	Federally Threatened
S	Sensitive species from Regional Forester's list
C	Candidate species under Endangered Species Act
MS	Magnuson-Stevens Act designated Essential Fish Habitat

### Occurrence

HD	<b>Habitat Documented</b> or suspected within the project area or near enough to be impacted by project activities
HN	<b>Habitat Not</b> within the project area or affected by its activities
D	Species <b>Documented</b> in general vicinity of project activities
S	Species <b>Suspected</b> in general vicinity of project activities
N	Species <b>Not documented</b> and not suspected in general vicinity of project activities

### Effects Determinations

#### Threatened and Endangered Species

NE	No Effect
NLAA	May Effect, Not Likely to Adversely Affect
LAA	May Effect, Likely to Adversely Affect
BE	Beneficial Effect

#### Sensitive Species

NI	No Impact
MIH	May Impact Individuals or Habitat, but Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species
WIFV	Will Impact Individuals or Habitat with a Consequence that the Action May Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species
BI	Beneficial Impact

## **II. INTRODUCTION**

This Biological Evaluation (BE) analyzes the potential effects of the proposed action for Blue Culverts, on the Blue Mountain Ranger District of the Malheur National Forest. This BE satisfies the requirements of Forest Service Manual 2672.4 that requires the Forest Service to review all planned, funded, executed or permitted programs and activities for possible effects on proposed, endangered, threatened or sensitive species.

The following sources of information have been reviewed to determine which TES species, or their habitats, occur in the project area:

- Regional Forester's Sensitive Species List
- Forest or district sensitive species database(s) and the GIS mapping layer(s)
- Oregon Natural Heritage Program, Rare, Threatened and Endangered Plants and Animals of Oregon
- Project area maps and aerial photos.

The Blue Culverts project will

1) Remove barriers to fish passage at 8 road crossings in Granite Boulder Creek, Vincent Creek and Vinegar Creek. To complete this work the following actions would occur:

- Replace 5 culverts with single span structures (open bottom arch culvert, round pipe, or box culverts), at project points 1, 2, 3, 6 and 11.
- Replace 3 culverts with low-water crossings (engineered rocked fords at project points 5, 7 and 8.

2) Install approximately 3 armored drain dips in roads over existing culverts up-stream of fish bearing reaches where these configurations are needed for high flow relief and to reduce the potential of erosion. Project points 4, 9 and 10.

Timing: Culvert replacement would be implemented during the in-stream work period of July 15 through August 15, 2004. Work in Vincent Creek can continue until September 15<sup>th</sup>. If not all work can be completed in one operating season and the ODFW cannot provide an extension of the work period, then the remaining work would be implemented in 2004-2005. Construction of armored drainage dips would not be limited to the July 15-August 15 in-stream work period. (In-stream work period avoids conflicts with fish).

## **III. PROJECT DESCRIPTION**

The project will take place in the Vincent, Vinegar and Granite Boulder sub-watersheds. Vincent, Vinegar and Granite Boulder Creeks host two threatened fish species and one sensitive fish species. Currently, 1 road crossing on Granite Boulder Creek, 3 road crossings on Vinegar Creek and 7 road crossings on Vincent Creek are passage barriers to various life stages of fish at several stream flows. A need exists to correct road crossings identified as passage barriers which would reestablish stream connectivity for all the life stages of protected and threatened fish species. A further need exists in these subwatersheds to ensure high water flow relief at crossings that exhibit a potential of erosion. Culverts, rocked fords or drain dips associated with culverts (to handle overflow) are proposed for installation.

**Alternative 1 - No Action** – No Federal actions would occur under this alternative. This alternative does nothing to directly affect plants. Environmental conditions in the subwatershed would continue to follow natural and biological processes.

**Alternative 2 – Proposed Action** – This alternative proposes to remove existing fish passage barriers at 8 culvert sites in Granite Boulder Creek, Vinegar Creek and Vincent Creeks and to address potential erosion problems at these sites and at 3 other culvert sites in Vinegar and Vincent Creeks that are above fish bearing habitat, but which could produce damaging sediment to fish bearing portions downstream should a 100 year flood occur. Granite Boulder Creek, Vincent Creek and Vinegar Creeks are all tributaries of the Middle Fork of the John Day River.

