Finding of No Significant Impact
and
Final Programmatic Environmental Assessment

for Implementation of Action 149 Fish Habitat Improvement Measures from the December 2000 National Marine Fisheries Service Biological Opinion of the Federal Columbia River Power System in Three John Day Subbasins in the Mid-Columbia River Steelhead Evolutionarily Significant Unit in Central Oregon

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Finding of No Significant Impact
PN-FONSI 03-05

**Programmatic Environmental Assessment
for Implementation of Action 149
Fish Habitat Improvement Measures from the
December 2000 National Marine Fisheries Service
Biological Opinion of the Federal Columbia River
Power System in Three John Day Subbasins in the Mid-Columbia
River Steelhead Evolutionarily Significant Unit in Central Oregon**

Introduction

The National Marine Fisheries Service (NMFS) issued a Biological Opinion (BiOp) in December 2000 on continued operation and configuration of the Federal Columbia River Power System (FCRPS). Unless actions identified in the Reasonable and Prudent Alternative (RPA) in the BiOp are taken, a jeopardy opinion under the Endangered Species Act (ESA) may be issued for continued operation of the FCRPS. As part of the RPA, NMFS identified the need to improve migration, spawning, and rearing habitat for listed anadromous fish stocks in priority subbasins as part of an off-site mitigation program. RPA Action 149 requires that Reclamation "shall initiate programs in three priority subbasins (identified in the Basin-wide Recovery Strategy) per year over 5 years, in coordination with NMFS, U.S. Fish and Wildlife Service (USFWS), the states, and others, to address all flow, passage, and screening problems in each subbasin over 10 years." (Note: Except for specific references to the 2000 FCRPS BiOp, the government agency formerly known as NMFS will be referred to as NOAA Fisheries in this document.)

The U.S. Bureau of Reclamation (Reclamation) developed a Programmatic Environmental Assessment (PEA) in order to implement its anadromous fisheries habitat improvement program within three John Day River subbasins. The intent is to tier additional National Environmental Policy Act (NEPA) analysis, as necessary, off the PEA document. The PEA analyzes the environmental impacts of implementing a 10-year program of improving streamflows and correcting fish passage and screening problems within the North Fork, Middle Fork, and Upper (main stem) subbasins of the John Day River, priority subbasins within the Mid-Columbia River Steelhead Evolutionarily Significant Unit.

The PEA was prepared pursuant to the National Environmental Policy Act of 1969. In addition to the action alternative, the PEA also evaluated a no-action alternative as required by NEPA. The proposed action is discussed and analyzed in general terms, as the PEA describes generic types of projects suitable for wide application throughout the project area and, therefore, does not include any site-specific data or analysis. However, the assessment and its analysis of environmental consequences are based

on numerous completed projects within the John Day priority subbasins and address the broad range of implementation measures proposed to comply with Action 149.

Alternatives Considered

No Action. The "no action" alternative is for Reclamation to contribute minimal assistance toward habitat improvement activities in the North Fork John Day, Middle Fork John Day, and Upper John Day subbasins. There might be Reclamation funding of planning efforts; however, these funds would be minimal and could not be used for on-the-ground project work (construction). Reclamation's Demonstration Project has been completed, and Reclamation does not have funding or authority to continue the Demonstration Project. The "no action" alternative acknowledges that improvements would still get accomplished in the subbasins, but with limited Reclamation funds and technical expertise.

Proposed Action. The proposed action is the implementation of Reclamation's responsibilities under Action 149 of the 2000 FCRPS BiOp in the North Fork John Day, Middle Fork John Day, and Upper John Day subbasins. Reclamation is specifically required to implement Action 149 in order to conserve listed species under the ESA.

Recommended Alternative

The proposed action is the implementation of Reclamation's responsibilities under Action 149 of the 2000 FCRPS BiOp in the North Fork John Day, Middle Fork John Day, and Upper John Day subbasins. Toward this end, Reclamation would provide technical expertise, and construct or provide construction funding, to accelerate improvements in fish habitat. This effort and funding would be directed to improve fish habitat, which in turn should improve fish populations, by using established, accepted methods for removing fish passage barriers, augmenting streamflows, and providing or updating fish screens. All activities would abide by applicable permit requirements and state water law.

The proposed action would improve flows, eliminate in-stream passage barriers, and correct fish screen deficiencies on private lands that are related to irrigation. Reclamation's involvement in these actions would occur through December 2010 in the Upper John Day and Middle Fork John Day subbasins, and through December 2012 in the North Fork John Day Subbasin. Reclamation would not maintain further commitments related to the FCRPS BiOp after this point. Consequently, project operation and maintenance (O&M) would be the responsibility of the landowner. Long-term O&M oversight, if appropriate, would become the responsibility of a third party (such as a watermaster or state agency).

The following is a list of potential measures that Reclamation would contribute to or implement. Depending on the subbasin-specific conditions, not all measures would

apply to all subbasins. Discretion would be used in determining which measures are appropriate in meeting the particular passage, flow, and screen deficiencies for each situation.

Goals	Potential Measures
Correct passage barriers	Remove pushup dams and replace with pump systems, infiltration galleries, or other permanent structures, such as lay-flat stanchion dams, with viable fish passage facilities. Consolidate diversions.
Correct streamflow deficiencies	Acquire water for in-stream flow during critical migration periods. Replace headgates to provide better control of water withdrawals, and install measuring devices.
Correct screen deficiencies	Utilize rotary drum, flat plate, or traveling belt screens that meet NOAA Fisheries criteria. Utilize NOAA Fisheries-approved exposed or buried well screens on pump intakes. Utilize screen methods to protect fish from wasteway attraction flows. Utilize siphons at stream/irrigation ditch interfaces.

Environmental Commitments

Because the specific choice of locations and the number of willing participants is not known, nor can the choice of specific measures be determined at this time, this Environmental Assessment is prepared at a programmatic level. When specific locations for projects have been determined, Reclamation would fulfill compliance requirements for each individual site-specific project. As examples of these additional, site-specific requirements, Reclamation would:

- Inspect project sites for the presence of listed or proposed threatened or endangered species.
- Complete ESA consultation with NOAA Fisheries and USFWS before initiating any action that would result in irretrievable and irreversible commitment of resources. This includes consultation at both a programmatic level and for site-specific projects.
- Design all fish screens, fishways, and other fish passage-related structures to meet NOAA Fisheries criteria.
- Conduct cultural resource surveys to determine the presence of resources eligible for listing on the National Register of Historic Places in locations that may be affected by construction or operation of the proposed modifications.

- Consult with tribes to determine if Indian sacred sites are present and seek to avoid damage to those that are present.
- Secure through the Oregon Division of State Lands and the U.S. Army Corps of Engineers any necessary permits under Section 404 of the Clean Water Act.
- Conduct in-stream activities within Oregon Department of Fish and Wildlife guidelines for timing of in-water work.
- Adhere to all requirements of the Oregon Water Resources Department regarding the acquisition of water.
- Initiate additional NEPA analysis for any projects that exceed the scope of the PEA.

Consultation and Coordination

Public Involvement. Reclamation has coordinated with federal, state, and local agencies during the preparation of the PEA to gather input, provide information, and to meet NEPA and ESA regulatory requirements. This coordination was integrated with the public involvement process. Reclamation held a scoping meeting to familiarize the communities with the proposed program and to solicit input on concerns and possible actions and impacts. Reclamation mailed 146 copies of the draft PEA to 72 organizations to solicit public comment on the proposed action and associated impacts. In addition, Reclamation met with local, state, and federal agency staff to discuss the project.

National Marine Fisheries Service and U.S. Fish and Wildlife Service Coordination. Coordination on fish and wildlife issues to meet the requirements of the Fish and Wildlife Coordination Act (FWCA) and the ESA was accomplished by informal consultation with the USFWS and NMFS.

Continued coordination with NMFS and USFWS will be needed to resolve ESA issues regarding listed salmon, steelhead, and bull trout. Based on discussions with NMFS and USFWS concerning the types of flow, screen, and barrier projects to be implemented, Reclamation concluded that a “may affect, but unlikely to adversely affect” determination is anticipated for most projects. Consequently, Reclamation will develop a programmatic BA for implementation of Action 149 in Oregon and will continue to consult with NMFS and USFWS. The programmatic BA is intended to provide a basis to obtain concurrence from NMFS and USFWS on the types of projects expected to be implemented that would not require additional consultation and identify the types that would. A mitigation strategy will be developed with NMFS and USFWS for each type of project. For some types of projects no additional consultation will be required beyond any terms and conditions specified in the BiOp developed in response to the programmatic BA; other types of projects will require individual consultation and could include preparation of a site-specific BA with an associated BiOp that could include site-specific terms and conditions.

National Historic Preservation Act. As specific projects are identified, Reclamation would determine if a project has the potential to impact historic properties. If that potential is determined to exist (i.e., if the project is an undertaking under the National Historic Preservation Act), then all consultation and coordination activities required by Section 106, 36 CFR 800 would be implemented. This might include consultation with the State Historic Preservation Office and interested Indian tribes on resource significance, and treatment of adverse impacts. Consultations and impact mitigation actions would be documented in a memorandum of agreement signed by consulting parties.

Sacred Sites and Indian Trust Assets. On a programmatic level, Reclamation meets regularly with various interested parties to provide updates on implementation of its responsibilities under the FCRPS BiOp. Among these parties is the Columbia River Inter-Tribal Fish Commission, which represents the four lower Columbia River tribes – Nez Perce, Umatilla, Warm Springs, and Yakama – that signed treaties with the United States in 1855. These programmatic meetings would continue to be held throughout the duration of the habitat improvement program.

Specific to the John Day Basin, cooperation and collaboration with the on-going habitat restoration programs of the Warm Springs and Umatilla Tribes would be critical to program accomplishment. Reclamation has supported the Warm Springs' habitat restoration office since it was established in the John Day Basin in the mid-1990's and has initiated discussions with the Umatilla tribal staff to determine how best to coordinate program activities. Reclamation would continue to work with these tribes to collaborate on habitat restoration projects.

As specific projects are identified, Reclamation would consult as necessary with tribes to determine whether traditional cultural properties (TCPs) or sacred sites may be impacted. If National Register-eligible TCPs are present, appropriate mitigation measures would be determined through these consultations. Reclamation would seek to avoid sacred sites. If human remains are inadvertently discovered during construction, work in the immediate vicinity of the discovery would cease, except to secure and protect the remains. Reclamation would contact tribes as required to determine appropriate procedures for consultation and treatment of the human remains. Reclamation would also carry out any other applicable measures of the state of Oregon burial laws.

Public Comment Summary/Changes in the Final PEA

The public comment period for the draft PEA extended from December 12, 2002, through January 24, 2003. One hundred forty-six copies of the draft PEA were sent to a mailing list of 72 organizations, agencies, and individuals. Four comment letters were received: North Fork Watershed Council, NOAA Fisheries, John Morris (private individual), and the Oregon Department of Fish and Wildlife's John Day Screen Shop.

The North Fork Watershed Council letter recommended that Reclamation consider flow augmentation measures that are outside the scope of Reclamation's responsibilities under BiOp Action 149. The PEA was not changed in response to this comment.

The letter from NOAA Fisheries suggested enhancements that would allow the final PEA to be used as a biological assessment (BA) to meet the requirements of a subsequent Section 7 consultation. Although Reclamation does not intend to use the PEA as a BA, the NOAA Fisheries comments were considered and extra detail regarding pushup dam replacements was added to the PEA as a result.

The John Morris letter suggested that past and current habitat improvement activities in the project subbasins be highlighted and that the existing environment be portrayed in a more positive light. This individual also asked questions about the details of some proposed activities. In addition, Morris suggested that the PEA address flow augmentation opportunities that are outside the scope of Reclamation's responsibilities under BiOp Action 149. General characterizations of current conditions were updated and more detail was added to the description of proposed activities as a result of this comment.

The letter from the Oregon Department of Fish and Wildlife pointed out minor errors of factual information and requested that an additional fish screening technique – siphons – be added to the PEA. All noted errors were corrected. In addition, a section on the use of siphons to prevent fish from inadvertently swimming up irrigation ditches was added.

Environmental Impact Findings

Potential impacts to natural, cultural, and social resources from the proposed action are summarized below, based on the full analysis presented in the PEA. Implementation of Action 149 is expected to result in overall, long-term benefits to ESA-listed and other anadromous and resident fish. Any negative impacts would be minimized by the adherence to mitigation measures noted in the PEA.

Hydrology and Water Quality. The replacement of pushup dams with lay-flat stanchion dams and other channel structures may cause local, short-term decreases in water quality. However, these impacts would be less than those associated with annual pushup dam maintenance. Water quality should improve in the long-term. Hydrology would be only minimally affected by pushup dam replacement. Construction of pump stations would occur outside the river channel and not affect water quality or hydrology.

Building and upgrading fish screens at diversion ditches and pump intakes would generally not affect hydrology or water quality.

Transfer of water rights to in-stream flows, and other means of increasing flows, would increase streamflows in the long-term as water rights for in-stream use accumulate.

Water quality may be decreased in the short-term as water diversion structures are removed. However, in the long-term, water quality would generally increase as relatively-high water temperatures and pollutants are diluted and dissolved oxygen is increased by the increased streamflows.

Vegetation. The proposed action is not expected to change most vegetation from its existing condition. However, riparian vegetation could be negatively impacted in the short-term by the replacement of pushup dams and other in-stream activities. A local and typically small acreage of upland vegetation plant communities would be excavated during the installation of lay-flat stanchion dams and infiltration galleries. This ground disturbance would be direct but short-term, and could hasten the introduction or spread of noxious weeds.

Flood Plains and Wetlands. A local and typically small amount of certain wetlands types could be excavated at each site during in-stream or streambank installation of lay-flat stanchion dams and infiltration galleries. Other proposed action activities are not expected to measurably impact floodplains or wetlands.

Fish. The replacement of pushup dams with lay-flat stanchion dams and other channel structures would cause negative short-term impacts to fish in the immediate vicinity of the in-channel construction activity. These impacts would be less than those from re-construction of a pushup dam. In the long-term, fish habitat and fish passage for adult and juvenile salmonids would be improved. Construction of pump stations would not affect fish in the short-term, but would improve fish habitat in the long-term by preventing pushup dam effects.

The installation or upgrading of fish screens would have minor to mostly non-existent impacts to fish in the short-term. In the long-term, fish would benefit from higher survival rates at encounters with fish screens. The installation of siphons would allow fish access to more habitat than without siphons.

Activities to increase streamflows would cause no short-term negative impacts to fish. In the long-term, habitat quality would improve locally and for substantial distances downstream.

Wildlife. In-stream construction activities to install lay-flat stanchion dams and other channel structures would cause short-term animal disturbance, especially if conducted during the breeding period. Long-term, the beneficial improvement of habitat from fewer pushup dams and less water diversion maintenance would offset this disturbance. Since construction would occur at dispersed sites over a large area and several years, the impact to wildlife would not be significant.

Threatened and Endangered Species. The impacts to threatened and endangered fish – steelhead and bull trout – are the same as noted above for fish. Overall, the long-term and cumulative positive impacts to steelhead and bull trout habitat and survival

greatly outweigh the short-term negative impacts, especially when mitigation is considered.

Construction activities could disrupt nearby nesting bald eagles during courtship, incubation, and rearing. However, the impacts to bald eagles would be insignificant if the proposed mitigation is adopted.

Essential Fish Habitat for Chinook Salmon. The intent of the proposed action is to have a long-term, positive impact on steelhead and other native fish, including chinook salmon and their habitat. However, some of the techniques employed to achieve the positive impacts may cause short-term and local negative impacts. Overall, the proposed action's long-term and cumulative positive impacts to essential fish habitat greatly outweigh the short-term negative impacts, especially when mitigation is considered.

Recreation. Overall impacts to recreation would be positive. In particular, recreational fishing and boating would benefit from increased fish populations and augmented streamflows.

Land Use. The rural character of the study area would not be expected to change. Legal protections given to federal Wild and Scenic Rivers and to State Scenic Waterways would remain unchanged.

Socioeconomics. The proposed action would benefit socioeconomics, as increased fishing and boating opportunities would expand the contribution of recreation and tourism to the economy of the project area. Water acquisitions could result in agricultural land being taken out of production, resulting in a negative impact to the local economy. However, landowner involvement in the proposed action habitat improvement projects is totally voluntary, helping assure negative impacts to individuals are avoided.

Indian Trust Assets. The proposed action is intended to improve in-stream habitat for anadromous fish species. This objective indirectly benefits treaty rights by increasing fish survival for tribal members and others in American society. Coordination of activities with tribal restoration efforts would ensure that Indian Trust Assets are protected, maintained, and restored.

Historic Properties. Any proposed action construction activity that would disturb soil, such as replacement of a fish screen, has the potential to damage or destroy historic properties within the disturbance area. However, specific construction impacts cannot be ascertained until specific project locations are identified. Acquisition of water for streamflow is unlikely to trigger impacts to historic properties.

Paleontological Resources. Any proposed action construction activity that would disturb soil, such as replacement of a fish screen, has the potential to damage or destroy historic properties within the disturbance area. However, specific construction impacts

cannot be ascertained until specific project locations are identified. Acquisition of water for streamflow is unlikely to trigger impacts to paleontological resources.

Indian Sacred Sites. Indian sacred sites as defined by Executive Order 13007 would likely not be impacted by the proposed action. The proposed action is limited to private lands, which is outside the scope of Executive Order 13007.

Environmental Justice. The proposed action is not expected to impact communities in any disproportionate way toward minority or low-income populations. An expected increase in anadromous fish survival would benefit all citizens, including Indian Tribes whose culture is historically tied to fish for subsistence.

Conclusion

Implementing the proposed action is expected to provide long-term benefits to ESA-listed and other anadromous and resident fish and would meet Reclamation's requirement under Action 149 of the NMFS 2000 FCRPS BiOp. Therefore, based on the analysis of the environmental consequences in the PEA, and consultation with potentially-affected tribes, agencies, organizations, and the general public, Reclamation concludes that implementing the proposed action, with the environmental commitments described in the PEA, would not have a significant impact on the quality of the human environment or the natural and cultural resources in the project area.

This **Finding of No Significant Impact** has therefore been prepared and is submitted to document environmental review and evaluation in compliance with the National Environmental Policy Act of 1969.

Recommended:

Karen A. Blakney
ESA Program Manager

May 1, 2003
Date

Approved:

Ronald J. Eggers
Area Manager
Lower Columbia Area Office
Portland, Oregon

May 2, 2003
Date

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for Implementation of Action 149 Fish Habitat Improvement Measures from the December 2000 National Marine Fisheries Service Biological Opinion of the Federal Columbia River Power System in Three John Day Subbasins in the Mid-Columbia River Steelhead Evolutionarily Significant Unit in Central Oregon

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List of Acronyms and Abbreviations

af	acre-feet
BE	Biological Evaluation
BiOp	Biological Opinion
BLM	Bureau of Land Management
BP	before present
BPA	Bonneville Power Administration
CFR	Code of Federal Regulations
cfs	cubic feet per second
COE	U.S. Army Corps of Engineers
CRITFC	Columbia River Intertribal Fish Commission
CTUIR	Confederated Tribes of the Umatilla Indian Reservation
CTWSRO	Confederated Tribes of the Warm Springs Reservation of Oregon
DSL	Oregon Division of State Lands
EFH	Essential Fish Habitat
EO	Executive Order
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
FCRPS	Federal Columbia River Power System
FERC	Federal Energy Regulatory Commission
fps	feet per second
GSWCD	Grant Soil and Water Conservation District
ICBEMP	Interior Columbia Basin Ecosystem Management Project
ITAs	Indian Trust Assets
LFSD	lay-flat stanchion dam
m	meters
mm	millimeters
mps	meters per second
N.A.	not available
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NPPC	Northwest Power Planning Council
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
OAR	Oregon Administrative Rules
ODA	Oregon Department of Agriculture

(List of Acronyms & Abbreviations Continued)

ODEQ	Oregon Department of Environmental Quality
ODFW	Oregon Department of Fish and Wildlife
ONHP	Oregon National Heritage Program
ORVs	Outstandingly Remarkable Values
OSP	Oregon State Police
OWEB	Oregon Watershed Enhancement Board
OWRD	Oregon Water Resources Department
PACFISH	Environmental Assessment for the Implementation of Interim Strategies for Managing Anadromous Fish-Producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California
PEA	Programmatic Environmental Assessment
Reclamation	U.S. Bureau of Reclamation
Register	National Register of Historic Places
RM	River Mile
RPA	Reasonable and Prudent Alternative
SHPO	State Historic Preservation Office
TCPs	traditional cultural properties
USDA	U.S. Department of Agriculture
USDI	U.S. Department of the Interior
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

Chapter 1
Purpose and Need

1.1 Introduction

The U.S. Bureau of Reclamation (Reclamation) has developed this Programmatic Environmental Assessment (PEA) in order to implement its anadromous fisheries habitat improvement program within three John Day River subbasins. The intent is to tier additional National Environmental Policy Act (NEPA) analysis, as necessary, off this PEA document. This PEA analyzes the environmental impacts of implementing a 10-year program of improving streamflows and correcting fish passage and screening problems within the North Fork, Middle Fork, and Upper (main stem) subbasins of the John Day River. These subbasins comprise the "project area" for this document.

It is important to note that the subject of this environmental assessment is the implementation of a program for which Reclamation currently has no construction authority. Legislation is pending which will grant Reclamation the authority to conduct the construction portion of the program. This PEA is prepared to disclose the potential impacts of Reclamation's proposed program when that authority is received. In the interim, Reclamation will proceed with providing technical assistance to further the goals of the program. This technical assistance does not require NEPA compliance.

This PEA is prepared pursuant to the National Environmental Policy Act of 1969. In addition to the action alternative, this PEA also evaluates a no-action alternative as required by NEPA. The proposed action is discussed and analyzed in general terms, as this PEA describes generic types of projects suitable for wide application throughout the project area and, therefore, does not include any site-specific data or analysis. However, this assessment and its analysis of environmental consequences are based on numerous completed projects within the project area.

1.2 Purpose and Need for Action

The National Marine Fisheries Service (NMFS) issued a Biological Opinion (BiOp) in December 2000 on continued operation and configuration of the Federal Columbia River Power System (FCRPS). Unless actions identified in the Reasonable and Prudent Alternative (RPA) in the BiOp are taken, a jeopardy opinion may be issued for continued operation of the FCRPS. As part of the RPA, NMFS identified the need to improve migration, spawning and rearing habitat in priority subbasins as part of an off-site mitigation program. RPA Action 149 requires that Reclamation "shall initiate programs in three priority subbasins (identified in the Basin- wide Recovery Strategy) per year over 5 years, in coordination with NMFS, U.S. Fish and Wildlife Service (USFWS), the states, and others, to address all flow, passage, and screening problems in each subbasin over 10 years."