#### **IV. EFFECTS ANALYSIS**

##### **Plant Species**

To determine which sensitive plant species may be affected by the proposed action two steps are taken. First, the Forest GIS and sensitive plant database is searched to locate known sensitive plant populations that occur in or near the area of the proposed action. Second, to identify habitats that may harbor sensitive plants, the physical and biological features in the project area are correlated with those in which sensitive plants are known or suspected to occur (Nelson 1985). Specific habitat features for Forest sensitive plants are described in Sensitive Plants of the Malheur, Ochoco, Umatilla, and Wallowa-Whitman National Forests, (Brooks, et al. 1991), and in site reports of documented species.

Known populations of several sensitive plants are located within the watersheds where work will take place, these populations are all upstream and no closer than .4 miles from the culvert/overflow/dip installation projects. Only Interior Sedge (*Carex interior*) is suspected to have potential habitat in any project location and a majority of that habitat is downstream of most projects. Each of the seven plants identified as either existing within the watersheds where work will take place or where potential habitat exists are discussed as groups or individually below:

##### **Moonwort species (*Botrychium crenulatum*, *B. minganense*, *B. pinnatum*)**

Status: Federal - Species of Concern (*B. crenulatum* only)

State - candidate (*B. crenulatum* only)

Region 6 - sensitive

##### **Environmental Baseline:**

Moonworts are small spore-bearing plants closely related to ferns, and like many ferns prefer a moist and partially shaded habitat. They are widespread in distribution, but seldom abundant; they are easily overlooked, and little is known of their life cycles. They are mycorrhizal and do not produce leaves and fruiting bodies every year; however the conditions required to cause leaf growth and fruiting are not known. They are sometimes found in areas where ground disturbance occurred 20 to 40 years previously (on the Umatilla National Forest they have been found in numerous 30 year old spruce and fir plantations). Botrychiums most often grow on banks of small streams, in seepy or boggy areas in small forest openings, or in moist meadows. In the southern Blue Mountains they are found above 4500 feet, most often in association with lodgepole pine and/or Engelmann spruce. They become identifiable in late July to August as their leaves unfurl and fruiting bodies ripen.

Several populations of botrychiums were found within the general project area in the summer of 1998 but none were found at the culvert/dip/ford locations or closer than .4 miles from these project areas.

##### **Direct and Indirect Effects**

No direct or indirect effects are expected since there will be no activity in the area of the known plant populations.

##### **Cumulative Effects**

Based on the activities planned to be undertaken in the Blue Culverts E.A., the Past, Ongoing and

Reasonably Foreseeable Activities for this area (as described in the Blue Culverts E.A. Appendix C), and because of the design criteria and mitigation contained in the Forest Plan, this action will not contribute to cumulative negative effects. Implementation of the described Ongoing and Reasonably Foreseeable Projects would be expected to either *not effect* or to be a cumulative *positive effect*.

#### **Determination**

The proposed project will not affect individual plants. This action will not contribute to direct-indirect or cumulative effects. Rationale, this sensitive species and habitat were not found in or immediately adjacent to the culvert, dip or rock ford locations.

### **Clustered Lady's Slipper (*Cypripedium fasciculatum* )**

Status: Federal - Species of Concern

State - candidate

Region 6 - sensitive

#### **Environmental Baseline:**

Clustered lady's slipper is a rare orchid that grows in mesic conifer forests of the Rocky Mountains and the Pacific Northwest. It is often found on the lower third of northerly aspects, in filtered sunlight under conifer canopies, along riparian zones, and near springs, especially ones that are calcareous. It occurs in association with grand fir, Douglas fir, and ponderosa pine. It can range in elevation from 2500 to 6500 feet, and can be identified from May through August in the Blue Mountains. It is known from the Umatilla and Wallowa Whitman National Forests, but has not yet been found on the Malheur.

No *Cypripedium fasciculatum* plants were found during the 1998 botanical surveys of the project area.

#### **Direct and Indirect Effects**

No direct or indirect effects are expected to this species.

#### **Cumulative Effects**

Based on the activities planned to be undertaken in the Blue Culverts E.A., the Past, Ongoing and Reasonably Foreseeable Activities for this area (as described in the Blue Culverts E.A. Appendix C), and because of the design criteria and mitigation contained in the Forest Plan, this action will not contribute to cumulative negative effects. Implementation of the described Ongoing and Reasonably Foreseeable Projects would be expected to either *not effect* or to be a cumulative *positive effect*.

#### **Determination**

The proposed project will not affect individual plants, directly, indirectly or cumulatively. Rationale, this sensitive species and habitat were not found in or immediately adjacent to the culvert, dip or rock ford locations.