The purpose and need for this action is to improve migration, spawning and rearing habitat for listed anadromous fish stocks in the identified priority subbasins by working with willing partners on non-public lands to correct passage, diversion screening and in-stream flow problems caused by water diversion facilities as directed by RPA Action 149. Most diversion facilities are related to irrigated agriculture. Under this action, Reclamation will expand and focus habitat improvement work and will participate in habitat improvement programs in the subbasins. The priority subbasins within the Mid-Columbia River Steelhead Evolutionarily Significant Unit (ESU), established by NMFS, are the Upper John Day, Middle Fork John Day and North Fork John Day (Figure 1).

1.3 Scoping and Issues

Prior to formal scoping activities, Reclamation's "Advance Team" conducted work in the spring of 2001. This Advance Team was comprised of Reclamation staff with experience in habitat-related and public-outreach actions. The Team visited the area and met with elected officials, irrigators, resource agencies, tribal representatives and other interested citizens in the John Day subbasins. These meetings helped to determine local concerns, identify potential partners and information sources, and quantify and define ongoing local efforts.

Reclamation initiated public scoping for this habitat improvement program within the three John Day subbasins on March 11, 2002. This scoping effort involved a meeting of 26 people, representing 13 organizations, with an interest in habitat improvement activities in one or more of the three subbasins. The scoping period ended on April 12, 2002.

During that month-long period, one written comment was received. Also during this period, Reclamation's Subbasin Liaison made contact with private individuals and others within the subbasins. These contacts, along with their interests and concerns, were documented on Stakeholder Contact Records.

Several issues, both within and outside the scope of this PEA, were identified during the scoping period. Table 1 summarizes these issues. Each issue was identified, then evaluated against two criteria: 1. Is the issue consistent with the purpose and need for Reclamation's proposed action? 2. Is the issue within the management constraints? Management constraints are discussed in Section 2.2.1 of this document. An issue was determined to be within the scope of the analysis if the answer to both questions was "yes."

The scoping process clarified the issues and alternatives to be included in the PEA. All of the issues that are within the scope of the analysis, as defined above, can be dealt with in the action alternative. No new alternatives were developed from these issues that will be analyzed in this PEA.

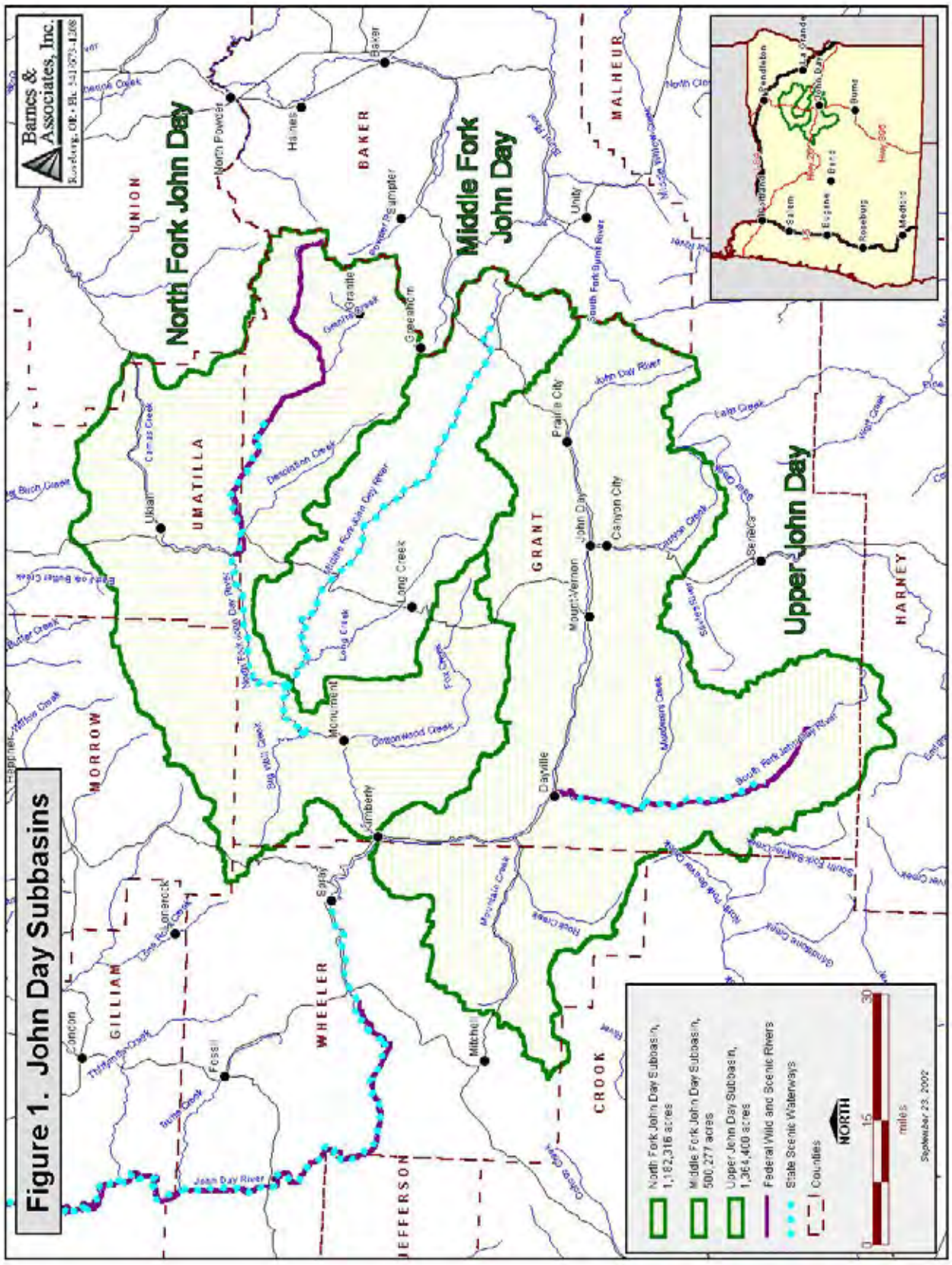
Figure 1. John Day Subbasins
Barnes & Associates, Inc.
North Fork John Day
Middle Fork John Day
Upper John Day
UNION
BAKER
MALHEUR
UMATILLA
GRANT
HARNEY
MORROW
GILLIAM
WHEELER
CROOK
JEFFERSON
North Fork John Day Subbasin, 1,182,316 acres
Middle Fork John Day Subbasin, 500,277 acres
Upper John Day Subbasin, 1,364,400 acres
Federal Wild and Scenic Rivers
State Scenic Waterways
Counties
NORTH
miles
September 23, 2002

Note that some issues are analyzed and treated differently between this PEA and the "Scoping Document for Programmatic Environmental Assessment for Implementation of Action 149 of the NMFS 2000 FCRPS BiOp in Three Subbasins of the Mid-Columbia Steelhead ESU in Eastern Oregon". These differences are the result of changes in the interpretation of management constraints since the finalization of the scoping document.

Table 1. Issues Raised During Scoping Period.

Issue	Consistent with Purpose and Need?	Consistent with Management Constraints?
Pump stations can be beneficial	YES	YES
Infiltration galleries as method of diversion	YES	YES
Lay flat dams to eliminate fish barriers	YES	YES
Lack of fish screens	YES	YES
Improper fish screens	YES	YES
Numerous fish barriers due to push up dams	YES	YES
Problems due to low flows	YES	YES
Purchase water rights	YES	YES
NMFS requires screening for all life stages, even when some life stages are not present *	YES	YES
Channel restoration is needed in some areas	YES	NO
Culverts are barriers to fish	YES	NO
Thermal barriers	YES	NO
Artificial flooding	YES	NO
Water storage in channel – e.g. beaver dams	YES	NO
Water storage off channel	YES	NO
Groundwater & surface water exchange	YES	NO
Juniper thinning	NO	NO
Irrigation return cooling water projects	NO	NO
Construct streamflow gaging stations	NO	NO

* This issue is evaluated against the two criteria in anticipation that eventually all life stages will be present.

1.4 Description of Affected Areas and Location

1.4.1 General

Located in the southern section of the Columbia Plateau Ecological Province, the entire John Day Basin covers nearly 8,100 square miles in north-central and northeastern Oregon. It is the fourth largest basin in the state of Oregon.

The John Day River flows generally northwest from its source in the Strawberry Mountains (9,000 feet elevation) to its mouth at River Mile (RM) 217 (200 feet elevation) on the Columbia River, upstream from the town of Rufus. Major rivers flowing into the mainstem are the North Fork, Middle Fork, and South Fork John Day rivers. The entire John Day system contains over 500 river miles and is one of the largest undammed rivers in the western United States. The John Day River is also the longest free-flowing river with wild salmon and steelhead in the Columbia River Basin.

Topographically, the John Day Basin is an interior plateau generally situated between the Blue Mountains to the east and the Cascade Range to the west. More specifically, the basin is bounded by the Columbia River (Lake Umatilla) to the north, the Blue Mountains to the east, the Aldrich Mountains and Strawberry Range to the south, and the Ochoco Mountains to the west.

The geographic scope of this PEA includes all of the John Day Basin upstream from the confluence of the North Fork John Day and mainstem John Day Rivers at Kimberly (see Figure 1). This basin area includes the North Fork John Day (1,182,316 acres), Middle Fork John Day (500,277 acres) and Upper John Day (1,364,400 acres).

The North Fork John Day, the largest tributary to the main John Day River, originates in the Wallowa-Whitman National Forest in the Blue Mountains at elevations near 8,000 ft. The North Fork John Day River flows westerly for 117 miles and joins the mainstem near Kimberly, 15 miles downstream of the town of Monument. The Middle Fork John Day River originates south of the North Fork in the Malheur National Forest (Blue Mountains), flows westerly for 75 miles, and merges with the North Fork about 18 miles upstream of Monument. The Upper John Day River begins in the Strawberry Mountains in the Malheur National Forest and flows west through the town of John Day (RM 247) and then north from Dayville (RM 212), ending at its confluence with the North Fork John Day River at Kimberly (RM 185). The Upper John Day Subbasin includes the South Fork John Day River, which originates in the southwest portion of Malheur National Forest and flows 60 miles north until it merges with the mainstem near Dayville.

1.4.2 Land Uses

Historically, the John Day Basin was used by Native Americans, fur trappers, and homesteaders. After the treaty of 1855 between the U.S. Government and Indian tribes of the region, homesteads and ranches were established on the river corridor where fertile bottomlands could be farmed and water was available for irrigation and livestock. Gold mining was an important use in the Upper John Day Subbasin in the early part of the century. Small communities were established along the river to provide goods and services for mines, homesteads, and ranches.

Today the economy is heavily based on government, tourism, and agriculture, although some mining continues. The historically large contribution of timber to the basin economy has declined in the last decade due to a number of factors, including lack of

raw materials, environmental litigation (which has contributed to the availability of raw materials), a sagging domestic lumber market, and increased lumber imports. Expansion of the economy is constrained by the current small population, isolation from major cities and limited transportation facilities.

The timber industry is most important in the forested upper portions of the basin. Livestock agriculture is important throughout the basin, and is comprised mostly of cattle and sheep ranching and associated feed crops. Predominant irrigated crops are grass and alfalfa hay.

Mining for gold and other precious metals continues today, both recreationally and commercially. This activity occurs primarily on National Forest lands on the Middle Fork and North Fork John Day Rivers, as well as their tributaries. Most of the mining activity along the North Fork John Day occurs on Granite Creek, located in the upper subbasin. Mining for road construction rock and gravel occurs throughout the basin. However, there are no permitted in-river gravel extraction operations in the John Day Basin (Tim Unterwegner, ODFW, personal communication, July 31, 2002).

Tourism and recreation are growing industries, constituting a significant sector of the basin's economy and are inextricably tied to the production of natural resources. Hunting, fishing, boating, whitewater rafting, camping, wildlife observation, photography, hiking, swimming, and scenic viewing are among the most common recreational activities. Federal Wild and Scenic river segments and State Scenic Waterway designations have undoubtedly contributed to the rise in tourism and recreation. These river segments contain outstandingly remarkable values (ORVs) and provide opportunities for white water rafting, fishing, and wildlife viewing.

Irrigated agriculture comprises nearly two percent of the land in the upper basin, consisting mostly of grass hay, alfalfa, and clover. Irrigated lands are mostly along the upper mainstem from Picture Gorge to the Blue Mountain Hot Springs, in scattered meadow areas of the Middle Fork, and in the lower areas of the North Fork where orchard production and cattle grazing exist (ODFW et al. 1990).

Much of the John Day Basin is within the ceded lands of the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) and the Confederated Tribes of the Warm Springs Reservation of Oregon (CTWSRO). Ceded lands were formerly owned by Indians and subsequently ceded to the United States through treaties. Through these treaties, the Tribes have reserved certain rights to the use of this land and its resources. This area is still used for ceremonial and subsistence purposes, including hunting, fishing, and gathering plants.

1.4.3 Land Ownership/Jurisdiction

The three subbasins occupy a significant portion of Grant County, as well as moderate portions of Umatilla and Wheeler Counties (see Figure 1). Subbasin acres by county are shown in Table 2.

Table 2. Subbasin Acres by County.

County	North Fork John Day	Middle Fork John Day	Upper John Day	Total
Baker	423	609	72	1,104
Crook	0	0	1,992	1,992
Grant	716,387	499,668	1,077,185	2,293,240
Harney	0	0	17,678	17,678
Morrow	141,568	0	0	141,568
Umatilla	311,004	0	0	311,004
Union	7,246	0	0	7,246
Wheeler	5,688	0	267,473	273,161
Total	1,182,316	500,277	1,364,400	3,046,993

The three subbasins are largely dominated by federal ownership in the upper reaches and private ownership in the valley bottoms. Table 3 and Figure 2 display the ownership breakdown within each of the three subbasins.

Table 3. Subbasin Acres by Ownership.

Ownership	North Fork John Day	%	Middle Fork John Day	%	Upper John Day	%	Total	%
Private	432,949	37	212,168	42	650,289	48	1,295,406	43
National Forest	692,198	59	283,707	57	526,621	39	1,502,526	49
Bureau of Land Mgmt	39,269	3	3,865	1	155,629	11	198,763	7
National Park Service	0	0	0	0	6,041	<1	6,041	<1
State of Oregon	17,900	1	537	<1	25,820	2	44,257	1
Total	1,182,316	100%	500,277	100%	1,364,400	100%	3,046,993	100%

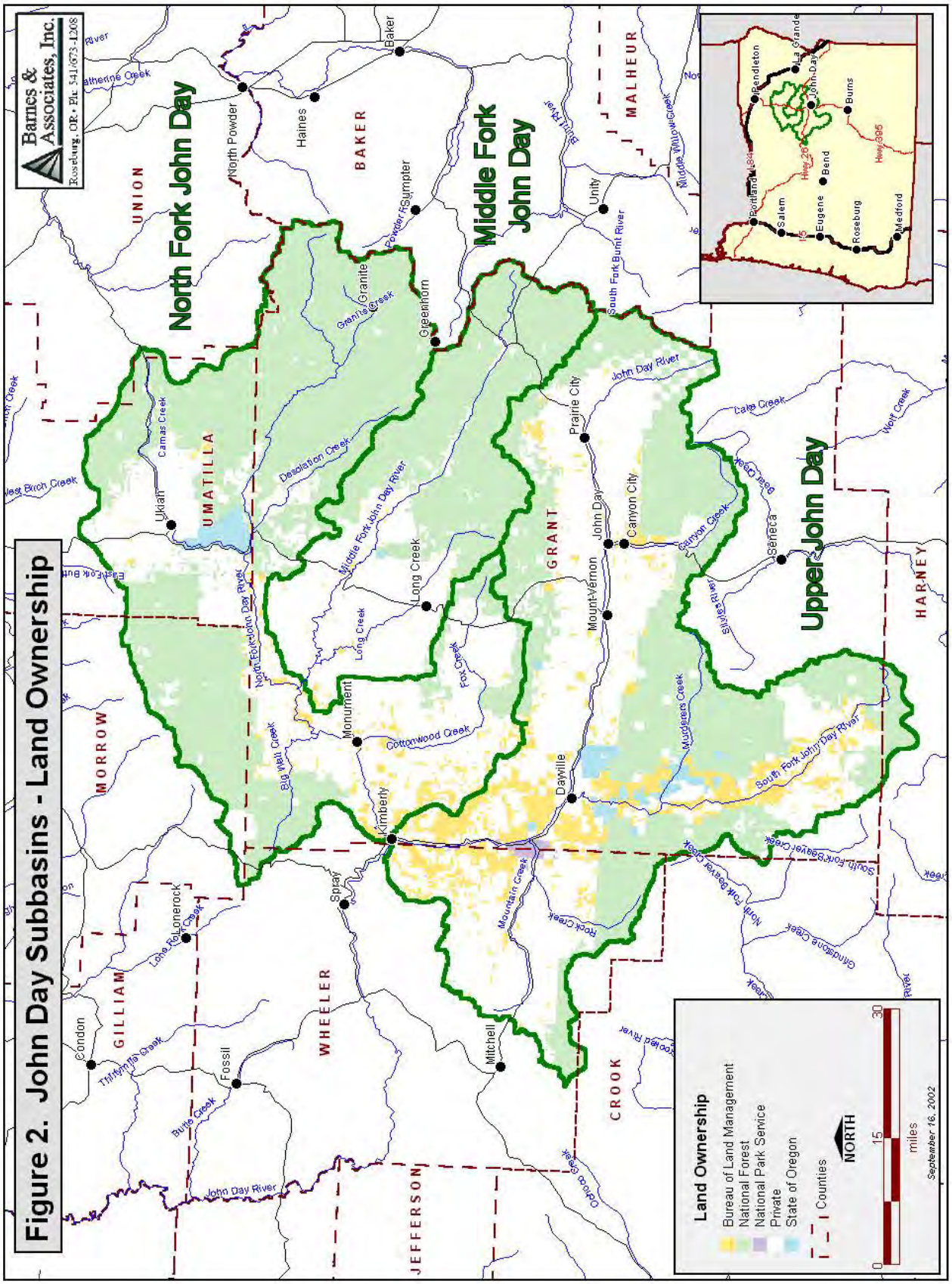
Figure 2. John Day Subbasins - Land Ownership
Barnes & Associates, Inc.
Roseburg, OR • Ph: 541/673-1208
North Fork John Day
Middle Fork John Day
Upper John Day
UNION
BAKER
MALHEUR
UMATILLA
GRANT
HARNEY
MORROW
GILLIAM
WHEELER
CROOK
JEFFERSON
North Powder
Haines
Baker
Unity
Granite
Greenhorn
Prairie City
John Day
Canyon City
Mount Vernon
Seneca
Ukiah
Monument
Long Creek
Dayville
Kimberly
Spray
Mitchell
Condon
Fossil
Lonerock
John Day River
Middle Fork John Day River
North Fork John Day River
South Fork John Day River
Camas Creek
Desolation Creek
Granite Creek
Big Wall Creek
Cottonwood Creek
Fox Creek
Mountain Creek
Rock Creek
Murderers Creek
Canyon Creek
Baker Creek
Lake Creek
Wolf Creek
Pendleton
La Grande
Burns
Bend
Salem
Eugene
Roseburg
Medford
Portland
I-5
Hwy 26
Hwy 395
Land Ownership
Bureau of Land Management
National Forest
National Park Service
Private
State of Oregon
Counties
NORTH
0
15
30
miles
September 16, 2002

1.5 Overview of Problems

Historically, the John Day River was one of the most significant anadromous fish producing rivers in the Columbia River Basin (CRITFC 1995). Currently, the John Day River supports a diverse assemblage of native and non-native fish, including runs of spring and fall chinook salmon, summer steelhead, and Pacific lamprey; and resident populations of westslope cutthroat, interior redband, and bull trout. Recent runs of spring chinook salmon and summer steelhead are smaller than historic runs. In addition, summer steelhead and bull trout are federally-listed as threatened under the Endangered Species Act (ESA). Harvest of anadromous fish is very limited within the John Day Basin, but fish produced here contribute to fisheries in the ocean and the lower Columbia River.

Past and current land uses have degraded the aquatic resource. Water withdrawals have reduced flow in the channel, especially during summer, and contributed to higher water temperature; grazing, mining, timber harvest, and maintenance of pushup dams have reduced riparian vegetation and shade, also contributing to higher water temperature and reducing habitat diversity; pushup dams and reduced flows have created physical and thermal obstacles to fish movement. Yet, the aquatic habitat is healthier than in many other Columbia Basin tributaries due to the absence of large dams and the presence of quality habitat in some federally-owned headwater areas.

As knowledge increases, impacts of these detrimental practices are recognized. This recognition allows for alternatives to be devised and improvements made to agricultural systems to protect fisheries. To date, there have been many habitat restoration accomplishments in the project area. These accomplishments are summarized in section 1.6 below. This PEA focuses on correcting streamflow, fish passage and screening problems.

Figure 3. Pushup dam in project area.

Upstream and downstream migration of salmon, steelhead, and trout have been hindered by pushup dams. Pushup dams are two- to 10-foot high structures built of rip-rap, river rock, gravel, sand and dirt, metal, sandbags, and/or other materials and debris, consolidated across the river or stream channel, for the purpose of raising water levels for diversion to downslope land (Figure 3). There is no complete count of pushup dams in the project area, but local input received during scoping indicates that there may be several hundred.

Pushup dams generally require maintenance one to several times per year depending on the severity of high and low flows after initial construction. The timing of the initial construction of pushup dams is generally late June or early July when flows recede nearer to base flow levels. As water levels continue to recede throughout the remainder of the summer, additional maintenance may be needed to maintain the desired diversion rate. This maintenance involves the in-stream use of heavy equipment and the introduction of fill material to reconstruct dams rendered ineffective by high streamflows in the winter and spring. Such maintenance disturbs channel and bank habitat near the dam site and creates sediment and turbidity that travel downstream. This disturbance reduces riparian cover vegetation and habitat diversity in and around the site of the diversion structure. Consecutive years of channel disturbance also tends to broaden the stream channel and, consequently, reduces water depth.

Downstream-migrating juvenile fish are susceptible to entrapment in water diversions that are either inadequately screened or not screened at all. Fish become impinged on inadequate screens, or are drawn into the diversion system without an escape route back to the main stream. Trapped fish eventually die as they run out of water, or are exposed to other lethal conditions (such as high water temperatures, lack of dissolved oxygen, or physical contact with pumps and sprinklers) in the irrigation channel or agricultural field.

According to the Oregon Department of Fish and Wildlife (ODFW), there are 30 to 50 unscreened diversions in the project area upstream of Kimberly (NPPC 2001; USBR 2002). In addition, there are approximately 150 diversions with screens that do not meet NMFS standards (NPPC, 2001). These out-of-compliance screens typically have openings that are too large to restrict the smaller life stages of fish. As a result, only smolt size and larger fish are kept out of the irrigation channel. The efficiency of the non-compliant screens is roughly 30 to 40 percent overall (Steve Allen, ODFW, Scoping Meeting, March 2002). By contrast, screens meeting current NMFS criteria are considered at least 95 percent efficient at keeping all life stages of fish out of diversions (Steve Allen, ODFW, Scoping Meeting March 2002). Pump stations, where irrigation water is pumped from the river, pose a similar problem. There are approximately 150 pump stations in the three subbasins that are inadequately screened or not screened at all.

Low streamflows are another problem in all three subbasins. Water use for irrigation is heavy, with water appropriations exceeding natural flows at times, most notably in the summer. Water appropriation varies by season; the average proportion of consumptive use to natural flow is two percent in winter, 15 percent in spring, 73 percent in summer and 14 percent in fall (OWRD 2000).

Artificially-low streamflow limits the movement of fish (especially when some reaches are completely dewatered), reduces the amount of aquatic habitat available for fish to live in, and reduces the quality of habitat. Low flows are a contributing factor to water temperatures exceeding Oregon Department of Environmental Quality (ODEQ)

standards for salmonid-bearing streams in much of the basin. See Section 3.1.1.2 for a discussion of ODEQ water quality limited streams within the project area.

1.6 Related Actions and Activities

The past 10 years have seen much fisheries habitat improvement activity in the project area. State and federal agencies, Indian tribes, local water user groups and others have been active with various habitat improvement projects including screen construction, passage barrier removal and streamflow improvement.

Under the Northwest Power Act, the Bonneville Power Administration (BPA) is responsible for mitigating the loss of fish and wildlife habitat caused by the development of the FCRPS. BPA meets this responsibility primarily by funding projects submitted to and recommended by the Northwest Power Planning Council (NPPC). They have also prepared documents to assist with the identification of environmental needs and recommendations for action. Two of the most notable documents are the Environmental Impact Statements titled, *Watershed Management Program, Final Environmental Impact Statement, DOE/EIS-0265*, dated July 1997, and the *Fish & Wildlife Implementation Plan Draft EIS, DOE/EIS-0312*, dated June 2001.

Reclamation has conducted a number of water optimization studies in the John Day Basin. These studies are comprehensive assessments that reviewed most of the ongoing agency watershed restoration programs, rated those programs as to their benefits, and identified gaps in both agency programs and project efforts.

Reclamation also took the lead on a demonstration project referred to as the John Day River Basin Water Conservation Demonstration Project. Upon completion of the project Reclamation prepared a completion report (USBR 2000). In total this demonstration project was comprised of 19 individual projects. These projects addressed a variety of in-stream and stream-related resource issues, including consolidation of irrigation diversions, removal of diversion dams, installation of gravity pipelines, reuse of tailwater, rehabilitation of existing drains, installation of infiltration galleries, and other resource management improvements.

Reclamation participated in plan formulation and oversight and entered into a cooperative agreement with the Grant Soil and Water Conservation District (GSWCD) for planning and design. Local water users, ODFW, Oregon Water Resources Department (OWRD), Grant County, Natural Resources Conservation Service (NRCS), the Tribes, and USFWS were also involved in the planning process. Reclamation entered into an agreement in October of 1996 with the Tribes to fund a tribal staff position in the city of John Day to help coordinate the proposed projects.

The total cost of the John Day Water Conservation Demonstration Project was about $1,841,200. Reclamation's cost share was approximately 38% of this total. The other cost share partners were landowners, BPA, OWRD, and the Oregon Department of

Agriculture (ODA). In addition, Reclamation provided $270,000 to the Tribes for project development, coordination, and monitoring (USBR 2000).

The primary source of funding for much of the habitat improvement activity has been the BPA through the NPPC's Rolling Provincial Review Process. The Oregon Watershed Enhancement Board (OWEB), other state and federal agency sources, and private grants have supplemented BPA funding.

The John Day River Basin has a strong local partnership to remove pushup dams. This partnership is between the GSWCD and the CTWSRO. These efforts have been focused primarily on the Upper John Day and Middle Fork John Day subbasins to replace pushup dams with pumping systems, infiltration galleries and permanent diversion structures such as lay-flat stanchions (see Section 2.2.2). The North Fork Watershed Council and the CTUIR have similarly removed passage barriers in the North Fork John Day Subbasin.

In 1971, ODFW identified the John Forrest property in the Upper John Day and Middle Fork John Day subbasins as the highest priority for stream restoration in the entire John Day Basin. The CTWSRO entered into a lease on this property in 2000 with the purpose of undertaking stream restoration projects. This lease was made possible by a grant from Reclamation and supplemental private funds (Robertson 2000). In 2002 the CTWSRO purchased the property with funds provided by the BPA. There have already been numerous restoration projects undertaken on this property, including replacement of three pushup dams with lay-flat stanchion dams (LFSDs), installation of riparian corridor fencing, riparian planting and initiation of biological monitoring (Brent Smith, CTWSRO, personal communication, September 26, 2002).

Much future passage improvement activity is planned as well. The CTUIR and the North Fork Watershed Council both have five-year plans to improve fish passage along the North Fork John Day River. The North Fork Watershed Council plans to work primarily along the lower North Fork, with an emphasis on replacing gravel pushup dams with permanent pumping stations. The CTWSRO also have a five-year plan to eliminate passage barriers, with an emphasis on their recently-purchased Oxbow Ranch property along the Middle Fork John Day River. Reclamation and GSWCD will provide technical assistance and construction implementation, respectively, for much of the future passage improvement work.

Fish screen replacements to meet NMFS standards have been accomplished primarily through the efforts of the fish screen production facility operated by ODFW at John Day. This screen shop, with its staff of approximately 30, produces about 20 NMFS-approved fish screens annually for application in the John Day Basin and throughout eastern Oregon.

Flow augmentation has been tackled through various strategies. The Oregon Wildlife Coalition, Oregon Water Trust and the John Day Bull Trout Recovery Team have acquired, via purchases or donations, in-stream water rights throughout the John Day

River system. CTWSRO, GSWCD, and Reclamation have conducted projects to improve flows by replacing flood irrigation and open irrigation systems with sprinkler, wheel line and closed systems. These projects have been targeted primarily at the Upper John Day and Middle Fork John Day subbasins. The North Fork Watershed Council has done streamflow restoration work in the lower North Fork John Day Subbasin.

Known future flow improvement projects include a plan by the Oregon Water Trust to acquire 2.0 cubic feet per second (cfs) throughout the John Day system over the years 2002 through 2004. The CTUIR have a five-year plan to improve flows in the North Fork John Day Subbasin. The CTWSRO also plan to conduct flow improvement projects over the next five years, much of it targeted at the Oxbow Ranch property.

In addition, Reclamation is conducting an "In-Stream Flow Incremental Methodology" study (IFIM) to identify habitat-flow relationships. This study will determine habitat availability at different flow rates and assist other agencies in making policy decisions regarding target streamflows.

A more detailed listing of past, on-going and future projects can be found in NPPC 2001. Appendix A includes a summary of the projects listed in NPPC 2001 for the project area. The Bureau of Reclamation's "Tributary Enhancement Water Conservation Demonstration Project" in the John Day River Basin is summarized in Appendix B.

Chapter 2
Alternatives

2.1 No Action Alternative

The "no action" alternative for this PEA is for Reclamation to contribute minimal assistance toward habitat improvement activities within these three subbasins. There might be Reclamation funding of planning efforts; however, these funds would be minimal and could not be used for on-the-ground project work (construction). Reclamation's Demonstration Project has been completed, and Reclamation does not have funding or authority to continue the Demonstration Project. The "no action" alternative acknowledges that improvements will still get accomplished in the subbasins, but with limited Reclamation funds and technical expertise.

As described in Section 1.6 above, there has been much passage improvement, fish screen installation and, to a lesser degree, streamflow augmentation effort in the three subject subbasins over the last 10 or more years. It is anticipated that this work will continue into the foreseeable future. However, the current level of Reclamation funding for existing programs is inadequate to complete the screening and barrier tasks within the 10-year time frames as identified in the BiOp from NMFS (USBR 2001). It is presumed that Reclamation funding is inadequate to fully resolve low streamflow issues as well.

The implementation of Action 149, as identified in the NMFS December, 2000 BiOp, is a legal requirement under the ESA. The BiOp finds that operation of the FCRPS constitutes "jeopardy" to anadromous fish species. Therefore, the action agencies, including Reclamation, the U.S. Army Corps of Engineers (COE) and BPA, must implement these Action 149 off-site mitigation measures to offset the effects of the hydropower system, or potentially face legal actions as a result of a jeopardy opinion. The "no action" alternative is not a viable alternative but, in compliance with NEPA, must be evaluated and its impacts compared to those of the action alternative.

2.2 Proposed Action

The proposed action is the implementation of Reclamation's responsibilities under Action 149 of the 2000 FCRPS BiOp in the North Fork John Day, Middle Fork John Day, and Upper John Day subbasins in order to conserve listed species under the ESA. Toward this end, Reclamation will provide technical expertise, and construct or provide construction funding, to accelerate improvements in fish habitat. These actions will occur through December 2010 in the Upper John Day and Middle Fork John Day subbasins; and through December 2012 in the North Fork John Day Subbasin. This effort and funding will be directed to improve fish habitat, which in turn should improve fish populations, by using established, accepted methods for removing fish passage

barriers, augmenting streamflows, and providing or updating fish screens. All activities will abide by applicable permit requirements and state water law.

The following is a list of potential measures that Reclamation expects to contribute to or implement. Depending on the subbasin-specific conditions, not all measures will apply to all subbasins. Discretion will be used in determining which measures are appropriate in meeting the particular passage, flow, and screen deficiencies for each situation.

Goals	**Potential Measures**
Correct passage barriers	Remove pushup dams and replace with pump systems, infiltration galleries, or other permanent type structures, such as LFSDs, with viable fish passage facilities. Consolidate diversions.
Correct streamflow deficiencies	Acquire water for in-stream flow during critical migration periods. Replace headgates to provide better control of water withdrawals, and install measuring devices.
Correct screen deficiencies	Utilize rotary drum, flat plate, or traveling belt screens that meet NMFS criteria. Utilize NMFS-approved exposed or buried well screens on pump intakes. Utilize screen methods to protect fish from wasteway attraction flows. Utilize siphons at stream/irrigation ditch interfaces.

Because the specific choice of locations and the number of willing participants is not known, nor can the choice of specific measures be determined at this time, this Environmental Assessment is prepared at a programmatic level.

The following descriptions of these methods are general and for broad application. Individual project sites will be evaluated with the landowner to select appropriate treatments and to customize designs as necessary to account for site-specific features such as flow range and topography.

2.2.1 Management Constraints

In developing the suite of strategies to implement Action 149, the following management constraints were applied:

a. Reclamation will address issues/needs which have been caused by water diversion activities.

b. Reclamation will address barrier removal and screening issues/needs which are in non-public ownership (as opposed to U.S. Forest Service and other public ownership). Both the facility and land must be non-public.
c. All work accomplished in pursuit of Action Item 149 of the 2000 BiOp will be done with willing participants.
d. Reclamation activities will be confined to in-stream work, with the exception of some screening activities.
e. Reclamation will assume no operation, replacement or maintenance responsibilities associated with construction or other programs developed as a result of this effort.
f. Fish screens and fishways (fish ladders around dams) will be designed to meet the applicable NMFS and USFWS criteria. (NMFS fish screen criteria are included in Appendices C and D. USFWS defers to NMFS for fish screen criteria, even for bull trout. Fishway criteria are detailed in Table 4.)
g. Screens developed through this effort will be sized to meet existing water rights.
h. Flow issues will be addressed in accordance with state water laws.
i. Water acquisition will occur through water purchases or interim leases. Water purchases will be negotiated in a manner such that water rights ownership is in the name of a legally-recognized third party, not in the name of the U.S. Government.
j. Reclamation's presence and assistance in each subbasin is anticipated to be limited to 10 years.

2.2.2 Passage Barriers

The purpose of pushup dams is to raise the water level such that irrigation headworks can draw the allotted volume of water. Unintentionally, the dams frequently become obstacles to migrating fish, especially as flow recedes during summer and fall and most flow passes through the rock dams rather than over them. In these cases, the dams can function like a sieve and inhibit upstream and downstream movement of adult and juvenile fish. Note that for purposes of this PEA, passage barriers are defined as water diversion structures such as pushup dams. Passage barriers as defined herein do not include log jams, mining tailings, stream configurations, or thermal barriers.

The primary means of correcting these passage obstacles is by replacing pushup dams with alternate means of acquiring water for the irrigation system. There are four currently-accepted technologies that can eliminate the need for most pushup dams as described in the following four sections.

Another barrier to fish passage sometimes occurs when an irrigation ditch intersects a stream. These ditches can capture and divert the streams themselves. Siphons can be used to remove this type of fish passage barrier by sending the irrigation water through a pipe under the stream. Screens can also be used to keep fish in the stream and out of the ditch, though they are less effective than siphons in this application. Both screens and siphons are discussed in section 2.2.4, "Fish Screens."

For all passage barrier removal actions, in-stream activities must be performed within the ODFW guidelines for timing of in-water work, and coordinated with the District Fish Biologist for emergency extensions of the work window, which is:

- July 15 to August 15 in the Upper John Day (main stem) upstream from John Day, and the Middle Fork and North Fork John Day upstream from the Highway 395 crossings,
- July 15 to August 31 in the remainder of the reaches downstream from John Day and Highway 395, or
- An alternate work window that may be required by ODFW or NMFS.

Figure 4. Lay-flat stanchion dam (2001 Coolie Island diversion project).

Figure 5. Lay-flat stanchion dam showing fishway (2001 Coolie Island diversion project).

2.2.2.1 Lay-flat stanchion dams

Pushup dams can be replaced with stanchion dams, such as LFSDs, which are permanent structures built in the channel (Figures 4 and 5). LFSDs are constructed of pre-cast concrete sections buried in the streambed with tops set at streambed grade. Weld plates are fixed to the concrete to allow the addition of stanchions and braces to hold flashboards for ponding water during the irrigation season. When flashboards are in place, one section of the dam is set at a lower level to concentrate flow and create a fishway for upstream and downstream passage of fish within the river channel at all flows. Often, steel sheet piling is installed to protect adjacent streambanks from erosion. Sheet piling may not always be available, or equipment may not be able to access a work area, so alternative materials such as concrete might be used. See Appendix E for a generic LFSD design.

Outside of the irrigation season, the flashboards, braces, and

stanchions are removed so that high flows, debris, and bedload pass unimpeded and do not damage the structure or adjacent streambanks. Examples of LFSDs in the John Day Basin include the Holliday Ranch and Keerins diversions (USBR 2000), Coolie Island diversion project (see Figures 4 and 5), and Beaver Dam diversion project.

Construction of LFSDs requires one-time excavation within the river channel and adjacent riparian areas. A typical installation takes from two to five days, with about half of the time involving in-stream work. During in-stream work, streamflow is diverted around the local construction site so that virtually all work is completed in dry or semi-dry conditions. First, pre-cast concrete blocks are placed into the streambed, then sheetpiling is driven into the streambed along the banks. The culvert and headgate are installed in the sheetpiling along one bank. Clean rock and native soil are used to backfill the sheetpiling, fill a portion of the old ditch, and bury the new culvert section. Finally, the pushup dam is removed or re-graded and the bank and spoils are shaped to natural grades and revegetated as necessary.

It may be necessary to replace the headgate at the same time the LSFD is installed. The headgate and culvert are installed through the streambank-protective sheet piling (on the side opposite the fishway) to control the diversion of water into the ditch. Headgates will be sized to the appropriate delivery rate in accordance with Oregon water laws. Water measurement devices will be appurtenant features of headgate installations as necessary.

An automated headgate may be installed as an appurtenant feature to the LFSD and headgate design. An automated headgate allows a constant, targeted flow of water in the delivery ditch, regardless of the flow in the stream channel from where the water is diverted. See Section 2.2.3.2 for a more detailed discussion of automated headgates.

The fishway and other features of LFSDs will be appropriately designed in accordance with applicable NMFS and USFWS fish passage criteria for all life stages. Currently, USFWS does not have guidelines for upstream passage of bull trout, but is in the process of developing them (Chris Allen, USFWS, personal communication, September 2002). NMFS currently has no published criteria for upstream passage of adult and juvenile salmonids that would apply to diversion structures in the John Day subbasins. (NMFS has upstream passage criteria in internal review, but those criteria are unlikely to become formally adopted in 2002.) However, NMFS does provide the following guidelines (Table 4) for upstream salmonid passage as currently applied to small diversion dams (Larry Swenson, NMFS, personal communication, May 2002).

Table 4. NMFS Guidelines for Upstream Salmonid Passage at Small Diversion Dams.

Salmonid Size Class	Maximum Drop Between Pools	Maximum Water Velocity (at bottom of falls)
Adults	12 inches	8 feet per second
Juveniles	6 inches	5 feet per second

In addition, pools must be sufficiently sized and configured to provide resting areas, and deep enough so that energy is dissipated and fish can effectively leap or swim from pool to pool. Fishway exits should be sufficiently separated from diversion intakes and configured to minimize "fallback" of fish. Natural substrate (e.g. cobbles and boulders) is generally considered desirable in fishways to produce natural hydraulics.
LFSDs are most appropriate where:

- river banks are sufficiently high and stable to allow construction of the dam, headgate works, and diversion pool,
- the channel is narrow enough to make LFSDs construction cost-effective,
- stream substrate is heavily silted or otherwise inappropriate for an infiltration gallery (infiltration gallery screens are susceptible to clogging by silt and clay),
- the point of application is relatively close to the point of diversion (so as to minimize losses from the water delivery system), and
- sufficient head differential exists between diversion and use to allow a gravity system.

2.2.2.2 Infiltration galleries

In some cases, pushup dams can be replaced with infiltration galleries, which are long sections of well screen buried approximately one foot under the river channel (Figures 6, 7, and 8). Well screens draw water from within the substrate, and transmit it by gravity into the irrigation system. Because there is no dam, there is no obstacle to fish passage. Well screens cover a large area and are of fine-mesh (openings <3/32 inch), thus no fish can be drawn into them, and are designed for intake velocities of less than 0.4 feet per second. An access pipe and irrigation shut-off valve allow air to be injected backward into the well screen to clean sediment and debris from it periodically. Examples in the project area include the Fields, Lemon, Courchesne, and Rudishauser galleries (USBR 2000). See Appendix F for a generic infiltration gallery design.

Figure 6. Infiltration gallery showing well screen installation (1998 Fields demonstration project for USBR).

Construction of an infiltration gallery requires one-time, shallow excavation and screen/pipe burial in the channel and adjacent riparian areas. During construction, streamflows are directed around the work area using temporary barriers where possible, or temporary piping on small sites. A trench is excavated two feet wide by 16 inches deep (for a 12-inch screen) to receive the screen and pipe. The collector is placed in the trench and connected to the control station and delivery system. The control station consists of the control valve and backflush plumbing. Excavated materials are used to cover the collector. Excess spoils are shaped over the disturbed area of the streambank and seeded, usually later in the fall.

Figure 7. Cover over infiltration gallery (1998 Fields demonstration project for USBR).

If the collector supplies an open ditch delivery system, a flow measuring device may be installed as an appurtenant feature so the system can be regulated to the legal rate of diversion. If the system supplies a pump, the pump outlet is equipped with a totalizing flow meter.

Screens are stainless steel and sized from two to 36 inches in diameter, with intake slot openings sized from 0.010 to 0.100 inches. The length of screen for a particular site depends on the substrate material; finer material requires longer lengths of screen for a given amount of intake. Collectors are placed shallow, with the crown of the screen approximately four inches below the existing streambed elevation (screens buried deeper tend to seal over and require more frequent back flushing).

Infiltration galleries are most appropriate where:

Figure 8. Infiltration gallery upon completion (1998 Fields demonstration project for USBR).

- stream substrate is composed of coarse gravel and cobble, with little silt and few organic matter fines, to avoid clogging of the buried screen,
- streambanks are stable, so the well screen collector is less likely to be exposed by streambank failure and resulting headcut migration,
- the least intrusive structure on site is important,
- point of application is relatively close to the point of diversion (so as to minimize losses from the water delivery system),
- sufficient head differential exists between diversion and use to allow a gravity system, and
- flows can be easily re-routed around the site during construction.

2.2.2.3 Permanent pump stations

Permanent pump stations (Figures 9 and 10) can be associated with a natural pool or a buried well screen to eliminate the need for a pushup dam. Because they do not rely on gravity flow, pumps can be located closer to the irrigated fields (rather than substantially upstream from the fields, as most ditch diversions are), thus reducing the length of river from which water is removed, and the length of ditch or pipeline required to deliver the water. Water loss to evaporation and ditch seepage is generally lower with pump stations relative to the longer ditches associated with pushup dams. Pump intakes are screened relative to the maximum flow capacity to meet NMFS criteria (Appendix C) and ensure fish are not injured, thus eliminating the need for separate screens within the irrigation system. Examples in the project area include the Cathedral Rock, Clausen, Kight, Ediger, Page, Morris-Pike, and Lee irrigation projects (USBR 2000). See Appendix G for a generic pump station design.

Figure 9. Pump at permanent pump station (1994 Cathedral Rock ditches project for USBR).

A pump station consists of a screened intake pipe in the river connected to a pump mounted on the bank. The pump is connected to the rest of the irrigation delivery system (usually a pipeline) and a reliable source of power (to power the pump motor). Power sources may include electricity or diesel. Virtually all construction is done only once, off-site, and on the bank outside of the stream channel.

Figure 10. Intake pipe at permanent pump station.