### **Least phacelia (*Phacelia minutissima*)**

Status: Federal - Species of Concern

State - candidate

Region 6 - sensitive

#### **Environmental Baseline:**

Least phacelia is a diminutive annual found in seasonally moist areas that support little competing vegetation, such as rocky meadows with *Veratrum californica*, scablands, streambanks in meadows or sagebrush, and dried mud flats or puddles under aspen. Associated species: *Veratrum californica*, *Polygonum kellogii*, *Collomia linearis*, *Wyethia amplexicaulis*, and *Senecio integerrimus*. It occurs between 5000 and 8000 feet elevation, and is identifiable from Mid-June through early August.

No habitat for, nor existing populations of, *Phacelia minutissima* were found during the 1998 botanical

surveys of the project area.

#### **Direct and Indirect Effects**

No direct or indirect effects are expected to this species.

#### **Cumulative Effects**

Based on the activities planned to be undertaken in the Blue Culverts E.A., the Past, Ongoing and Reasonably Foreseeable Activities for this area (as described in the Blue Culverts E.A. Appendix C), and because of the design criteria and mitigation contained in the Forest Plan, this action will not contribute to cumulative negative effects. Implementation of the described Ongoing and Reasonably Foreseeable Projects would be expected to either *not effect* or to be a cumulative *positive effect*.

#### **Determination**

The proposed project will not affect individual plants or habitat, directly, indirectly or cumulatively. Rationale, this sensitive species and habitat were not found in or immediately adjacent to the culvert, dip or rock ford locations.

### **Inland sedge (*Carex interior*)**

Status: Federal - none

State - none

Region 6 - sensitive (proposed)

This sedge is addressed as it is proposed as an addition to the upcoming revised Region 6 Sensitive Species List.

#### **Environmental Baseline:**

Inland sedge grows in low to mid-elevation wet meadows, and in marshy forest openings around seeps and springs, especially if they are calcareous. It is widespread in distribution, but seldom abundant. It can be recognized in August when it is in fruit, but it is not easily distinguished from the more common *Carex muricata*.

#### **Direct and Indirect Effects**

The proposed project will not affect individual plants. This project may disturb a small amount of habitat with no known populations, but will not contribute to a trend towards federal listing or cause a loss of viability to the species.

#### **Cumulative Effects**

Based on the activities planned to be undertaken in the Blue Culverts E.A., the Past, Ongoing and Reasonably Foreseeable Activities for this area (as described in the Blue Culverts E.A. Appendix C), and because of the design criteria and mitigation contained in the Forest Plan, this action will not contribute to cumulative negative effects. Implementation of the described Ongoing and Reasonably Foreseeable Projects would be expected to either *not effect* or to be a cumulative *positive effect*.

#### **Determination**

The proposed project will not affect individual plants. This project may disturb small amounts of habitat with no known populations, but will not contribute to a trend towards federal listing or cause a loss of viability to the species. Monitoring possible noxious weed populations for 2 years following project implementation and seeding or mulching & seeding of disturbed ground with local native grass seed is recommended to reduce the likelihood of noxious weed invasion and their possible spread to this *Carex* habit.

### **Northern Twayblade (*Listera borealis*)**

Status Federal: none

State: none

Region 6: Sensitive

Environmental Baseline:

*Listera borealis*, northern twayblade, is a perennial orchid of moist forests. Its distribution ranges from Alaska and northern Canada, south into the Rocky Mountains to northern Wyoming and Utah. It is known in the Blue Mountains of eastern Oregon from the Wallowa and Greenhorn ranges. It is common in the north, but becomes quite scarce, with widely separated occurrences, near the southern extreme of its range. Known populations in the U.S. range in elevation from 3000 to 6500 feet.

*Listera borealis* is typically found in moist coniferous forest, either along streams, or in dryish humus. It occurs from mid elevations to subalpine and alpine slopes. It inhabits cold air drainages, usually at streamside at lower elevations, but is not restricted to streamside at higher elevations. It most often grows with spruce (*Picea engelmannii*), subalpine fir (*Abies lasiocarpa*), and Douglas fir (*Pseudotsuga menziesii*) in the inland northwest. Most occurrences are associated with old growth forest with a tree canopy cover of greater than 60%. Low slope (less than 10 %), continuous moss cover, and organically rich substrate with a thick duff layer are other common features of *L. borealis* habitat (Cronquist et al, 1977; Hitchcock et al, 1969; Salstrom & Gamon, 1993).