A flow meter should be installed as an appurtenant feature on permanent pump stations. Most flow meters are mechanical and show the rate at which water is withdrawn and have a totalizing feature to record use of water over time. The rate of withdrawal should be recorded in gallons per minute or cfs. The totalizer should record in acre-feet (af).

Pump stations are most appropriate where:

- power lines can be run to the site (if electricity is used to power the pump motor), or diesel fuel can be stored (if diesel is the power source),
- the stream/river is too large for LFSDs to be practical or safe to install,
- topography does not allow gravity flow into the irrigation system,
- stream bottoms are heavy to silt or clay, thus precluding the use of infiltration galleries,
- high water volumes (in excess of 2.0 cfs) to serve large acreages (80 acres or more) are required,
- point of application is far from the point of diversion, thus precluding the use of LFSDs and infiltration galleries with their associated delivery system losses through evaporation and leaks, and/or
- flows cannot be easily re-routed around the construction of infiltration galleries or LFSDs.

Installation of a pump station may involve some disturbance to the channel and the adjacent riparian area to remove the pushup dam and set the pump. Further disturbance may be required to maintain an adequate pool level in the stream for the pump intake and to provide electrical service to the pump site.

Note that for the purposes of this PEA, a permanent pump station is a potential action item under Reclamation's ESA Habitat Program if the pump station replaces an in-stream structure (such as a pushup dam) and is an optional way of handling a diversion screen or barrier issue. If not, then the pump station would not fall within the scope of this PEA and would not qualify under Reclamation's ESA Habitat Program.

2.2.2.4 Consolidate diversions

In some cases, two or more diversions might be consolidated into one system to eliminate the need for one or more pushup dams. In this scenario, a downstream diversion system is fed water by an upstream diversion. The connection can be made via pipeline or ditch. This option is very limited to situations where topography, ownership, and water rights allow such transfers. Examples in the project area include Widows Creek and the Holmes Pipeline (USBR 2000). Figure 11 of the Holmes Pipeline project shows the installation of an eight-inch PVC under the Middle Fork John Day River to feed water to a lower ditch delivery system from a single upstream

Figure 11. Water delivery pipe feeding lower ditch delivery system from upstream diversion (Holmes pipeline project for USBR).

diversion. The single diversion now delivers the irrigation water previously provided by two diversions.

Combining diversions into one system would require a Transfer Application for a Change in Point of Diversion to be filed with the OWRD for the downstream ditch diversions to be moved to the common diversion point. If the point of diversion moves more than ¼ mile or crosses another point of diversion, advertising the proposed change is required. The "Transfer Application" process may take six months to a year to complete.

If an upstream change in point of diversion is requested on a stream where an in-stream water right appurtenant to a reach of the stream is in force, the upstream transfer may be considered an injury to the in-stream water right. An upstream move of a point of diversion would partially "de-water" the stream by the amount of the appropriation and would be considered an injury to the in-stream water right within the reach that is receiving less water after the transfer. However, combining the ditches and eliminating one or more diversion dams would be a benefit to the stream.

Consolidation of diversions requires one-time excavation within the river channel to remove the pushup dam and along the route of connection between irrigation systems. Diversion consolidation is often included in projects to replace two or more pushup dams with a permanent diversion facility such as a LFSD or infiltration gallery.

2.2.3 Streamflow

2.2.3.1 Acquisition of water for in-stream flow during critical migration periods

The most expedient method of increasing streamflow is to transfer existing consumptive water rights to in-stream water rights of record. OWRD becomes the custodian of all water transferred to in-stream.

Oregon water law allows the landowner to change the use of an existing certificate of water right to in-stream use through the transfer or lease process. For example, if a water right for irrigation were transferred to in-stream use, the amount of water allowed on the certificate would remain in-stream from the point of diversion of record downstream in an established reach for in-stream use with the same priority as the original right of record. The resulting in-stream water right could call (have junior rights in priority regulated in favor of the older in-stream priority) for water from junior water rights upstream. Junior water rights of record downstream within the designated reach of the in-stream water right would not be allowed to appropriate the water.

A transfer from a consumptive use to an in-stream use may result in the elimination of the original water right of record's diversion. If the water right is permanently transferred in its entirety, there might not be a need for a diversion dam or pump at the original point of diversion. However, in some cases only a portion of the water right may be transferred, or the transfer may be temporary, resulting in the need to maintain the diversion.

Transferring or leasing a certificate of water right to an in-stream water right may be made if there is no injury to an existing right of record or enlargement of the original right of record. Such shifts in water rights must follow established OWRD procedures, which include notifying interested stakeholders so that they may assess potential impacts. When a right is leased or transferred to in-stream use, the OWRD determines:

1. The amount of water actually used under the original right of record, after accounting for losses to the stream. For example, an irrigator may divert 1.0 cfs in a ditch. However, losses returning to the stream may be 30 percent of the flow diverted. The in-stream water right quantity allowed would be 0.70 cfs.

2. The reach of the stream/river that could be served by the in-stream water right. The in-stream flow will be protected within this reach by OWRD staff.

3. Period of use of the in-stream water right. If the full rate of a water right (daily usage allowed under the water right) is used continuously for approximately 100 days, the duty (annual total water usage allowed under the water right) is reached. If the water right has a season of use (e.g., irrigation), the full rate will not cover continuous use of the right for the full season allowed. When a right of record that has a seasonal use associated with it is transferred or leased to in-stream, the OWRD determines when the period of in-stream use is to occur.

It is important to note that an irrigation water right is lost if it is not used at least once during the irrigation season within a five-year period.

There are five ways an existing right of record can be used as an in-stream water right:

1. Transfer: A certificate of water right holder may permanently transfer the water allowed under their right of record to in-stream use (OAR 690-077-0075). This would create a permanent in-stream water right. The water right could be acquired either through purchase or as a gift. This is the preferred method of increasing streamflows because it provides a specific amount of flow in perpetuity. An additional benefit is that the transfer to in-stream may result in the removal of a diversion dam or fish screen, or both. (Note: OAR is an acronym for “Oregon Administrative Rules,” a compilation of the administrative rules of Oregon state agencies, compiled, indexed, and published by the Secretary of State’s Office.)

2. Lease: A certificate of water right holder may lease the water allowed under their right of record to in-stream use (OAR 690-077-0077). The owner of the water right may lease out the water for in-stream use for a period of one to five years at a time. Further leases in one- to five-year increments are possible after the expiration of the previous lease.

3. Split Season Use: A certificate of water right holder may split off a portion of the water allowed under their right of record and lease it out for in-stream use (OAR

690-077-0079). A landowner would irrigate up to a certain date (July 1 and July 15 are likely dates), then the balance of their annual water right would remain in-stream as a legally protected in-stream right for the rest of the season. For example, a split season lease may be applied for when a user has five af of duty but uses only three af of the duty and desires to lease the remaining two af for in-stream use.

Under state water law, adequate measuring devices are required to guarantee that the water right of record is not being expanded. As with leases discussed above, the duration of the split season use is limited to five years or fewer. Further leases in one- to five-year increments are possible after the expiration of the previous lease. Split season leases were authorized during the 2001 Oregon legislative session.

4. Cancellation: Cancellation of a water right will allow the water to remain within the stream channel. However, the water is treated as all other natural flows and may be appropriated by any legal water right holder. Any new water right subsequently applied for will be treated as a new application and assigned a current date.

5. Payment for non-use: One could pay an irrigator not to use water seasonally to increase flows during critical times for fisheries resources. For example, an irrigator could be paid to grow one less crop of alfalfa a year, thus freeing up the water normally used for that last cutting. However, as with cancellation of water rights, the water not used may be appropriated by any other legal water right holder on that stream. The payment agreement between the irrigator and water purchaser would be in the form of a contract. Annual contracts are recommended. However, if multi-year contracts are used, all parties need to be aware of the five-year "no-use" clause: an irrigation water right is lost if it is not used at least once during the irrigation season within a five-year period.

The "transfer" process is the preferred method of acquiring water for in-stream use because it provides sustainable water for the future. The lease and split season lease options have potential benefits, too. However, the benefits are short term because the water leased will return to the original use after the lease term has expired.

Cancellation of water rights or payment for non-use are so limited in their application, because of the potential for appropriation by others, that they are not deemed viable methods of increasing streamflows in the main river reaches. However, these approaches can provide some localized benefit in tributaries to the main river reaches.

To the extent possible, streamflow acquisitions will comply with NMFS protocols (currently NMFS 2001) for improving the protection of listed steelhead.

2.2.3.2 Replacement of headgates to provide better control of water withdrawals and install measuring devices

Non-functioning headgates and measurement devices can inadvertently allow excessive water withdrawals, including withdrawals that exceed the limits of the water right of record. One way to control withdrawals is to install approved headgates and appurtenant measuring devices which measure the rate at which water is being diverted. A functioning and properly-controlled headgate, along with a measuring device, would allow the water user to divert the appropriate amount of water to fulfill the needs of the water right without waste.

The Natural Resources Conservation Service has several headgate designs to assist the local water user. Headgates will be sized to the appropriate delivery rate in accordance with Oregon water law. Immediately downstream from the headgate, a measuring device appurtenant to the headgate should be installed. The measuring device should be chosen from among the many weirs and flumes available to best fit the needs of the water user and the physical conditions of the site.

Figure 12. Cipolletti sharp-crested weir.

The most common type of weir is a sharp-crested weir. A particular type of sharp-crested weir called a Cipolletti weir is shown in Figure 12. Designs for the Cipolletti and other types of sharp-crested weirs are shown in Appendix H. Another option is to install a Ramp, Parshall, H, Palmer Bowlus, or Cutthroat or similar type of flume.

A properly-installed weir or flume will measure the rate at which water is being diverted. To measure the duty (annual amount of water used), a total flow meter or recorder would need to be installed in the weir pool or flume channel near the staff gage. The installation of the headgate and weir or flume is most important. The recorder may be installed in the future if needed to monitor or regulate the duty of a water right.

An automated headgate may be installed as an appurtenant feature to the overall headgate design. An automated headgate allows a constant, targeted flow of water in the delivery ditch, regardless of the flow in the stream channel from where the water is diverted. The system works by way of a Cipolletti weir, ramp flume, or similar flow measuring device that reads the rate of flow in the delivery ditch, then transmits the flow data back to the headgate. This flow data then triggers an automatic adjustment of the headgate so that the target rate of water is delivered to the ditch.

The flow data is transmitted via radio signals or a hardwire connection. Hardwire connections are effective for transmission distances of 500 feet or less. Beyond that distance, radio transmissions are necessary. In any case, the flow measuring device must be no more than 20 minutes away from the headgate (in water travel time) for the automated system to work effectively. This 20-minute maximum lag time generally equates to one-half to one mile in stream distance.

2.2.4 Fish Screens

Diversions of surface flow can also divert fish from the river and into irrigation systems where they generally do not survive or cannot return to the river. The primary means of correcting this loss of fish from ditch diversions is to screen them from the flow near the upstream end of the diversion system and return them to the river. The primary means of correcting fish loss into pump diversions is to screen the flow entering the pump forebay pool or intake pipe, thus keeping the fish in the river.

Irrigation ditches, where they cross streams, can cause undesirable mixing of irrigation water with stream water. In addition, irrigation ditches can sometimes capture and divert the streams themselves. At some times and locations, the return of irrigation flow to the river may be concentrated enough to pose an attraction for adult and juvenile fish to move up-current into irrigated fields or irrigation ditches. Siphons can be used to send the irrigation water through a pipe under the stream. Screens can also be used to keep fish out of irrigation ditches, though they are less effective than siphons.

Several types of fish screens are available, including: rotary drum, flat plate, traveling belt, well screens, and Johnson screens. For each specific site, screens will be sized to accommodate the maximum legal flow rate, designed to protect the smallest fish present (per NMFS criteria), and located according to local topography to obtain the gradient needed for efficient operation of screens and return of fish to the river (Appendices C and D). Reclamation will coordinate with ODFW 's John Day Screen Shop to ensure that all fish screens meet applicable acceptable screen criteria.

NMFS has published detailed criteria for surface water and pump intake screens to protect salmonids of fry (less than 2.36 inches long) and fingerling (greater than 2.36 inches long) sizes (Appendices C and D). Because most of the project area is potential spawning and rearing habitat for salmonids (see Section 3.4.1), it is likely that protection for salmonid fry will be expected at most locations. USFWS considers NMFS fish screen criteria sufficient for the protection of bull trout (Chris Allen, USFWS, personal communication, September 2002). The screen descriptions in the following sections are generic.

2.2.4.1 Rotary drum screens

Rotary drum screens are the preferred technology for screening juvenile fish from most small (less than 30 cfs) surface water diversions in the John Day Basin because they have been proven efficient and self-cleaning. Typical single and dual drum screens are shown in Figures 13a and 13b.

Figure 13a. Dual drum fish screen with trash rack.

Generally, rotary drum screens will consist of a cylindrical screen, a drive mechanism (paddlewheel, solar, or electric power) to rotate the screen, a frame and seal, a headgated bypass system to return fish to the river, flashboards to adjust the water level on the screen, and a gantry for suspending the screen when not in service (see Appendices I and J for general design features). Where necessary, steel or concrete abutments, retaining walls, and trashracks will be incorporated into the design (Figures 13a and 13b illustrate these features).

Figure 13b. Single drum fish screen with trash rack.

Rotary drum screens are typically installed in the diversion ditch, and can be built in dry conditions when ditches are shutdown. Generally, no in-stream construction is required. Construction sites have typically already been disturbed by construction of the ditch and/or the old fish screen.

2.2.4.2 Flat plate and traveling belt screens

At sites where rotary drum screens are not practical, these alternative screen types may be appropriate. Flat plate and traveling belt screens may be most appropriate where water levels vary drastically (e.g. a rotary drum screen might be submerged part of the time) and where debris loads are low (because they are less efficient at self-cleaning than rotary drum screens).

Flat plate screens are simply a plate of screen material placed vertically, horizontally, or at an angle in the diversion (Figure 13c). To meet NMFS criteria to be self-cleaning, they must include a cleaning system such as an array of electric, water paddle or solar-powered wipers. Although there is substantial variation in designs, a typical flat plate screen installation consists of a screen plate, a system of baffles to equalize flow through the plate, a concrete or steel supporting structure, a cleaning system, a fish bypass system for return to the river, and flashboards to control the water level on the screen (see Appendices K and L for general design features).

Figure 13c. Flat plate fish screen.

Traveling belt screens consist of a flexible belt-like screen (sometimes plastic) placed in the diversion (Figure 13d). The screen moves along a track so that the upstream side moves upward and the downstream side moves downward, thus helping to clean debris from the screen similar to a rotating drum screen. A typical installation includes a belt screen and track, a power system (hydraulic, electric, or solar), a supporting structure, a fish bypass system, and flashbords to control water level on the screen (see Appendices M and N for general design features).

Figure 13d. Traveling belt fish screen.

There are substantial variations possible with these screen types. For instance, if they are installed at the very entrance to the diversion adjacent to the river channel, the fish bypass system and flashboards may not be necessary.

Flat plate and traveling belt screens are typically installed in the diversion ditch, and can be built in dry conditions when ditches are shutdown. Generally, no in-stream

construction is required. Construction sites have typically already been disturbed by construction of the ditch and/or the old fish screen.

2.2.4.3 Screen pump intakes

Pump intakes will be screened using exposed or buried well screens, or Johnson screens, sized and designed to meet NMFS criteria for the applicable fish sizes. Examples in the project area include the Cathedral Rocks, Kight, Ediger, and Page irrigation projects (USBR 2000).

Screening the intake of an existing pump would not require in-stream work, except to place the screened pipe into the river. Metal fabrication and installation would occur offsite and on the bank.

See Appendix C for NMFS detailed criteria for pump intake screens.

2.2.4.4 Siphons

Siphons (sometimes called inverted siphons or drop siphons) can be used to send irrigation water through a pipe under the stream. Siphons are closed conduits designed to run full and under pressure. The closed conduit pipe is often made of PVC material. See Appendix W for a generic siphon design.

The conduit pipe is designed to handle the maximum flow of the irrigation ditch. The siphon is installed in a trench that is excavated along the centerline of the irrigation ditch where it crosses the stream. Siphons are installed while the flow in the irrigation ditch is turned off. Soil is backfilled around the pipe and compacted. The pipe is protected by rip-rap armour rock placed on the backfill over the pipe. Inlet and outlet structures are made of concrete. Disturbed ground is reshaped to natural or near-natural conditions and revegetated following construction. This construction technique allows the stream to flow over the siphon along its natural course.

Streamflow during construction is diverted around the construction site so that virtually all work is completed in dry or semi-dry conditions. All in-stream work takes place during the ODFW in-stream work period.

Examples of siphons include the John Day irrigation flow siphoned under Laycock Creek and the John Day irrigation flow siphoned under Bear Creek. This last project was completed in the summer of 2002 by ODFW with technical support by Reclamation.

Alternatively, screens (as described in the sections above) can be used to prevent the movement of fish from streams into irrigation ditches. However, screens are most effective in this application when used at the “tail waters” of irrigation ditches; i.e., the end of the irrigation return flow ditch or pipe as it re-enters the stream. An example of the use of a rotary screen to screen an irrigation ditch is the John Day River irrigation flow prior to the ditch entering Riley Creek.

2.2.5 Mitigation

General program practices to minimize the negative impacts of the proposed action, and to mitigate for unavoidable negative impacts, include:

A. General
    1. Obtain all required federal, state and local permits.
    2. Design structures and conservation practices in accordance with Natural Resources Conservation Service technical guidelines and accepted engineering practices.
    3. Inspect each project site to determine the presence of threatened and endangered plant and animal species and conduct Section 7 consultations as required.
    4. Inspect each project site where there is the potential for historic properties or scientifically-important paleontological sites to exist. If they are present, seek to avoid adverse impacts to the resource site. If adverse impacts cannot be avoided, implement appropriate mitigations actions. Resource significance, project impacts, and mitigation treatment will be determined using processes defined in 36 CFR 800. (Note: The Code of Federal Regulations (CFR) is a codification of the general and permanent rules published in the *Federal Register* by the Executive departments and agencies of the federal government).
    5. When appropriate, consult with tribes to determine if Indian sacred sites are present. Seek to avoid damage to those that are identified.
    6. Provide landowner or other appropriate personnel with operation and maintenance procedures that will produce optimum conservation benefits over the life of the project.

B. Project design
    1. Design fish screens and bypass systems at ditches, pumps, and infiltration galleries to meet NMFS criteria (Appendices C and D).
    2. Design fishways to meet NMFS criteria (currently unpublished) for upstream passage of juvenile and adult salmonids.
    3. Apply the most recent NMFS protocols (currently NMFS 2001) to ensure that water acquisition projects provide streamflows and water depths which improve the protection of listed steelhead and salmon.
    4. Seek to design to avoid impacts to National Register-eligible historic properties, scientifically-important paleontological sites, or Indian sacred sites.

C. Construction timing and location
    1. Perform in-stream activities within the ODFW guidelines for timing of in-water work, and coordinate with the District Fish Biologist for emergency extensions of the work window, which is:
        - July 15 to August 15 in the Upper John Day (main stem) upstream from John Day, and the Middle Fork and North Fork John Day upstream from the Highway 395 crossings,

- July 15 to August 31 in the remainder of the reaches downstream from John Day and Highway 395, or
- An alternate work window that may be required by ODFW or NMFS.

2. Time construction to avoid conflicts with bald eagles and other protected wildlife of site-specific concern.
3. Install fish screens and siphons while diversions are shut down to avoid contact with flowing water during construction.
4. Avoid demolition of pushup dams while the adjacent pools are harboring adult chinook salmon or steelhead.
5. Locate infiltration galleries in habitats where salmon and steelhead are not likely to spawn.

D. Construction practices

1. Use appropriate construction methods to isolate in-channel construction areas from flowing water to minimize turbidity and sediment released from site.
2. Insure that petroleum products, chemicals or other harmful materials are not allowed to enter the water.
3. Perform as much machine work as possible from the streambanks to minimize disturbance to the streambed.
4. Minimize disturbance to riparian vegetation.
5. Restore the site to near-original conditions/grade. Remove spoils from the construction area when it is not possible to shape them to near-original conditions.
6. Dispose of construction spoils and waste materials at proper sites away from the stream channel.
7. Use silt screens to minimize the overland flow of fine sediments from construction sites into the stream during precipitation events.
8. Capture salmonids that are inadvertently trapped in sections of ditch or river isolated for construction, and liberate them into adjacent flowing water.
9. If National Register-eligible historic properties, scientifically-important paleontological sites, or Indian sacred sites are present near construction impact areas, implement protective strategies to avoid or minimize damage during construction.

E. Site recovery

1. Stabilize disturbed riparian and streambank soils with native grasses and vegetation, such as willows, red osier dogwood, and cottonwood.
2. Fence riparian areas where existing fences are disturbed by construction, or where fence is required to facilitate vegetation recovery after planting.
3. Vacate construction sites leaving a positive visual impact blending with the natural landscape.

These general mitigation measures, as well as those specific measures from Chapter 3, are included in Appendix O, Environmental Commitments.

Design and other criteria can be modified or augmented as part of consultation on individual, site-specific, in-stream projects. All actions related to the implementation of Action 149 will be conditional to the appropriate criteria developed during forthcoming programmatic and site-specific consultation with NMFS and USFWS.

2.2.6 Alternatives Considered but Eliminated from Further Study

The actions shown in Table 5 below were considered, but not included in an alternative and were eliminated from further study because they do not fit in with the management constraints noted in Section 2.2.1 above. Some of these actions were identified during the scoping process. Other alternatives as described in Table 5 were developed during the course of preparing this PEA.

Table 5. Actions Considered but Eliminated from Further Study.