*Listera borealis* typically flowers in June and requires insect pollination, though pollinator species are not known. Like other orchids, *L. borealis* requires a fungal symbiont for seed germination and growth. The plant may then remain as an underground “mycorrhizome” for several years before it produces a photosynthetic stem. It may take another dozen years before the plant produces a flowering stem, judging from studies of similar species (Salstrom & Gamon, 1993).

**Direct and Indirect Effects**

No direct or indirect effects are expected to this species.

**Cumulative Effects**

Based on the activities planned to be undertaken in the Blue Culverts E.A., the Past, Ongoing and Reasonably Foreseeable Activities for this area (as described in the Blue Culverts E.A. Appendix C), and because of the design criteria and mitigation contained in the Forest Plan, this action will not contribute to cumulative negative effects. Implementation of the described Ongoing and Reasonably Foreseeable Projects would be expected to either *not effect* or to be a cumulative *positive effect*.

**Determination**

The proposed project will not affect individual plants or habitat, directly, indirectly or cumulatively. Rationale, this sensitive species and habitat were not found in or immediately adjacent to the culvert, dip or rock ford locations.

**Effects Determinations**

Threatened and Endangered Species

NE	No Effect
NLAA	May Effect, Not Likely to Adversely Affect
LAA	May Effect, Likely to Adversely Affect
BE	Beneficial Effect

Sensitive Species

NI	No Impact
MIIH	May Impact Individuals or Habitat, but Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species
WIFV	Will Impact Individuals or Habitat with a Consequence that the Action May Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species

BI	Beneficial Impact
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## **V. REFERENCES**

### **Contributors**

*Jean Wood, Forest Botanist, Umatilla National Forest. Former District Botanist on Blue Mountain Ranger District, General recommendations based on her surveys of the area, writeup on *Listera borealis*, excerpts from VV(Vincent-Vinegar B.E.)*

### **Sources of Data**

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### **Literature References**

Brooks, P., K. Urban, and G. Yates. 1991. Sensitive Plants of the Malheur, Ochoco, Umatilla, and Wallowa-Whitman National Forest, R6-WAW-TP-040-92, USDA Forest Service, Pacific Northwest Region.

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## VEGETATION MANAGEMENT STRATEGY

### Blue Culverts

March 5, 2003

Five general strategies for managing competing and unwanted vegetation have been identified: No Action, Prevention, Early Treatment, Maintenance, and Correction. Presently, the nature and condition of the associated vegetation is below damage thresholds, so the strategies which apply to this situation include prevention, maintenance, and early treatment.

#### A. EVALUATION OF MANAGEMENT STRATEGIES

This analysis considered the competing and unwanted vegetation concerns related to the Blue Culverts: culvert replacement, culvert overflow dips and rocked fords. Potential strategies considered for this analysis based on evaluation of needs for vegetation management are as follows:

1. **NO ACTION** –

This means that no activity interfering with natural processes will be undertaken. It is the appropriate strategy anytime you have no evidence to support a prediction that competing or unwanted vegetation will exceed the damage threshold of a site.

Because it is expected that disturbed soil in and around the project area will may be susceptible to invasion by noxious weeds this strategy is inappropriate. Activities in the proposed action would provide the “disturbed” or bare ground, a common location for establishment of noxious weeds. For these reasons the favored no action alternative may not be appropriate.

2. **PREVENTION** –

This strategy refers to detection or amelioration of site conditions that stimulate or favor competing vegetation. Prevention does not involve direct treatment of competing vegetation, but anticipates potential vegetation problems and takes steps to avoid reaching a damage threshold. Use of natural controls is the key concept behind this approach.

The spread of noxious weeds are mainly due to vehicle traffic, recreational use, and ground disturbing activities. Several things may be done to prevent the invasion of noxious weeds on disturbed ground: 1) require vehicles and equipment be washed and inspected, 2) not park or stage vehicles with known infestations and 3) seed or mulch & seed the disturbed area with local native plants.

3. **EARLY TREATMENT** –

Early treatment involves initiating action to control competing vegetation before a damage threshold is reached. Control during the early development stages is usually easier, less costly, and can require fewer treatments.

Noxious weeds could occupy the disturbed ground created by this project by moving in from adjacent areas or carried in on equipment.

Principal species include dalmatian toadflax, yellow toadflax, tansy, perennial pepperweed, hound's-tongue, bull thistle, Canada thistle, white top, knapweed, tarweed and sulfur cinquefoil. Disturbed soil should be surveyed twice per year to inspect for the presence of noxious weeds. Surveys should continue after two years after the project is completed.