Actions	Reasons for Elimination
Remove fish-barrier culverts	Not required by the BiOp
Manage for removal of thermal barriers	Not required by the BiOp
Thin juniper trees to reduce water consumption	Not required by the BiOp
Flood fields artificially during non-irrigation season to increase groundwater supply	Not required by the BiOp
Store water in-channel, e.g. behind beaver dams, for release to improve flows	Not water acquisition by purchase or lease, not required by the BiOp
Store water off-channel for release to improve flows	Not water acquisition by purchase or lease, not required by the BiOp
Supplement surface water quality and quantity via exchange with groundwater	Not required by the BiOp
Offset surface water usage with groundwater from wells not hydrologically connected to surface water	Not required by the BiOp
Supplement in-stream water quality and quantity via irrigation return flow projects	Not required by the BiOp
Align NMFS screen requirements with fish life stage distribution	Not required by the BiOp
Install streamflow gaging stations	Not Reclamation responsibility – responsibility of Oregon Water Resources Department
Convert to less water-intensive crops	Not required by the BiOp
Regulate rate and duty	Not required by the BiOp
Restore riparian areas and vegetation	Not required by the BiOp
Restore uplands	Not required by the BiOp
Remove roads	Not required by the BiOp
Restore flood plains by removing “channelizing” mine tailings	Not required by the BiOp
Reconstruct/modify low-flow channels	Not required by the BiOp

Chapter 3
Affected Environment and Environmental Consequences

Much of the information used to describe existing conditions was derived from the recent subbasin summary (NPPC 2001). Potential impacts fall into three categories: Short-term (initial construction of new facilities and demolition of old ones), long-term (operation and maintenance of the new facilities), and cumulative (additive impacts of multiple actions under this proposal or other non-related actions).

3.1 Hydrology and Water Quality

3.1.1 Existing Conditions

3.1.1.1 Hydrology

The John Day River is a free-flowing system; it has no operating storage reservoirs (there is one dysfunctional storage dam on Canyon Creek in the Malheur National Forest, but it does not currently store water). Gaging stations operated by the U.S. Geological Survey (USGS) currently record streamflows within the North Fork, Middle Fork, and Upper John Day subbasins and also in the lower mainstem John Day River at river miles 20.9 and 156.7. The gage at RM 156.7, referred to as the "John Day River at Service Creek, Oregon" gage, is just downstream from the North Fork confluence. Thus, it best describes the flow from all project area subbasins combined. Overall, flow varies greatly but usually peaks with snowmelt during March through May, and is typically lowest during August and September (Figure 14).

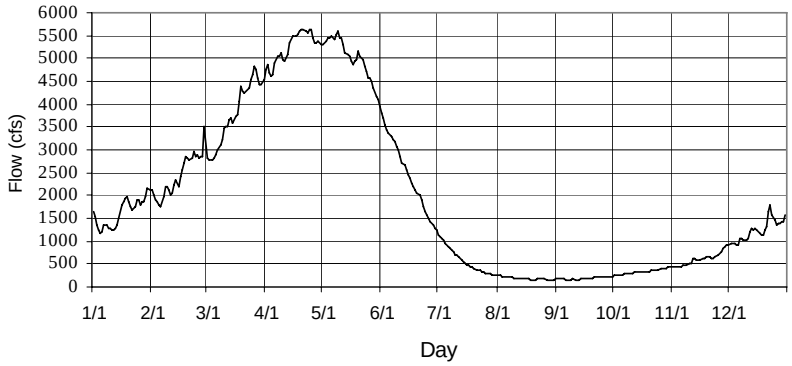

Figure 14. Average streamflow in the lower John Day River at Service Creek (RM 156.7, below the confluence with the North Fork), 1929 to 1998.

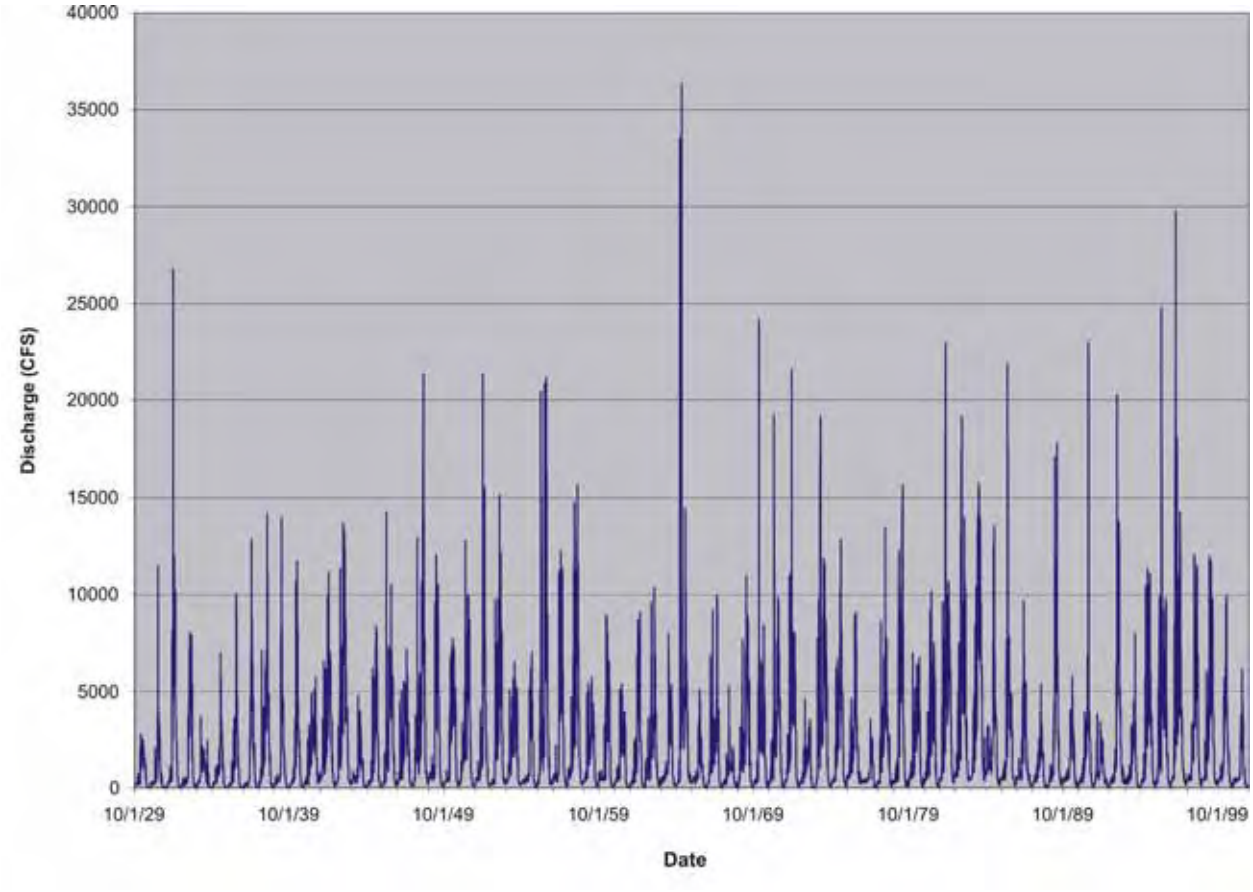

Figure 15. Hydrograph of lower John Day River at Service Creek (RM 156.7, below the confluence with the North Fork), with the dates of major flow events.

Floods tend to be associated with rain-on-snow events from January through March, and sometimes in May (Figure 15). There is a steep decrease in flow during early summer, low flows during August and September, and then an increase in flow as the irrigation season ends and most diversion flow is returned to the river (Figure 16). Figure 17 shows the same data, but on a relative scale of discharge per square mile of drainage.

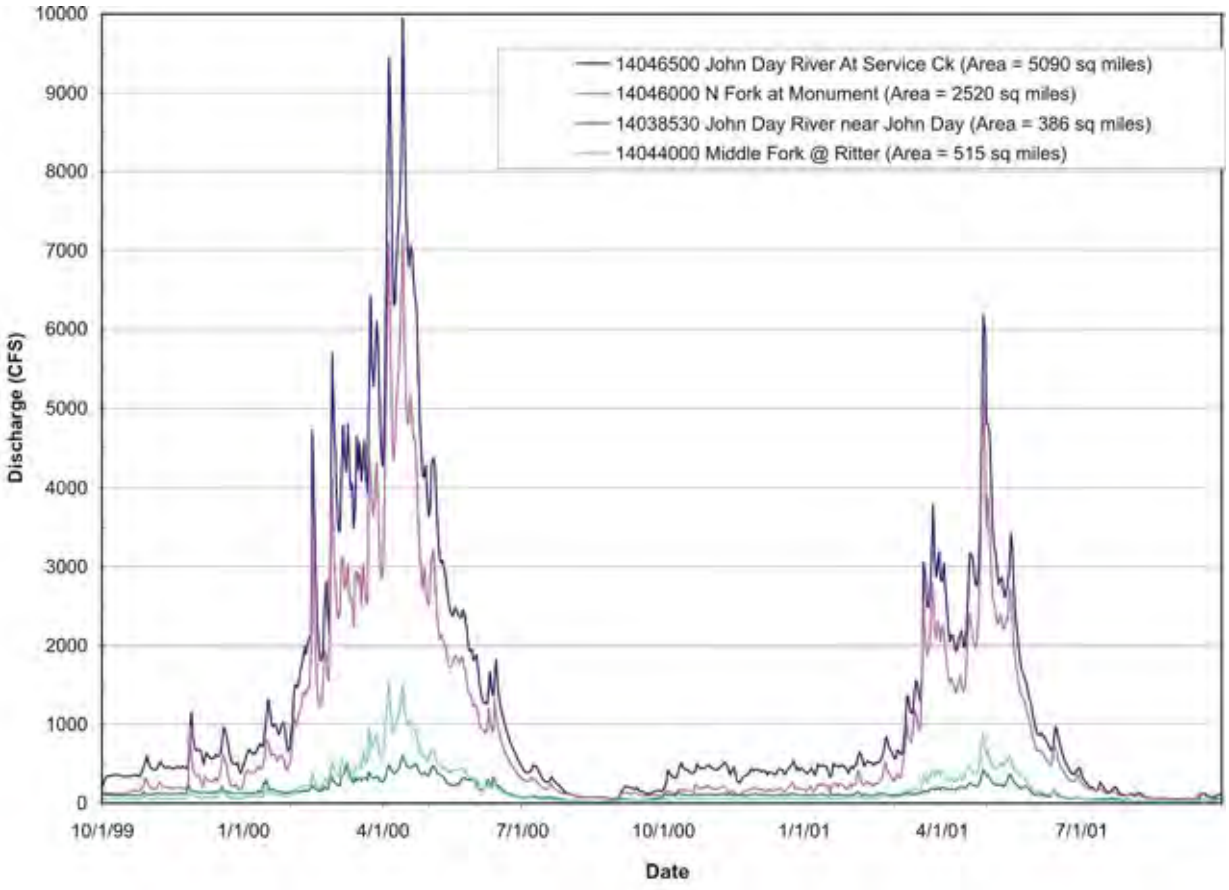

Figure 16. Hydrograph of streamflows at selected gages in and near the project area, October 1999 to September 2001.

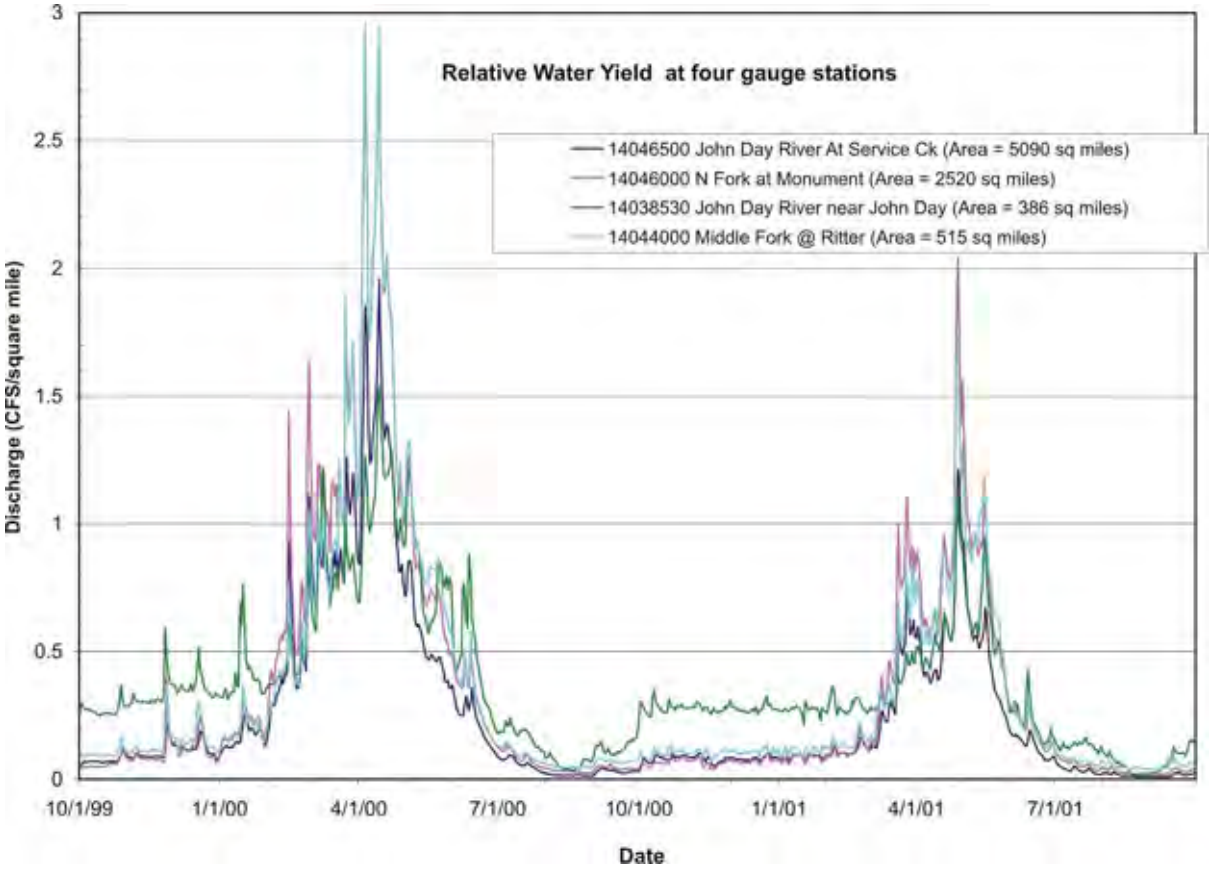

Figure 17. Water yields for selected gages in and near the project area, October 1999 to September 2001.

North Fork John Day: The North Fork Subbasin supplies approximately 60 percent of the water to the entire John Day Basin. The average annual discharge of the North Fork near Monument is 904,000 af, which includes flow from the Middle Fork. Flows vary widely from winter highs to summer lows (Figure 18). The lowest daily mean flow during 2000 was 61 cfs, and for the period of record (1929 to 2000) was 17 cfs (USGS 2002).

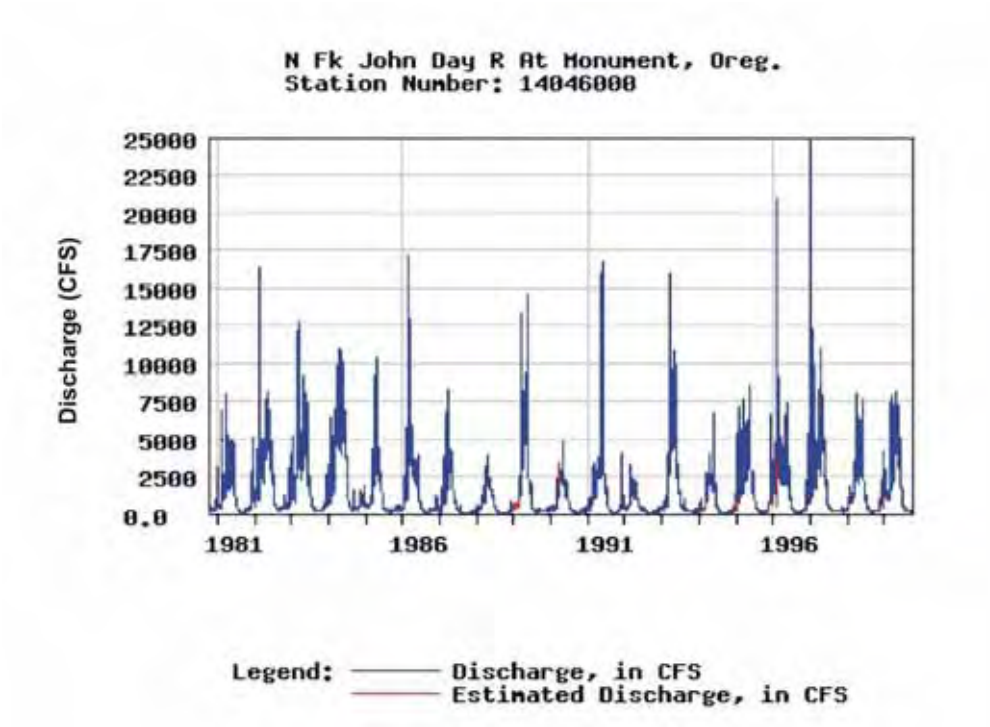

Figure 18. Hydrograph of streamflows at the Monument gaging station on the North Fork John Day River, October 1980 to September 1999.

Middle Fork John Day: Average annual discharge of the Middle Fork John Day River at Ritter (RM 15) is approximately 185,000 af. Estimated annual discharge at the mouth of the Middle Fork is 268,000 af (OWRD 1991). The lowest daily mean flow during 2000 was 23 cfs, and for the period of record (1930-2000) was 0.9 cfs (USGS 2002). Figure 19 shows the hydrograph of streamflows at the Ritter gaging station (RM 15) on the Middle Fork John Day River from October 1980 to September 1999.

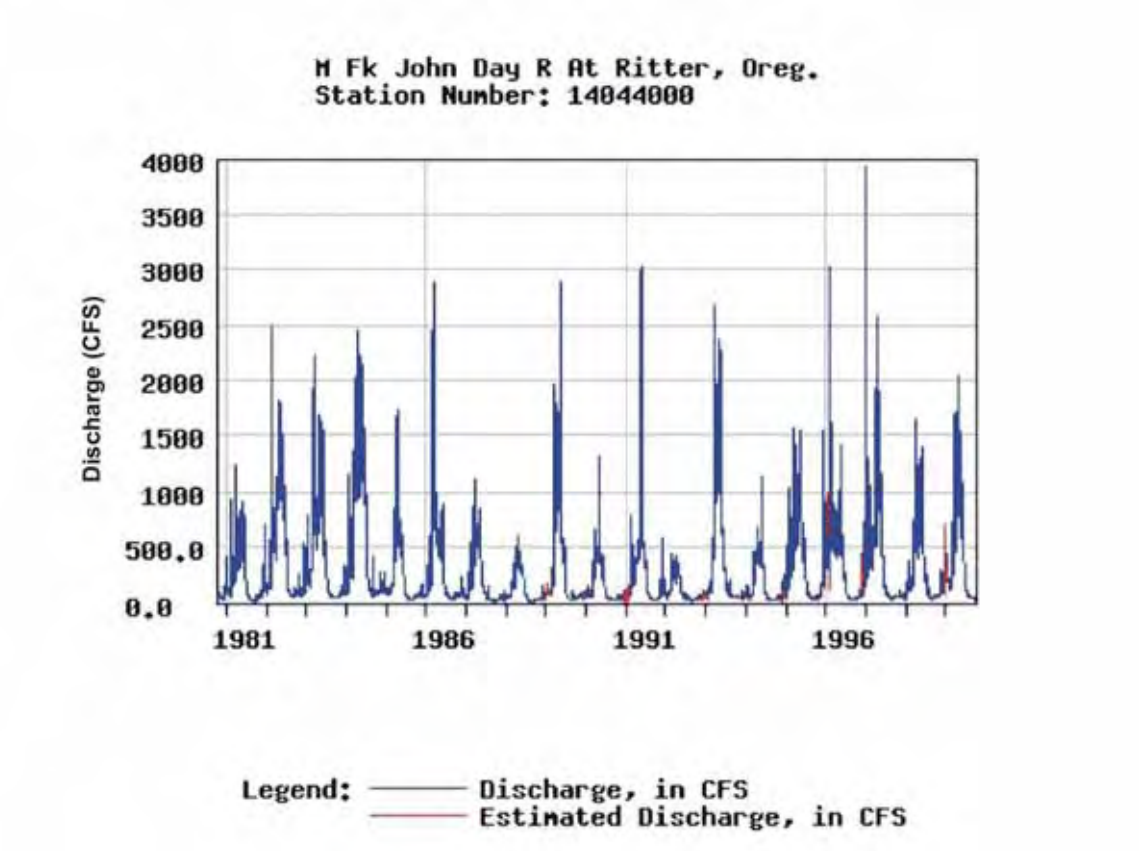

Figure 19. Hydrograph of streamflows at the Ritter gaging station (RM 15) on the Middle Fork John Day River, October 1980 to September 1999.

Upper John Day: The average annual discharge at Picture Gorge is 346,000 af (this includes 100,000 af from the South Fork John Day River which empties into the mainstem seven miles upstream of Picture Gorge). Discharge peaks between March and early June; lowest flow is during August and September (Figure 20). Higher in the subbasin, at the USGS gaging station near John Day (Station Number 14038530), the lowest daily mean flow during 2000 was 13 cfs, and for the period of record (1969-2000) was 3.5 cfs (USGS 2002).

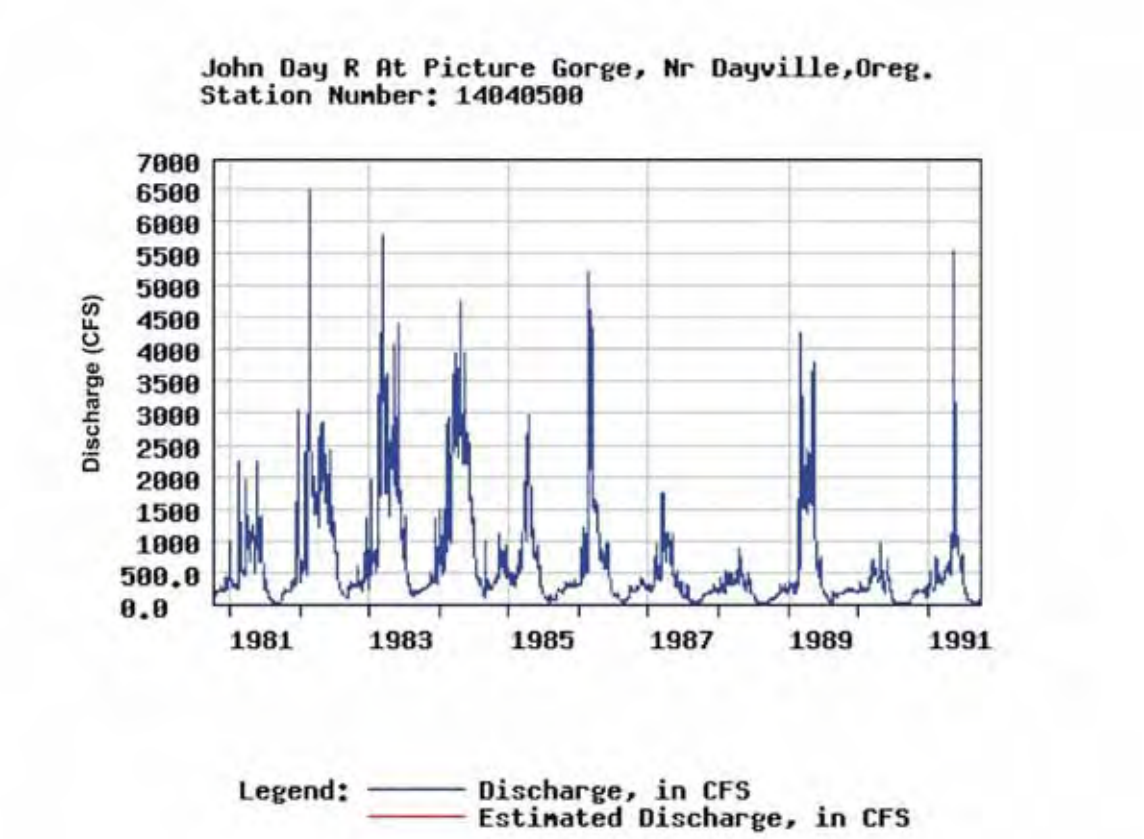

Figure 20. Hydrograph of streamflows at the Picture Gorge gaging station (RM 205) on the Upper John Day River, October 1980 to September 1991 (end of record for this site).