Monitoring: Is proposed for twice a year for two years following ground disturbing activities to determine whether noxious weeds were introduced onto the disturbed soil or have expanded from adjacent locations. This monitoring would require a person to walk around/over the disturbed ground twice per year, spring and fall, to check for the presence of noxious weeds. Survey once for earlier season weeds (late May to early June) and once in summer (late June to early July). This will ensure detection of species with different life cycles and blooming periods.

Early treatment: If monitoring detects noxious weeds, the surveyors would fill out a Weed Location Form, and then remove the plants at that time by their roots, place them in a plastic bag, and dispose of them in an approved landfill. If large infestations are found that would take a more significant investment or resources and time to eradicate, the Forest Noxious Weed Coordinator will be consulted and the appropriate control actions will be planned. Pay particular attention to remove all roots on those species spreading through rhizomes and to avoid spreading seed from all species. Clothing of the those performing treatment should be monitored to ensure they do not contain seed/vegetative material. NOTE: Extra care and handling must be done when treating poison hemlock to prevent ingestion, or exposure to plant material which is poison, see note below on procedure. Do not treat this plant until contact with Forest Noxious Weed Coordinator for direction on safe removal techniques and protection .

Species of interest: As a minimum the following weeds known to occur on the Forest should be looked for, and others not on the list but considered noxious should be looked for as well:

Nineteen Oregon Department of Agriculture listed noxious weed species are known or suspected to occur on the Malheur National Forest:

Canada Thistle	Dalmatian Toadflax	Diffuse Knapweed
Field Bindweed	Hound's-tongue	Leafy Spurge
Musk Thistle	Perennial Pepperweed	Poison Hemlock*
Purple Loosestrife	Scotch Broom	Scotch Thistle
Spotted Knapweed	St. Johnswort	Sulfur Cinquefoil
Tansy Ragwort	White Top	Yellow Star Thistle
Yellow Toadflax	Tarweed	

\*Do not treat this plant until contact with Forest Noxious Weed Coordinator for direction on safe removal techniques and protection .

A description for each plant and photographs are included in APPENDIX A.

4. **Maintenance:**

This strategy emphasizes maintenance of vegetative conditions that are currently below a damage threshold, but can be expected to periodically exceed that threshold. For this project, the monitoring strategy to be implemented under the early treatment strategy is expected to serve the maintenance function.

5. **Correction:**

The monitoring and early treatment strategy's outlined above are expected to eliminate the need for a corrective action. Corrective actions should only occur when a competing/unwanted vegetation threshold has been exceeded, typically when early treatment has been ineffective. As an example if all disturbed soil were covered by a noxious weed, corrective action in the form of chemical treatment or biological control would have to be considered. Prior to implementing any corrective action using chemical or biological control the Forest Service would have to prepare NEPA documents to address those activities.

Michael Tatum  
Ecologist/Certified Silviculturist  
Blue Mountain Ranger District

## APPENDIX A - Photographs of identified Noxious Weeds



### **Yellow Starthistle**

(*Centaurea solstitialis* L.)

**Growth Habit:** Annual, erect, rigid branching stems.

**Leaves:** Basal leaves deeply lobed, upper leaves not lobed, small, sharply pointed.

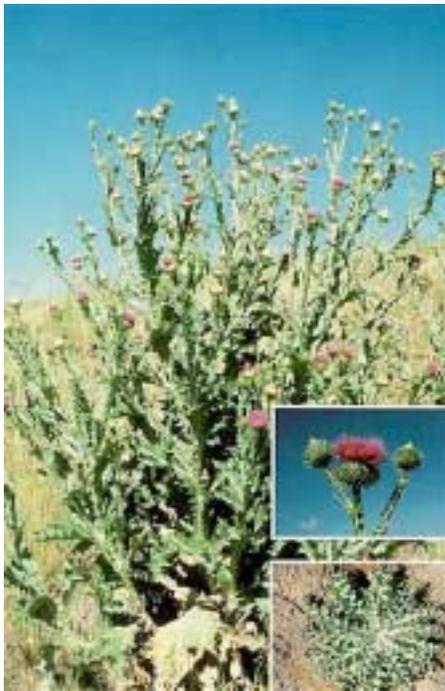
**Stems:** Rigid, covered with a cottony fiber, to 30 inches tall, winged structures.

**Flower:** Yellow, terminal, flower bracts are tipped with straw-colored, 3/4 inch thorn.

**Roots:** Taproot.

**Seeds:** Smooth, light-colored, often darker mottled, 1/8 inch long, notched just above the base.

**Other:** Causes "chewing disease" in horses.



### **Scotch Thistle**

(*Onopordum acanthium* L.)

**Growth Habit:** Biennial, sometimes annual, erect, up to 8 ft. tall. Rosette formed first year, flowering stem elongates second year.

**Leaves:** Large, coarsely lobed, hairy on both sides, velvety gray appearance. Margins lined with sharp conspicuous spines. Basal leaves up to 2 ft. long and 1 ft. wide.

**Stems:** Erect, branching, spiny leaf wings extend down onto stem, covered with dense fine hairs.

**Flowers:** Solitary, terminal, 1 to 2 inches in diameter, violet to reddish colored. Bracts spine tipped.

**Roots:** Large fleshy taproot.

**Seeds:** Deep brown to black, distinctly wrinkled, 3/16" long.

**Other:** Reproduce by seed only. Dense strands may be impenetrable to recreationists, livestock or wildlife.



## Leafy Spurge

(*Euphorbia esula* L.)

**Growth Habit:** Perennial, erect, up to 3' tall, spreading by seed or creeping roots.

**Leaves:** Alternate, long, narrow, 1/4" wide and 2" long, usually drooping.

**Stems:** Branched near top, hairless, entire plant contains milky sap.

**Flowers:** Inconspicuous, surrounded by large heard shaped floral leaves which turn yellow-green near maturity.

**Roots:** Brown, numerous pink buds, deep, spreading, very persistent.

**Other:** Grows in nearly all soil types and habitats. Seed is thrown to 20' by exploding seed capsule.



## Diffuse Knapweed

(*Centaurea diffusa* Lam.)

**Growth Habit:** Annual or biennial, bush, up to 2 ft. tall. Rosette formed first year, flowering stalk elongates second year.

**Leaves:** Greyish-green, alternate, basal leaves whorled, upper leaves much reduced. Covered with fine hair.

**Stems:** Hairy, erect, single main stem from a rootstock, branched near or above the base.

**Flower:** Solitary, usually white, sometimes pink, rose or lavender; seedhead bracts end as sharp, rigid spines.

**Roots:** Elongated taproot.

**Seeds:** Oblong, dark brown or grey with longitudinal lines.

**Other:** May seriously reduce productive potential of infested rangelands.



## **Common St. Johnswort**

(*Hypericum perforatum* L.)

**Growth Habit:** Perennial, erect, numerous branches

**Leaves:** Opposite, attached directly to stem, 1 inch long, oblong, covered with transparent dots.

**Stems:** Woody at the base, 1 to 3 ft. tall, rust colored, with 2 ridges.

**Flower:** Yellow, 3/4 inch diameter, numerous in flat-topped clusters, 5 petals with numerous stamens.

**Roots:** Branched and deep, some shallow and capable of sending up shoots.

**Seeds:** Small, shiny black, with rough texture in a round, pointed, three-part seedpod.

**Other:** Contains a toxic substance which causes white-haired animals to become allergic to strong sunlight.



## **Scotch Broom**

(*Cytisus Scoparius* (L.) Link)

**Growth Habit:** Perennial, erect, woody shrub to 10 feet tall.

**Leaves:** Three parted leaves with smooth leaf margins.

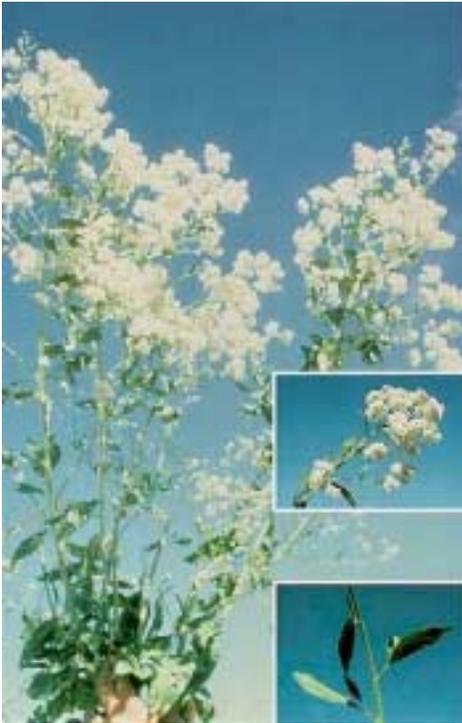
**Stems:** Dark green with angled surfaces.