The lowest flows at all these gaging sites was less than 10 cfs, and occurred during August at all sites except the North Fork, where it occurred during stream freeze-up in November (USGS 2002). The legal irrigation season typically runs from April 1 to September 30 (Allen 2001). Approximately 40 diversions are allowed to withdraw stock water year-round.

The primary out-of-stream water use is agricultural irrigation. Of the consumptive (out-of-stream) uses, irrigation comprises 77.9%. Other consumptive water uses and their proportion of the total include: mining, 16.2%; power generation, 2.2%; industrial and municipal, 1.9%; domestic, 0.4%; livestock watering, 0.2%; and other uses, 1.2%.

Surface withdrawals total 189.61 million gallons of water per day, with most water withdrawn in the Upper John Day Subbasin (Table 6). Withdrawals in the John Day Basin vary by season. The average proportion of consumptive use to natural flow is two percent in winter, 15 percent in spring, 73 percent in summer, and 14 percent in fall (OWRD 2000). At times, appropriation is more than natural flows, most notably in summer.

Table 6. Water Withdrawals for Project Area Subbasins.

Category	Withdrawals, gallons (millions) / day	Withdrawals, af / day
Middle Fork John Day Subbasin		
Groundwater withdrawals	0.32	0.98
Surface-water withdrawals	11.05	33.91
Total water withdrawals	11.37	34.89
Upper John Day Subbasin		
Groundwater withdrawals	1.30	3.99
Surface-water withdrawals	116.73	358.18
Total water withdrawals	118.03	362.17
North Fork John Day Subbasin		
Groundwater withdrawals	0.25	0.77
Surface-water withdrawals	30.36	93.16
Total water withdrawals	30.61	93.92

Minimum streamflows and in-stream water rights for the purpose of supporting fish habitat are administered by the Oregon Water Resources Department. There are 14 minimum flows and 23 in-stream water rights currently in effect within the project area. Minimum streamflows were established in the 1980s, then converted to in-stream water rights pursuant to legislation passed by the Oregon Legislature in 1989. The in-stream water rights applications were made between 1989 and 1991. Since then, additional in-stream water rights have been established. All the minimum streamflows and in-stream water rights within the project area are listed in Appendix P.

While these in-stream water rights establish a constraint against future consumptive water uses, they do not affect rights of record in existence prior to the establishment of minimum streamflows in the 1980s. Most water rights for consumptive use were established prior to adoption of the in-stream protection. Those “senior” water rights will not be affected by the in-stream protection.

There are 17 in-stream water right applications pending for which certificate of water rights have not been issued. These pending in-stream water rights are not listed in Appendix P.

3.1.1.2 Water quality

The ODEQ has identified much of the John Day Basin as water quality limited. Many of these streams are historical habitat for and/or are currently occupied by spring chinook salmon and summer steelhead. Water quality limited means in-stream water quality fails to meet established standards for certain parameters for all or a portion of the year. Water quality parameters (and standards) of temperature (64°F for rearing salmonids and 55°F for spawning salmonids), dissolved oxygen (98 percent saturation), habitat modification (pool frequency), and flow modification (flows) relate to the beneficial use for fish. Standards for bacteria (fecal coliform) relate to the beneficial use for recreation.

Most water quality problems in the John Day Basin stem from mining and dredging, grazing, cumulative effects of timber harvest and road building, and water withdrawals for irrigation (NPPC 2001).

Streams not meeting ODEQ water quality standards are sometimes referred to as 303(d) streams, based on the federal Clean Water Act and its Section 303(d) water quality standards. These streams are displayed in Figure 21.

North Fork John Day: The North Fork has the best chemical, physical and biological water quality in the John Day Basin (USDI 2000). Most of the streams in this subbasin are considered in good condition, with the exception of elevated late summer water temperatures that do not meet ODEQ standards (Figure 21). Temperature and habitat modification are the primary water quality limitations for the North Fork (Table 7). Because the North Fork contributes 60 percent of the flow to the mainstem John Day, the influence of the North Fork on downstream temperature is significant. Other water quality problems in the North Fork include leaching of toxic mine waste and a high degree of stream sedimentation from highly erodible soils. Spawning criteria relate to steelhead and redband trout downstream of Camas Creek, but also include spring chinook upstream of Camas Creek (Table 8).

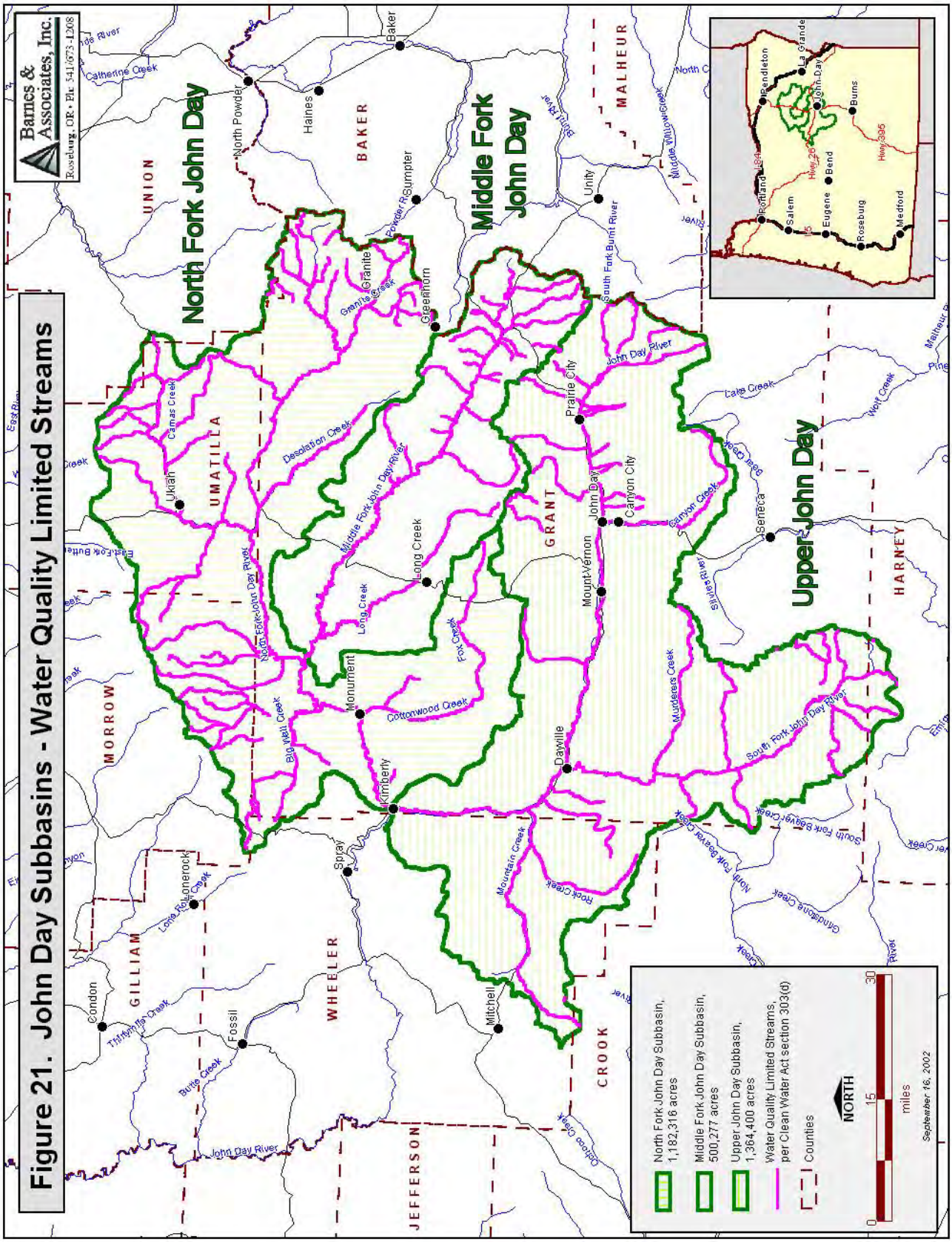
Figure 21. John Day Subbasins - Water Quality Limited Streams
Barnes & Associates, Inc.
Roseburg, OR • Ph: 541/673-1208
North Fork John Day
Middle Fork John Day
Upper John Day
UNION
BAKER
MALHEUR
UMATILLA
GRANT
HARNEY
MORROW
GILLIAM
WHEELER
CROOK
JEFFERSON
Baker
North Powder
Haines
Sumpter
Unity
Ukiah
Prairie City
John Day
Canyon City
Seneca
Long Creek
Monument
Mount Vernon
Dayville
Kimberly
Spray
Condon
Fossil
Mitchell
Lonerock
Pendleton
La Grande
Burns
Bend
Salem
Eugene
Roseburg
Medford
Portland
Hwy 26
Hwy 395
I-84
I-5
North Fork John Day Subbasin, 1,182,316 acres
Middle Fork John Day Subbasin, 500,277 acres
Upper John Day Subbasin, 1,364,400 acres
Water Quality Limited Streams, per Clean Water Act section 303(d)
Counties
NORTH
0
15
30
miles
September 16, 2002

Table 7. North Fork John Day River Subbasin 303(d) Listed Stream Segments and Water Quality Parameters of Concern. (Source: ODEQ)

Stream	Parameters of Concern	Stream	Parameters of Concern
Alder Creek	Sedimentation, Habitat Modification	Ditch Creek	Temperature
Bacon Creek	Habitat Modification	Fivemile Creek	Temperature, Habitat Modification
Baldy Creek	Temperature, Habitat Modification, Sedimentation	Fox Creek	Temperature
		Frazier Creek	Temperature, Habitat Modification
Bear Creek	Habitat Modification	Granite Creek	Temperature, Habitat Modification, Sedimentation
Beaver Creek	Temperature		
Beaver Creek, South Fork	Habitat Modification	Hidaway Creek	Temperature, Habitat Modification
Bear Wallow Creek	Temperature, Habitat Modification	Hog Creek	Sedimentation
Big Creek	Temperature	Indian Creek	Temperature, Habitat Modification
Big Wall Creek	Sedimentation, Habitat Modification, Temperature	John Day River, N. Fk.	Temperature, Habitat Modification
		Lane Creek	Temperature
Boulder Creek	Habitat Modification	Mallory Creek	Temperature
Bowman Creek	Temperature, Habitat Modification	Olive Creek	Habitat Modification
Bridge Creek	Temperature	Onion Creek	Temperature
Bull Creek	Habitat Modification	Owens Creek	Temperature, Habitat Modification
Bull Run Creek	Temperature, Sedimentation, Habitat Modification	Porter Creek	Sedimentation, Habitat Modification
		Potamus Creek	Temperature
Cable Creek	Temperature, Habitat Modification	Rancheria Creek	Temperature
Camas Creek	Temperature, Habitat Modification	Rudio Creek	Temperature
Clear Creek	Temperature	Skookum Creek	Temperature, Habitat Modification
Corral Creek	Habitat Modification	Stadler Creek	Temperature
Cottonwood Creek	Biological Criteria	Swale Creek	Temperature, Sedimentation, Habitat Modification
Cottonwood Creek, East Fk.	Biological Criteria		
Crane Creek	Temperature, Habitat Modification	Taylor Creek	Temperature, Habitat Modification
Crawfish Creek	Temperature, Habitat Modification	Trail Creek	Temperature, Habitat Modification
Davis Creek	Habitat Modification	Trail Creek, North	Habitat Modification
Deep Creek	Habitat Modification	Trail Creek, South	Temperature, Habitat Modification
Desolation Creek	Temperature	Wilson Creek	Temperature, Sedimentation
			Habitat Modification

Table 8. Dates when ODEQ Criteria for Spawning and Incubating Salmonids Apply (ODEQ 2001a,b).

Subbasin	Reach	Defining Species	Dates
North Fork	downstream of Camas Creek	steelhead	3/1 - 7/15
	upstream of Camas Creek	steelhead, spring chinook	8/15 - 7/15
Middle Fork	downstream of Hwy. 395	steelhead	3/1 - 7/15
	upstream of Hwy. 395	steelhead, spring chinook	8/15 - 7/15

Middle Fork John Day: Water quality in the Middle Fork John Day Subbasin generally exhibits satisfactory chemical, physical, and biological quality (USDI 2000). The Middle Fork usually has worse water quality problems than its tributaries, with the most serious water quality problem being elevated summer temperatures (Figure 21; Table 9). Sedimentation from streambank erosion is not a serious problem in the Middle Fork. Season-long cattle grazing contributes to elevated fecal coliform counts during summer. However, agricultural runoff presents a low level of potential impact to water quality. Spawning criteria are defined by steelhead downstream of Highway 395, and both steelhead and spring chinook upstream from Highway 395 (Table 8).

Table 9. Middle Fork John Day River Subbasin 303(d) Listed Stream Segments and Parameters of Concern. (Source: ODEQ)

Stream	Parameters of Concern	Stream	Parameters of Concern
Big Boulder Creek	Temperature	Little Butte Creek, East Fork	Temperature
Big Creek	Temperature	Little Butte Creek, West Fork	Temperature
Camp Creek	Temperature	Long Creek	Temperature
Caribou Creek	Temperature	Lunch Creek	Temperature
Clear Creek	Temperature	Mill Creek	Temperature
Clear Creek, Dry Fork	Temperature	Mosquito Creek	Temperature
Coyote Creek	Temperature	Placer Gulch	Temperature
Crawford Creek	Temperature	Ragged Creek	Temperature
Davis Creek	Temperature	Squaw Creek	Temperature
Granite Boulder Creek	Temperature	Summit Creek	Temperature
John Day River, Middle Fork	Temperature, Flow Modification	Vinegar Creek	Temperature
Little Boulder Creek	Temperature		

Upper John Day: Water quality is fair in the upper subbasin during most of the year (USDI 2000). Low summer flows on the mainstem John Day River above Dayville contribute to elevated temperatures (Figure 21, Table 10); high streamflows contribute to turbidity. Problematic eutrophication in the South Fork and mainstem John Day rivers are a partial result of irrigation return flow (non-point source) and possibly cattle feedlots (point source). However, agricultural runoff presents a low level of potential impact to

water quality. In the South Fork, water quality is generally satisfactory for the primary parameters (USDI 2000). Sediment loading (from moderately severe streambank erosion) and elevated water temperature are the primary water quality concerns in the South Fork. For example, lack of riparian shade results in water temperatures as high as 77° F near Izee (ODEQ). Spawning timing in the Upper John Day is presumed to be similar to that in the North Fork, with the town of John Day substituted for Camas Creek as the lower boundary of spring chinook spawning (Unterwegner, 2002; Table 8).

Table 10. Upper John Day River Subbasin 303(d) Listed Stream Segments and Parameters of Concern. (Source: ODEQ)

Stream	Parameters of Concern	Stream	Parameters of Concern
Badger Creek	Temperature	John Day River, South Fork	Temperature
Battle Creek	Temperature	Lonesome Creek	Temperature
Bear Creek	Temperature	McClellan Creek	Temperature
Belshaw Creek	Temperature	Mountain Creek	Temperature
Canyon Creek	Temperature	Murderers Creek	Temperature
Corral Creek	Biological Criteria	Pine Creek (Upper John Day)	Temperature
Cottonwood Creek	Temperature	Rail Creek	Temperature
Dads Creek	Temperature	Reynolds Creek	Temperature
Dans Creek	Temperature	Slife Creek	Temperature
Deardorf Creek	Temperature	Strawberry Creek	Temperature
Deer Creek	Temperature	Sunflower Creek	Temperature
Deer Creek, North Fork	Temperature	Tinker Creek	Temperature
Dog Creek	Temperature	Utley Creek	Biological Criteria
Flat Creek	Temperature	Venator Creek	Temperature
Grasshopper Creek	Temperature	Wind Creek	Temperature
Grub Creek	Temperature		
Indian Creek	Temperature		
John Day River	Temperature, Flow Modification, Dissolved Oxygen, Bacteria		

3.1.2 Environmental Consequences

3.1.2.1 No Action

Irrigation dams can affect local hydrology, even though they are too small to store sufficient water to alter stream hydrology at the subbasin scale. Construction of pushup dams changes the gravel size distribution in the work area and disturbs the channel substrate. This annual disturbance prevents the river from forming a more permanent channel and may interfere with the exchange of surface flow and groundwater locally, and the functioning of the streambed (Boulton et al. 1998). Annual construction and maintenance of pushup dams can also diminish water quality locally as fill materials are

introduced into flowing water, sediment is disturbed, and turbidity increases locally and downstream.

The diversion of water clearly affects local hydrology by reducing the amount of water in the adjacent river reach. In extreme cases, water withdrawals may completely dewater reaches of stream such that fish are unable to use or migrate through them. More often, reductions in flow contribute to concomitant reductions in water depth, velocity, and capacity to transport materials (e.g. suspended sediment, organic input, and nutrients).

Diversions and their maintenance can also reduce water quality. Shallower, slower water tends to warm faster than deeper, faster water (Adams and Sullivan, 1989). (However, in reaches with groundwater inflow, the proportion of groundwater to surface water is increased when surface water is withdrawn, potentially causing a cooling of local stream reaches.) Similarly, the lack of riparian vegetation and shade due to maintenance of pushup dams can increase daytime water temperatures. Shallow streams, and those lacking riparian vegetation, will generally have greater diurnal fluctuations in temperature (higher maximums and lower minimums) than deeper, well-shaded streams (Platts 1991).

Warmer water holds less dissolved oxygen than cooler water. The combination of warm water with less dissolved oxygen, especially water temperatures above 20°C and dissolved oxygen below 5 milligrams per liter, can stress salmonids (Bjornn and Reiser 1991). Warm water and reduced shade tend to cause increased primary production (e.g. periphyton, algae, and bacteria), which can further reduce water quality.

Irrigation water in ditches can mix with native streamflow where streams and irrigation ditches intersect and cross each other. Any contaminants carried in the irrigation water can be transferred to the native streamflow, thus compromising water quality. An example of contaminant is the moss treatment used by irrigators to control moss in irrigation ditches.

Most of these potential effects are likely to be most pronounced during the hot weather and low flow conditions of mid- to late summer, when most diversion occurs. However, the effect of artificially-low water temperatures could be most detrimental during winter, when salmonid eggs incubate and juveniles hide in the streambed, which may freeze with surface or anchor ice (Bjornn and Reiser 1991).

Annual impacts to local hydrology and water quality from existing diversion configurations and practices will continue. Some improvement is likely due to other programs, including Reclamation's minor presence in the subbasins, but it will not occur as rapidly as if this project proceeds.

3.1.2.2 Proposed Actions

Of the proposed actions, channel structures and the acquisition of water rights affect hydrology. Water quality could be affected by all proposed actions.

3.1.2.2.1 Replacing pushup dams

Short-term: Construction of LFSDs and infiltration galleries may cause local, short-term increases in turbidity and suspended sediments while equipment operates within the wetted channel to divert flow around excavation sites. But these increases will be less than those associated with annual re-construction of pushup dams because: construction occurs during low flow periods in sections dewatered with coffer dams, materials are mostly free of fines, and bank spoils are shaped and planted to avoid erosion during subsequent high flows (Ken Delano, GSWCD, personal communication, July 18, 2002). In contrast, pushup dams are constructed during higher flows (April and May), directly in the flow, using a variety of material including fine sand and gravel, and are often washed away during high flows (some dams are rebuilt two to three times in one year). Hydrology will not be affected except to shift local flows to different sides of the channel during construction. In-channel construction at most sites will take one to two days, and rarely more than five days even at the largest sites. Construction of pump stations will occur outside the river channel and not affect water quality or hydrology.

Long-term: Maintenance of LFSDs and infiltration galleries may cause some minor local increases in turbidity and TSS, but these should be inconsequential relative to the avoided impacts of annually rebuilding pushup dams with heavy equipment and fill material within the channel. Periodic local increases in turbidity and TSS could stem from clearing sediments from the fishway portion of LFSDs and back-flushing sediment from the screen of infiltration galleries. The effect on hydrology will decrease with time as the local riverbed adjusts to the new elements and the lack of annual construction disturbance. Over time, as the annual disturbance by heavy equipment is ceased, the channel and banks will tend to stabilize and provide more natural, diverse and better quality habitat than found in the vicinity of pushup dams, with less erosion and turbidity (USBR 2000). Pump stations will generally be located downstream from pushup dam sites, so flows and water quality in the intermediate river reach will be improved.

Cumulative: Project construction will be staggered so that short-term impacts will not accumulate. Maintenance impacts will be minor, local and spread over time and space such that they will not accumulate in any measurable way. Operation of the new facilities will reduce the annual increases in turbidity and TSS that otherwise result from annual reconstruction of pushup dams. The increase in local channel stability will reduce bank erosion and downstream bedload movement, with cumulative improvements in downstream channel stability.

3.1.2.2.2 Building and upgrading fish screens

Building and upgrading fish screens at diversion ditches and pump intakes will generally not affect hydrology or water quality. There is a small potential for impacts during construction, however, as described below. Water quality may be improved, albeit slightly, by installing siphons and precluding the mixing of irrigation water with streamflow.

Short-term: At most sites, construction of screens and supporting structures will occur while diversions are shutdown. There will be no construction in the river channel or in flowing water. Hence, there will be no impacts to hydrology or water quality. At diversion ditch screens, burial of the fish bypass pipe may require excavation of a narrow trench up to the bank, but this will not involve excavation into the wetted channel. Occasionally, a flowing diversion may be shut down specifically for screen construction. In this case, flow would increase concomitantly in the adjacent river channel. Hydrology and water quality in the river would tend towards a more natural condition; i.e., changes would be positive rather than negative.

Long-term: Fish screens will not change the quantity or quality of water diverted or in the river. The installation of siphons will slightly improve water quality by precluding the mixing of potentially-contaminated irrigation water with natural streamflow.

Cumulative: Construction on fish screens will be staggered so that any minimal impacts due to construction or related diversion shutdowns will not accumulate.

3.1.2.2.3 Flow increases

Transfer of water rights to in-stream flows and other means of increasing flows will directly affect the local hydrology during the seasons for which irrigation rights are returned to in-stream flows.

Short-term: The acquisition process will have no impact on hydrology and water quality. At some sites, demolition of existing dams and irrigation works may be required to preclude irrigation withdrawals and ensure the water acquisition to the stream. Such demolition, done gradually, would not affect hydrology, but could increase turbidity and TSS locally to levels and durations probably much less than those experienced with annual reconstruction of pushup dams.

Long-term: The return of water to the river would increase the in-stream flow by the approximate amount acquired at each diversion site. Increases in flow during November to May would have little effect on water quality, but increases during June to October would tend to improve water quality incrementally via decreased water temperature, increased dissolved oxygen and dilution of pollutants. An exception is river reaches dominated by natural or irrigation induced groundwater inflow, where increases in surface water flow and reduction of cooler groundwater flow may actually increase the overall temperature and decrease dissolved oxygen. Site-specific pre-project evaluations can determine where this may occur, and whether it is desirable.

Cumulative: Incremental increases in in-stream flow could accumulate into substantial overall increases in summer flows and improvement in water quality. However, the potential exists for downstream diversions to capture some or most of the in-stream flow increases during summer. Historical analysis, water rights reviews and vigilant monitoring of diversions and in-stream flows may help to ensure that in-stream flow gains remain in-stream beyond lower diversion points.

3.1.3 Mitigation

Negative impacts to hydrology and water quality will be minimized and mitigated by following detailed planning, design, construction, and recovery practices as outlined in Section 2.2.5.

3.2 Vegetation

3.2.1 Existing Conditions

Plant communities in the John Day Basin can be categorized into four groups which reflect their topographic position: riparian, terraces, uplands, and forest/woodland (NPPC 2001). These groups are described below.

Riparian plant communities are characterized by persistent green vegetation bordering streams. They also include topographic depressions away from surface water, where moist deep soil allows vegetation to persist through the growing season. Riparian communities are discussed separately in the Floodplains and Wetlands portion of this chapter.

Terrace communities are on old floodplains where soils are well-drained and subsurface water is diminished. This zone is a transition between riparian and upland vegetation, with xeric plants flourishing. Shrub-steppe plant communities can occur here. Western juniper, rabbitbrush, Great Basin wildrye, and cheatgrass are present.

Upland communities are on steep slopes with (1) shallow soils on ridges and south- or west-facing aspects, and (2) deeper well-drained soils on north- or east-facing aspects. Sometimes, the soil surface has a cryptogrammic crust of algae, fungi, mosses, and lichens. Shrub-steppe plant communities are prevalent with big sagebrush, low sagebrush, stiff sagebrush, Idaho fescue, and/or bluebunch wheatgrass appearing.

Forest/Woodland communities generally occur above 4,000-foot elevation where there is a beneficial increase in precipitation. Ponderosa pine is the dominant tree on south aspects, while Douglas fir, grand fir, western larch, or lodgepole pine occupy moister aspects. At elevations above 6,000-foot, Engelmann spruce, subalpine fir, or lodgepole pine are present.

Many plant communities have changed from their pre-European composition due to unmanaged livestock grazing, wildfire suppression, and/or introduction of foreign invasive plants. Valley-bottom private lands have been largely converted to agricultural production, especially livestock pasture and hay.

Due to their rarity, 53 plant species have special protection status by the state of Oregon, BLM, and/or U.S. Forest Service (see Appendix Q). Twenty-five species are typically associated with riparian/wetland habitats of the type where the proposed action

will be focused (Table 11). Federal listed, proposed, and candidate plants are discussed separately in the federal endangered and threatened species portion of this chapter.

Table 11. Plant Species Closely Associated with Aquatic, Riparian, or Wetland Habitats, and Having State of Oregon, Bureau of Land Management, or U.S. Forest Service Special Protection Status.

Botrychium ascendens	*Carex hystericina*
Botrychium crenulatum	*Carex interior*
Botrychium fenestratum	*Carex parryana*
Botrychium lanceolatum ssp. lanceolatum	*Dryopteris filix-mas*
Botrychium lunaria	*Juncus torreyi*
Botrychium minganense	*Mimulus clivicola*
Botrychium montanum	*Mimulus evanescens*
Botrychium paradoxum	*Phacelia minutissima*
Botrychium pedunculosum	*Pleuropogon oregonus*
Botrychium pinnatum	*Rorippa columbiae*
Calochortus longebarbatus var. longebarbatus	*Thelypodium eucosmum*
Calochortus longebarbatus var. peckii	*Trifolium douglasii*
Carex crawfordii	

Thirty-eight plant species are designated by the ODA as noxious weeds (see Appendix R). Two species—squarrose knapweed (*Centaurea virgata*) and silver nightshade (*Solanum elaegnifolium*)—are "A" designated, meaning the species occurs (1) in small enough Oregon infestations to make eradication or containment possible, or (2) in neighboring states so that future occurrence in Oregon seems imminent. Both species can grow in xeric or mesic habitats. The ODA-recommended action for "A" designated species is intensive control when and where found. For the 36 "B" designated species (i.e. regionally abundant, but with limited distribution in some counties), the ODA-recommended action is intensive control at the state or county level as determined on a case-by-case basis. Noxious weeds that are especially problematic in the Blue Mountains Ecoregion are yellow starthistle, leafy spurge, spotted knapweed, diffuse knapweed, and medusahead rye (Arnold 2000).

3.2.2 Environmental Consequences

3.2.2.1 No Action

With Reclamation's currently-minor presence in the subbasins, plant communities are expected to remain unchanged from their existing condition. State-listed, state-sensitive, BLM special status, or Forest Service (USFS) -sensitive plants have no regulatory protection on private land, so ground-disturbing activities there will continue with possible damage to plant individuals or populations. Continued construction or maintenance of pushup dams will expose raw soil each year, facilitating weed introduction and spread.

3.2.2.2 Proposed Action

Except for riparian plant communities, some of which are discussed in the Flood Plains and Wetlands section of this chapter, most others are expected to remain unchanged from their existing condition. However, a local and typically small acreage of upland plant communities on private land would be excavated at each site during the installation of LFSDs and infiltration galleries. This ground disturbance would be direct but short-term, and could hasten the introduction or spread of noxious weeds. Because state-listed, state-sensitive, BLM special status, or USFS-sensitive plants have no regulatory protection on private land, ground-disturbing activities may damage plant individuals or populations. Landowners willing to participate in proposed action measures can benefit from government or organization technical assistance that includes identification and control strategies for onsite noxious weeds.

3.2.3 Mitigation

Negative impacts to vegetation will be minimized and mitigated by:

1) Reclamation assisting in directing landowners to the appropriate sources for information and assistance in identifying and controlling noxious weeds. For example, GSWCD has a weed program that landowners can utilize for support with the identification and control of noxious weeds. GSWCD's program includes a brochure entitled "Weeds of the John Day River Basin."
2) Site recovery measures identified in Section 2.2.5 (e.g. seeding and/or planting).

3.3 Flood Plains and Wetlands

3.3.1 Existing Conditions

Much of the John Day River system's main channels are floodplains designated as 100-year flood hazard areas by the Federal Emergency Management Agency. Primary tributaries generally occur in "V"-shaped valleys and have narrow floodplains.

Wetlands occur on alluvial bars, streambanks, floodplains, and terraces (Crowe & Clausnitzer 1997). On private lands where the proposed action is focused, four National Wetland Inventory (NWI) types may be found: persistent emergent, broad-leaved scrub-shrub, broad-leaved deciduous forest, and needle-leaved evergreen forest. These four types are described below.

Persistent emergent wetlands (including the vegetated streambanks of rivers and creeks) within broad valleys are dominated by small-fruit bulrush, small-winged sedge, torrent sedge, common horsetail, creeping bentgrass, field mint, or tall mannagrass (see Appendix S). Within narrow valleys, dominant plants are American speedwell, arrowleaf groundsel, tall mannagrass, or common horsetail. Most persistent emergent wetlands probably qualify as jurisdictional wetlands. Jurisdictional wetlands are wetlands that meet specific criteria for vegetation, soil, and hydrology which make them subject to

protective regulation by the U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, and Oregon Division of State Lands (DSL).

Broad-leaved deciduous scrub-shrub wetlands in broad valleys grow willows (several species), stinking currant, prickly currant, mountain alder, red-osier dogwood, or black hawthorn (see Appendix S). In narrow valleys, mountain alder, sitka alder, or water birch are dominants. Several broad-leaved scrub-shrub wetland plant associations probably qualify as jurisdictional.

Broad-leaved deciduous forest wetlands support black cottonwood or quaking aspen within broad valleys, and quaking aspen in narrow valleys (see Appendix S). Approximately two-thirds of the plant associations possible in this kind of wetland are improbable as jurisdictional wetlands, especially if they contain a large amount of aerial cover in common snowberry or Kentucky bluegrass.

Needle-leaved evergreen forest wetlands are characterized by ponderosa pine or Douglas fir in broad valleys and grand fir in narrow valleys (see Appendix S). Common snowberry or Kentucky bluegrass can also be abundant, so nearly all of the plant associations are unlikely to qualify as jurisdictional.

It's estimated that 38 percent of Oregon's original wetlands have been lost (Dahl 1990). Historical loss data for regions within Oregon are not widely available, but the Willamette Valley and Klamath Basin account for a substantially higher loss—57 percent and 75 percent, respectively—than the statewide average (Morlan 2000). On Oregon's major rivers and their tributaries, there are structures such as dams, levees, and diversions - some of which were government-sponsored and remain in operation – that have changed hydrologic characteristics (e.g. water quantity, duration and periodicity of flooding or saturation, and water quality). The extent of these alterations suggests an overall drying out of wetlands in agricultural or semi-arid regions, with a corresponding decline in function. Riparian conditions in the middle and lower reaches of large river valleys such as the John Day River remain degraded (Gregory 2000).

3.3.2 Environmental Consequences

3.3.2.1 No Action

Broad-leaved deciduous scrub-shrub and deciduous forest wetlands on private lands will continue to be cleared for increased water production and conversion to agriculture.

3.3.2.2 Proposed Action

A local and typically small amount of persistent emergent, broad-leaved deciduous scrub-shrub, and/or deciduous forest wetlands on private land would be excavated at each site during in-stream or streambank installation of LFSDs and infiltration galleries. Some of these installations would involve more than 50 cubic yards of fill/removal. The effect would be direct but short-term (except when mature shrubs or trees are removed). Broad-leaved deciduous scrub-shrub and deciduous forest wetlands on

private lands would continue to be cleared for increased water production and conversion to agriculture.

3.3.3 Mitigation

Negative impacts to flood plains and wetlands will be minimized and mitigated by following the practices outlined in Section 2.2.5.

3.4 Fish

3.4.1 Existing Conditions

The John Day River supports one of the most diverse fish assemblages and healthiest populations of anadromous fish in the Columbia Basin (Table 12), yet anadromous fish are less abundant than they were historically. The relative health of the John Day's fish populations has been largely attributed to the absence of any large dams, limited interference by hatchery fish, and the presence of good habitat in headwater areas.

The John Day Basin supports runs of spring chinook salmon, summer steelhead, and Pacific lamprey; and resident populations of westslope cutthroat, interior redband, and bull trout. Historically, the John Day River was one of the most significant anadromous fish producing rivers in the Columbia River Basin (CRITFC 1995). However, recent runs of spring chinook salmon (2,000 to 5,000 fish) and summer steelhead (5,000 to 40,000 fish) are a fraction of their former abundance. Factors limiting the abundance of spring chinook salmon and summer steelhead include mortality of smolts and adults in the Columbia River, and mortality of all lifestages in the John Day Basin as a result of habitat degradation and water diversion.

The current fish management policy is designed to maintain native, wild stocks of salmon and steelhead, and to preserve the genetic diversity of these native stocks for maximum habitat use and fish production (ODFW et al. 1990). Wild stocks are especially valuable because they are adapted to subbasin conditions, are considered more genetically fit than hatchery stocks, and tend to be resilient to the range of natural habitat conditions they encounter. Also, wild fish are not susceptible to the catastrophic loss that is possible in hatcheries via mechanical system failures, disease epidemics in crowded raceways, and vandalism. Although there were releases of hatchery coho salmon and summer and winter steelhead in the past, there have been no releases of hatchery anadromous fish in the John Day Basin since 1969.

Table 12. Origin, Location, and Federal Status or Relative Abundance of Fish in the Project Area of the John Day Basin (NPPC 2001).

Species	Origin	Location	Status or Abundance
Summer steelhead *(Oncorhynchus mykiss)*	N	B	T / CH
Bull trout *(Salvelinus confluentus)*	N	UM, MF, NF	T
Spring chinook *(Oncorhynchus tschawytscha)*	N	UM, NF, MF	C / EFH
Redband trout *(Oncorhynchus mykiss gibbsi)*	N	B	SoC
Westslope cutthroat *(Oncorhynchus clarki lewisi)*	N	UM, NF	SoC
Brook trout *(Salvelinus fontinalis)*	I	UM, NF	O
Torrent sculpin *(Cottus rhotheus)*	N	B	C
Mottled sculpin *(Cottus bairdi semiscaber)*	N	B	C
Malheur mottled sculpin *(Cottus bairdi sp.)*	N	U	SoC
Speckled dace *(Rhinichthys osculus)*	N	B	C
Longnose dace *(Rhinichthys cataractae dulcis)*	N	B	C
Redside shiner *(Richarsonius balteatus balteatus)*	N	B	C
Chiselmouth *(Acrocheilus alutaceus)*	N	B	C
Bridgelip sucker *(Catastomus columbianus)*	N	B	C
Largescale sucker *(Catastomus macrocheilus)*	N	B	C
Northern pikeminnow *(Ptychocheilus oregonensis)*	N	B	C
Pacific lamprey *(Lampetra tridentata)*	N	B	SoC
Brook lamprey *(Lampetra richardsoni)*	N	B	U
Mountain whitefish *(Prosopium williamsoni)*	N	UM, MF, NF	C
Smallmouth bass *(Micropterus dolomieui)*	I	LM, UM, NF	C

I=Introduced, N=Native, B=Basinwide, LM=Lower Mainstem, UM=Upper Mainstem, MF=Middle Fork, NF=North Fork, C=common, O=occasional, U=unknown, SoC=species of concern, T=threatened, CH=critical habitat is designated, EFH=essential fish habitat is designated

3.4.1.1 Spring chinook salmon

Spring chinook salmon adults migrate upstream into and within the project area during April, May, and June. They arrive at holding and spawning areas in the Upper John Day, Middle Fork John Day, North Fork John Day, and Granite Creek (a tributary to the North Fork) by early July (Appendix T). In some years, small numbers of adults return to the South Fork John Day River, Camas Creek, Desolation Creek, and Canyon Creek. Most spring chinook return as 4-year-olds (75 percent), with 3-(2.5 percent) and 5-year-old (22.5 percent) returns comprising the remainder (Lindsay et al. 1986). Fish spawn from late August through late September. Emergence of fry commences in March and April following high water. Juveniles reside in rearing areas for approximately 12 months before migrating downstream the following spring, with migration peaking past Spray (RM 170) on the mainstem during the second week in April (Lindsay et al. 1986). Species, lifestages, and timing in the Upper John Day Subbasin are assumed to be similar to those in the North Fork John Day Subbasin, with the town of John Day substituted for Camas Creek to separate the upper and lower portions (Tim Unterwegner, ODFW, personal communication, June 26, 2002).

Spring chinook salmon are found in about 38 streams in the project area (Table 13, Figure 22). Spawning habitat is primarily limited to the mainstem and major tributaries of the North Fork, such as Granite, Clear, and Bull Run creeks. Rearing habitats are both on the mainstem reaches and the lower reaches of significant tributaries.

Table 13. Distribution of Spring Chinook Salmon in Project Area Streams. (Source: StreamNet)

Tributary Stream	Main Stream	Miles of Trib.	Miles Used	% Used
John Day River	Columbia River	277.6	181.8	65%
Bull Run Creek	Granite Creek	9.3	3.1	33%
Clear Creek	Granite Creek	8.0	2.3	29%
Indian Creek	John Day River	11.8	3.4	29%
North Fork	John Day River	111.0	59.6	54%
Beaver Creek	John Day River	4.10	0.8	20%
Beech Creek	John Day River	18.7	1.7	9%
Canyon Creek	John Day River	27.5	10.4	38%
Dads Creek	John Day River	8.6	4.2	49%
Deardorff Creek	John Day River	9.6	1.0	10%
Dixie Creek	John Day River	11.4	1.3	11%
Reynolds Creek	John Day River	9.3	1.4	15%
South Fork	John Day River	57.3	27.6	48%
Big Boulder Creek	Middle Fork	6.5	2.1	32%
Big Creek	Middle Fork	11.6	1.0	9%
Butte Creek	Middle Fork	4.9	2.2	45%
Camp Creek	Middle Fork	15.6	11.3	72%
Clear Creek	Middle Fork	12.7	3.9	31%
Coyote Creek	Middle Fork	2.5	0.6	24%
Deerhorn Creek	Middle Fork	3.4	1.5	44%
Eightmile Creek	Middle Fork	8.9	0.7	8%
Granite Boulder	Middle Fork	8.1	4.0	49%
Granite Creek	Middle Fork	5.9	1.3	22%
Huckleberry Creek	Middle Fork	6.4	0.5	8%
Indian Creek	Middle Fork	13.6	1.7	13%
Slide Creek	Middle Fork	10.2	0.3	3%
Squaw Creek	Middle Fork	9.4	2.8	30%
Big Wall Creek	North Fork	21.3	2.3	11%
Camas Creek	North Fork	36.7	15.5	42%
Deer Creek	North Fork	11.1	2.5	23%
Desolation Creek	North Fork	21.1	5.0	24%
Ditch Creek	North Fork	19.5	1.9	10%
Granite Creek	North Fork	16.2	10.0	62%
Mallory Creek	North Fork	14.3	4.0	28%
Middle Fork	North Fork	71.0	40.3	57%
Potamus Creek	North Fork	18.4	0.6	3%
Rudio Creek	North Fork	16.8	3.4	20%
Stony Creek	North Fork	6.8	3.0	44%

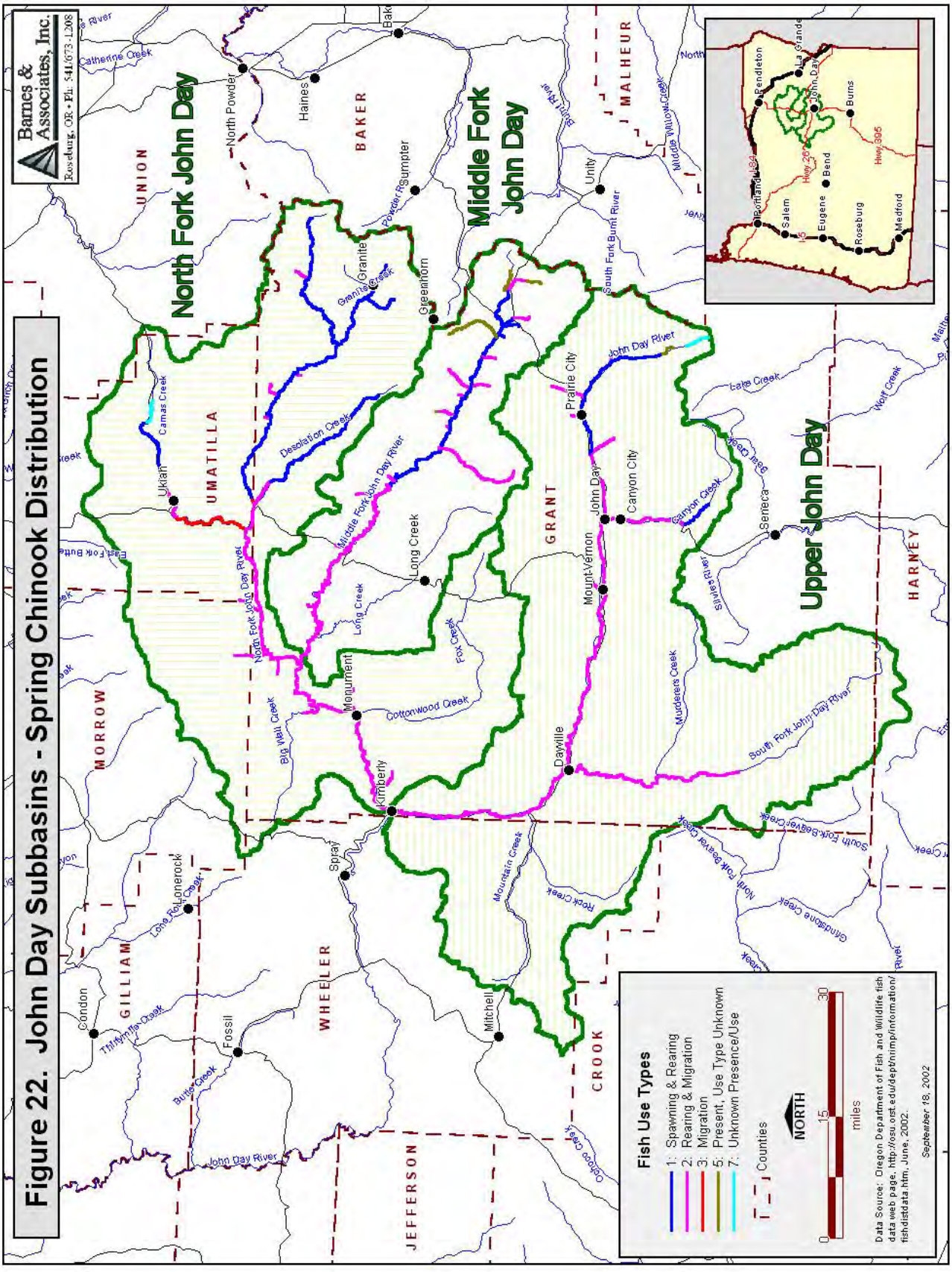
Figure 22. John Day Subbasins - Spring Chinook Distribution
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North Fork John Day
Middle Fork John Day
Upper John Day
UNION
BAKER
MALHEUR
UMATILLA
GRANT
HARNEY
MORROW
GILLIAM
WHEELER
CROOK
JEFFERSON
North Powder
Haines
Baker
Unity
Ukiah
Prairie City
John Day
Canyon City
Long Creek
Monument
Mount Vernon
Dayville
Seneca
Spray
Mitchell
Condon
Fossil
Lonerock
Portland
Salem
Eugene
Bend
Roseburg
Medford
Pendleton
La Grande
Burns
Fish Use Types
1: Spawning & Rearing
2: Rearing & Migration
3: Migration
5: Present, Use Type Unknown
7: Unknown Presence/Use
Counties
NORTH
0
15
30
miles
Data Source: Oregon Department of Fish and Wildlife fish data web page, http://osu.orst.edu/dept/nrimp/information/fishdistdata.htm, June, 2002.
September 18, 2002

Spring chinook spawning surveys have been conducted in index areas of Granite Creek, Clear Creek, Bull Run Creek, North Fork John Day River, Middle Fork John Day River, and Upper John Day River since 1959. The population trend for spring chinook salmon in the John Day River is essentially flat for the period of record (Figure 23), although the population appears to be increasing during the last 20 years. This increasing trend has been attributed to improvements in fish habitat in the mainstem John Day River above the town of John Day and in the Middle Fork John Day River above the town of Galena. The population in the Granite Creek system has shown a dramatic decrease in abundance over the last 30 years (Figure 24). Reasons for this decline are not clear. However, the decline appears to correlate with recent intensive forest management activities and degradation from historic mining.