**Flowers:** Numerous, large, showy yellow pea-like flowers.

**Roots:** Extensive

**Seeds:** Pea-like seeds in a brown to black flattened pod with white hairs on the margin.

**Other:** Escaped ornamental.



## Perennial Pepperweed

(*Lepidium latifolium* L.)

**Growth Habit:** Erect perennial, numerous stems, spreading by seed and deep-seated rootstocks.

**Leaves:** Alternate, lance shaped, bright green to gray-green, waxy, smooth to toothed margins, basal leaves larger than upper leaves.

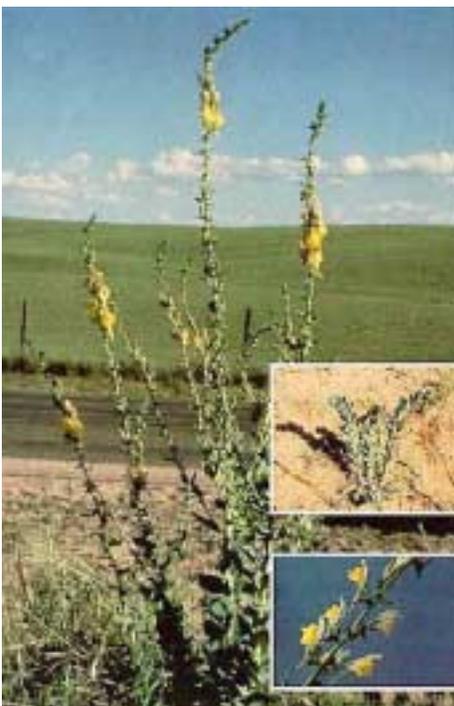
**Stems:** Branched, smooth, waxy, 1-3 feet tall.

**Flowers:** Raceme of small white flowers in dense clusters near branch ends.

**Roots:** Deep-seated and spreading.

**Seeds:** Small, rounded, flattened, slightly hairy, 1/16" long, reddish brown.

**Other:** Deep roots make it difficult to control.



## Dalmatian Toadflax

(*Linaria dalmatica* (L.) Mill.)

**Growth Habit:** Perennial, often over 3 ft. tall, erect.

**Leaves:** Light green, alternate, broad, heart-shaped, clasping the stem.

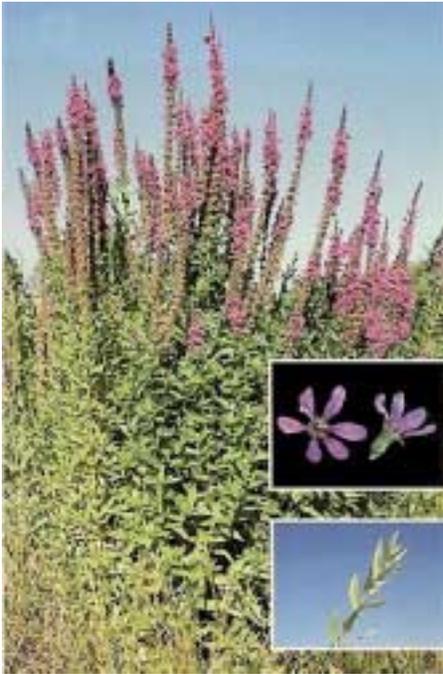
**Stems:** Branching, light green, smooth and leafy.

**Flowers:** Snapdragon type, bright yellow, tinged with orange, to 1 1/2" long spur, born in upper leaf axils.

**Roots:** Vigorous, deep and extensive, creeping roots.

**Seeds:** Numerous, irregularly angled.

**Other:** Spread by seed and creeping roots.



## Purple Loosestrife

(*Lythrum salicaria* L.)

**Growth Habit:** Perennial, erect to 8 feet tall, associated with moist or marshy areas.

**Leaves:** Simple, lance-shaped, smooth margins, opposite or whorled.

**Stems:** Branched, terminating in flowering stalks.

**Flowers:** Rose-purple flowers having 5 to 7 petals and numerous stamens, in long, vertical racemes.

**Roots:** Large, fleshy, adapted to aquatic sites.

**Other:** Dense infestations can impede water flow in canals and ditches.



## Musk Thistle

(*Carduus nutans* L.)

**Growth Habit:** Biennial, or winter annual, erect up to 7' tall. Freely branching. Rosette formed 1st year, flowering stem elongates 2nd year.

**Leaves:** Dark green with light midrib, hairless on both sides, long sharp spines.

**Stems:** Hairless.

**Flowers:** Solitary, terminal, nodding heads, 1 1/2" to 3" in diameter, deep rose to violet to purple.

**Roots:** Fleshy taproot, hollow near ground surface.

**Seeds:** Can be in excess of 20,000 per plant with 90% viable. 90% may germinate in first two years. Seeds may germinate after 10 years in soil.

**Other:** Reproduce by seed only.



## Sulfur cinquefoil

(*Potentilla recta* L.)

**Growth Habit:** Perennial, often over 3 ft. tall, erect.

**Leaves:** leaves, which are also rough-hairy, have five-to-seven-toothed, palmately arranged leaflets that are two to four inches long by 1/2-1 inch wide

**Stems:** stout, leafy, hairy stems.

**Flowers:** three to six inches across, and each flower has five light yellow petals surrounding a dark yellow center.

**Roots:** Vigorous, deep and extensive, creeping roots.

**Seeds:**

**Other:** Spread by seed and creeping roots.



## Poison Hemlock

(*conium maculatum* L.)

**Growth Habit:** Biennial, often over 10 ft. tall, erect.

**Leaves:** Lacy, alternate, fern like leaves.

**Stems:** hollow with ridges and purple colored spots.

**Flowers:** Small white, in groups looking like umbrellas.

**Roots:** Poisonous, vigorous, deep and extensive, creeping roots.

**Seeds:**

**Other:** Poison active up to 3 years after plant dies.

**DANGEROUS PARTS OF PLANT:** All parts, especially young leaves and seeds, sap and roots.

Contact Forest Noxious weed coordinator prior to attempting any control of this plant.

## Canada Thistle

(*Cirsium arvense* L.)



**Growth Habit:** Perennial, often over 6 ft. tall, erect.

**Leaves:** Long, narrow with crinkled spiny edges.

**Stems:** Green, rigid.

**Flowers:** Lavendar colored at tips of branches.

**Roots:** Rhizomes which spread..

**Seeds:** Plume parachute

**Other:**



## Spotted knapweed

(*Centaurea maculosa* Lam.)

**Growth Habit:** Biennial or short lived perennial, 1-3 feet tall.

**Leaves:** Basal leaves long, narrow, pinnately parted.

**Stems:** One or more.

**Flowers:** Solitary at branch ends,, comblike fringe.

**Roots:** Stout taproot.

**Seeds:**

**Other:**





## Field Bindweed

(*Convolvulus arvensis* L.)

**Growth Habit:** Perennial, prostrate.

**Leaves:** Alternate, arrowhead shaped.

**Stems:** 1-4 feet long, tangled ground mat, climbing.

**Flowers:** bell or trumpet shaped, white to pink, 1 inch in diameter.

**Roots:** Vigorous, deep and extensive, creeping roots.

**Seeds:** Capsule, 4 seeded.

**Other:** Spread by seed and creeping roots.



## Tansy Ragwort

(*Senecio jacobaea* L.)

**Growth Habit:** Perennial or short lived perennial from taproot, often over 1-6 ft. tall, erect.

**Leaves:** 2-8 inches long, alternate, pinnately lobed.

**Stems:** 1-6 feet tall single or several.

**Flowers:** Ray and disk flowers, yellow, numerous.

**Roots:**

**Seeds:**

**Other:** Spread by seed and creeping roots.



## **Yellow toadflax**

(*Linaria vulgaris* Mill.)

**Growth Habit:** Perennial, often over 1-2 ft. tall, erect.

**Leaves:** Pale green, numerous, narrow, pointed.

**Stems:** erect

**Flowers:** 1 inch long, with bearded, orange throat.

**Roots:** Vigorous, deep and extensive, creeping roots.

**Seeds:** Round, dark, flattened with papery wing.

**Other:** Spread by seed and creeping roots.



## **Hounds tongue**

(*Cynoglossum officinale* L.)

**Growth Habit:** Biennial, often over 1-4 ft. tall, erect.

**Leaves:** Light green, alternate, 1-12 inches long, 1-3 inches wide, rough, hairy.

**Stems:** Erect, rigid.

**Flowers:** Reddish purple and terminal.

**Roots:** Vigorous, deep and extensive, creeping roots.

**Seeds:** 4 prickly nutlet each about 1/3 inch long.

**Other:**