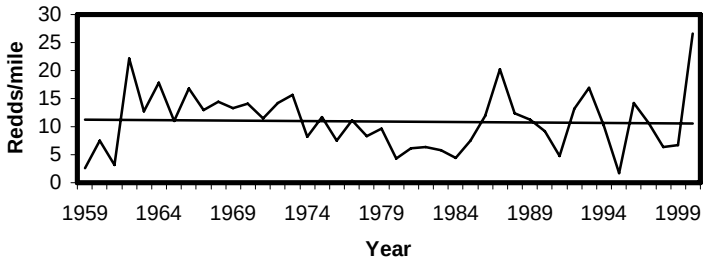

Figure 23. Results of spring chinook spawning surveys in the John Day River Basin, 1959-2000.

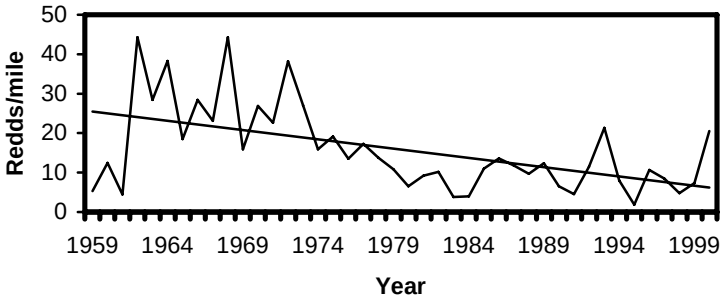

Figure 24. Results of spring chinook spawning surveys in the Granite Creek system, 1959-2000.

In 2000, record numbers of spring chinook salmon spawned in the index areas of the John Day River. A total of 477 redds were counted in the North Fork John Day, when in 1995 only 27 redds were tallied (ODFW, unpublished data). In the declining Granite Creek system, 241 redds were counted, more than double the 20-year average. Spawning populations in both the mainstem and Middle Fork John Day rivers were the

highest recorded since 1959. Contributing factors probably include improved ocean conditions, success in habitat restoration (screened diversions, improved adult and juvenile fish passage, efficient irrigation, riparian cover), and improved management practices.

Although no releases of hatchery chinook salmon have been made into the John Day River Basin, a small number of stray hatchery adults has been recovered during spawning surveys in the fall (Wilson et al. 2000). This small number (less than one percent of the total adult return) is thought to present little risk to the genetic integrity of the population.

There has been no spring chinook sport fishery since 1978, but the CTUIR have a limited subsistence fishery on the North Fork John Day River and on Granite Creek. The escapement target that would allow a sport fishery to resume is 7,000 spawners for three to four consecutive years, but this target has not yet been met. Escapement during 2000 and 2001 was about 6,000 spawners. Tribal, Oregon State Police (OSP), and ODFW closely monitor the quota for this fishery and the fishery itself.

3.4.1.2 Summer steelhead

The John Day River supports what may be the largest wild run of summer steelhead in the Columbia River Basin with an estimated run of between 5,000 and 40,000 fish. Adult summer steelhead enter the John Day from the Columbia River in mid- to late September, then gradually move upriver and spread into spawning tributaries along the way. Spawning commences in April in lower river tributaries and continues through mid-June in high elevation tributaries of the North Fork. Emergence of summer steelhead fry is usually complete by mid-July.

Spawning and rearing habitats for steelhead include virtually all accessible areas of the project area (Figure 25). The steelhead population is monitored by spawning ground surveys each spring on approximately 85 miles of tributaries. Spawning densities vary considerably, but a downward trend is indicated for the past 40 years (Figure 26). Indications are that smolt to adult survival rates have increased in at least the last two years.

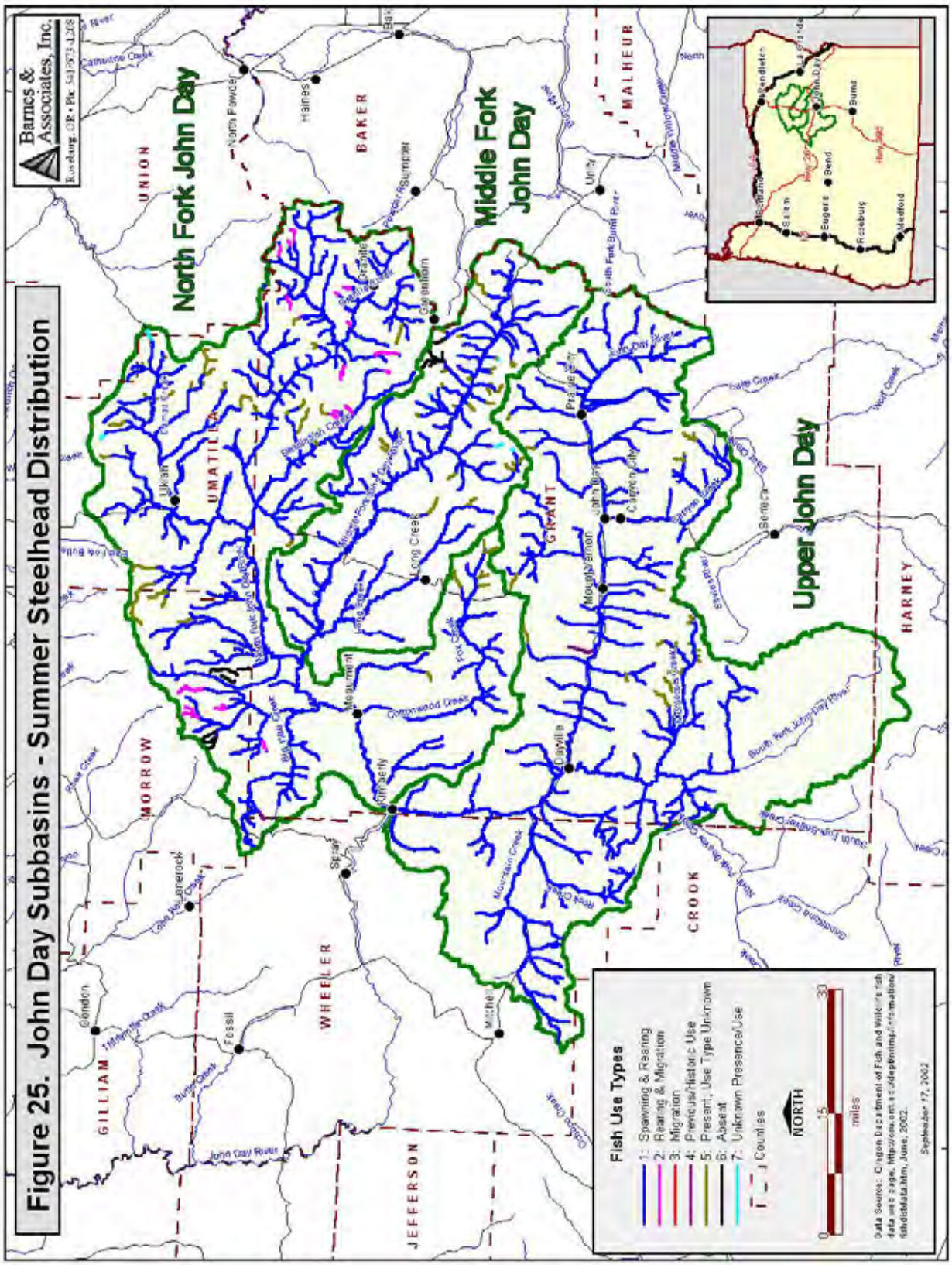
Figure 25. John Day Subbasins - Summer Steelhead Distribution
Barnes & Associates, Inc.
North Fork John Day
Middle Fork John Day
Upper John Day
UNION
BAKER
MALHEUR
UMATILLA
GRANT
HARNEY
MORROW
WHEELER
CROOK
GILLIAM
JEFFERSON
Fish Use Types
1: Spawning & Rearing
2: Rearing & Migration
3: Migration
4: Previous/Historic Use
5: Present, Use Type Unknown
6: Absent
7: Unknown Presence/Use
Counties
NORTH
miles

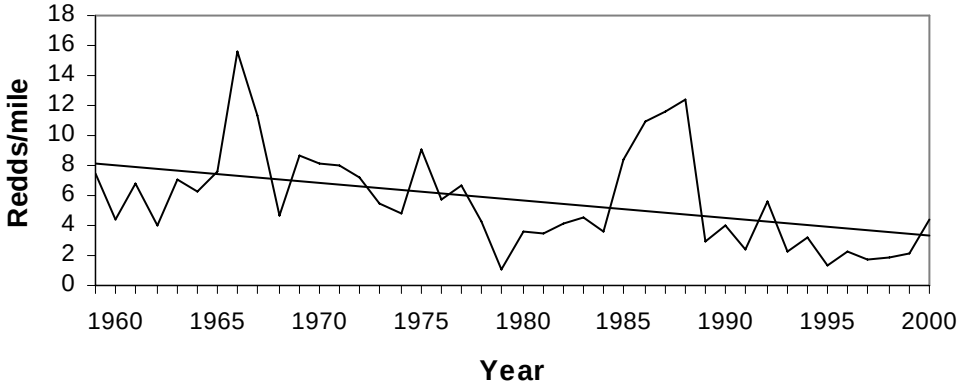

Figure 26. Spawning density (redds/mile) of summer steelhead in the John Day Basin, 1959 to 2000.

In March 1999, NMFS listed the John Day River summer steelhead as a threatened species as part of the Mid-Columbia River steelhead ESU under the ESA. Chilcote (2001) found that none of the six subpopulations in the John Day Basin were at risk of extinction, although the Upper John Day, Middle Fork, and South Fork subpopulations had moderate probability of becoming "sensitive" after 90 years (Table 14).

Table 14. Observed Six-Year Average of Wild Steelhead Abundance and Conservation Abundance Thresholds for John Day River Subpopulations (Abundance Expressed as Spawners per Stream Mile). (Source: Chilcote 2001)

Subpopulation	Observed Abundance	Viable Threshold [1]	Critical Threshold [2]
Lower John Day	2.7	0.8	0.1
Lower North Fork John Day	2.9	0.9	0.3
Upper North Fork John Day	1.9	0.8	0.4
Middle Fork John Day	4.8	2.2	0.8
South Fork John Day	2.6	1.7	0.6
Upper John Day	2.6	1.5	0.5

[1] "Viable threshold" represents the minimum population size expected to persist indefinitely.
[2] "Critical threshold" represents the population size with a 20% chance of becoming extinct within ten generations.

Very little life history or genetic information has been collected on summer steelhead within the John Day Basin. Available information indicates steelhead smolt primarily as two-year-olds (74 percent) and spend one year (58 percent) in the ocean before returning as adults. A smaller proportion of fish smolt as either one- or three-year-olds (10 percent and 16 percent, respectively) or spend two years in the ocean (39 percent) before returning as an adult.

Stray hatchery steelhead fish have been observed during incidental and statistical creel programs since 1986, with what appears to be an increasing trend. Stray hatchery steelhead are removed during a fishery in the lower river (Table 15) to minimize the potential for negative interactions between out-of-basin strays and wild fish. The lower river up to RM 40 at Cottonwood Bridge contains the highest concentration of hatchery strays (OSP 2000). A fishery on wild steelhead has been limited to catch and release since 1996. Prior to 1996, harvest of wild fish was allowed, with a two fish per day bag limit. Estimated catch of hatchery stray and wild steelhead ranged from a low of 305 in 1979 to a high of 9,657 in 1988. The Umatilla Tribes conduct a small subsistence fishery in certain areas of the subbasin.

Table 15. Description of Time Periods in which Fisheries Occur within the John Day Basin.

Fishery Location	Time Period	Comments
Mouth of John Day to Cottonwood Bridge (RM 38)	Year Round	Catch and release of all unmarked steelhead
Cottonwood Bridge (RM 38) to Kimberly (RM 185)	Year Round	Catch and release of all unmarked steelhead
Kimberly (RM 185) to Mouth of Indian Creek (RM 257)	Sept. 1 – April 15	Catch and release of all unmarked steelhead
Mouth of North Fork to RM 60 at Hwy 395 Bridge	Sept. 1 – April 15	Catch and release of all unmarked steelhead
Mouth of Middle Fork to RM 24.2 at Hwy 395 Bridge	Sept. 1 – April 15	Catch and release of all unmarked steelhead
South Fork John Day River		Closed to adult steelhead fishing
All Other Tributaries		Closed to adult steelhead fishing

3.4.1.3 Bull trout

Bull trout within the John Day Basin are considered part of a larger Columbia River population that was listed as threatened in 1998 by USFWS under the ESA. Bull trout were historically found throughout much of the upper John Day Basin, including the North and Middle forks and tributaries (Buchanan et. al. 1997). Current distribution is limited to those streams with excellent water quality and high quality habitat (Figure 27). Bull trout populations are depressed in the John Day Basin, with the population trend unknown. Bull trout populations are limited by degraded habitat resulting from past and ongoing land management activities, loss of prey species, and hybridization and competition with brook trout. Concerns with the small population size are compounded by fragmentation and isolation of some populations and lack of connectivity between local populations.

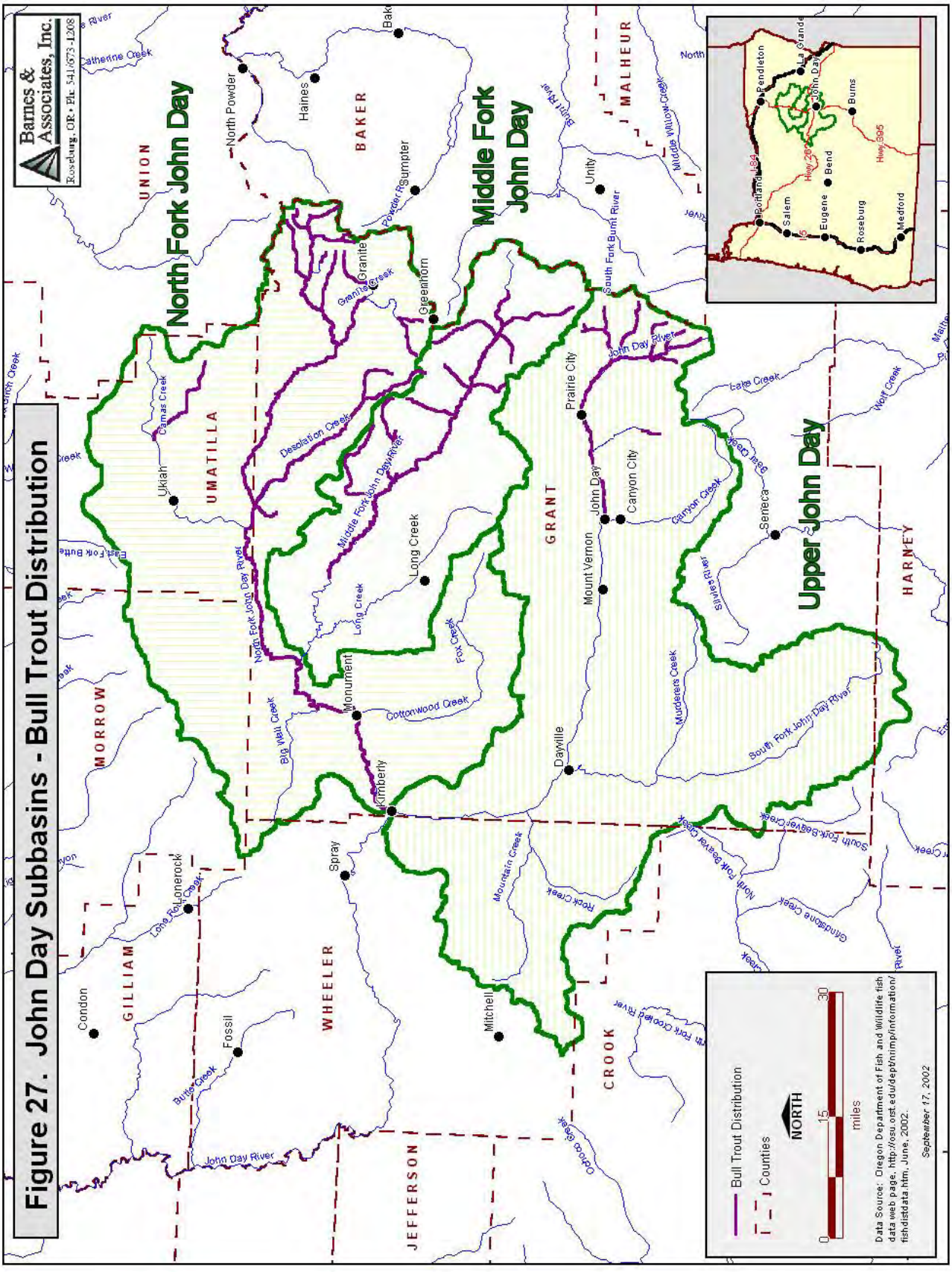
Figure 27. John Day Subbasins - Bull Trout Distribution
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North Fork John Day
Middle Fork John Day
Upper John Day
UNION
BAKER
MALHEUR
UMATILLA
GRANT
HARNEY
MORROW
GILLIAM
WHEELER
CROOK
JEFFERSON
North Powder
Haines
Baker
Unity
Prairie City
John Day
Canyon City
Mount Vernon
Dayville
Monument
Long Creek
Ukiah
Seneca
Spray
Condon
Fossil
Mitchell
Kimberly
Granite
Greenhorn
Rumpter
Pendleton
La Grande
Bend
Burns
Salem
Eugene
Roseburg
Medford
Bull Trout Distribution
Counties
NORTH
0
15
30
miles
Data Source: Oregon Department of Fish and Wildlife fish data web page, http://osu.orst.edu/dept/nimp/information/fishdistdata.htm, June, 2002.
September 17, 2002

Bull trout traverse much of the project area. For example, one subadult bull trout tagged near Spray in April 2001 migrated some 90 miles upstream into Granite Creek (Tim Unterwegner, ODFW, personal communication, March 2002). In general, bull trout tend to seek relatively cold water, which limits their range during the summer. Adult bull trout migrate upstream toward spawning areas as early as July and commence spawning in early September (Appendix T). Spawning is usually complete by early November, at which time the adults immediately move downstream. It is assumed that bull trout in the Middle Fork and North Fork subbasins exhibit a similar migration pattern.

The Middle Fork bull trout population is considered to be the most vulnerable and at the highest risk of extinction because they are found in only four tributaries that are relatively far apart and separated by apparently unsuitable habitat. Bull trout were historically present, and may still exist in low, seasonal abundance, in four other tributaries to the Middle Fork; thus eight tributaries are shown in Figure 27. A population assessment for bull trout in Big, Granite Boulder, and Clear creeks was completed in 1999 (Hemmingsen, in progress). Preliminary assessment results estimated the population in Clear Creek was approximately 640 fish and the population in Big Creek was approximately 1,950 fish. No estimate was made for Granite Boulder Creek. Additional surveys were conducted during summer 2000 in Vinegar Creek and part of Davis Creek. A single bull trout was found in Vinegar Creek.

Historically, a few anglers who selectively angled for them caught bull trout. Harvest of bull trout has been prohibited in the John Day River Basin since 1994. Since then, increased efforts toward angler education and enforcement have been initiated. Stocking of catchable rainbow trout was discontinued in the Middle Fork John Day and Desolation Creek to prevent incidental catch of bull trout.

3.4.1.4 Westslope cutthroat and redband trout

The John Day River supports the only population of westslope cutthroat trout found in Oregon. Westslope cutthroat are confined to the upper John Day River and tributaries above Fields Creek and a few tributaries in the North Fork John Day River (Figure 28).

Westslope cutthroat are listed as a sensitive species in Oregon and were petitioned for listing under the ESA. USFWS determined that listing was not warranted.

Although their distributions overlap, westslope cutthroat trout tend to occupy the upper reaches of streams while redband trout and steelhead tend to occupy lower reaches. There is a sympatric zone where both species, and their hybrids, occur. Hybridization with rainbow trout has been documented throughout westslope cutthroat distribution in the John Day River Basin (Spruell et al. 1997).

Very little is known about the life history of westslope cutthroat within the John Day River Basin. It is assumed they exhibit life history traits similar to other populations in basins throughout the interior Columbia River Basin. Spawning commences in April and May with emergence of fry occurring approximately three to four weeks later

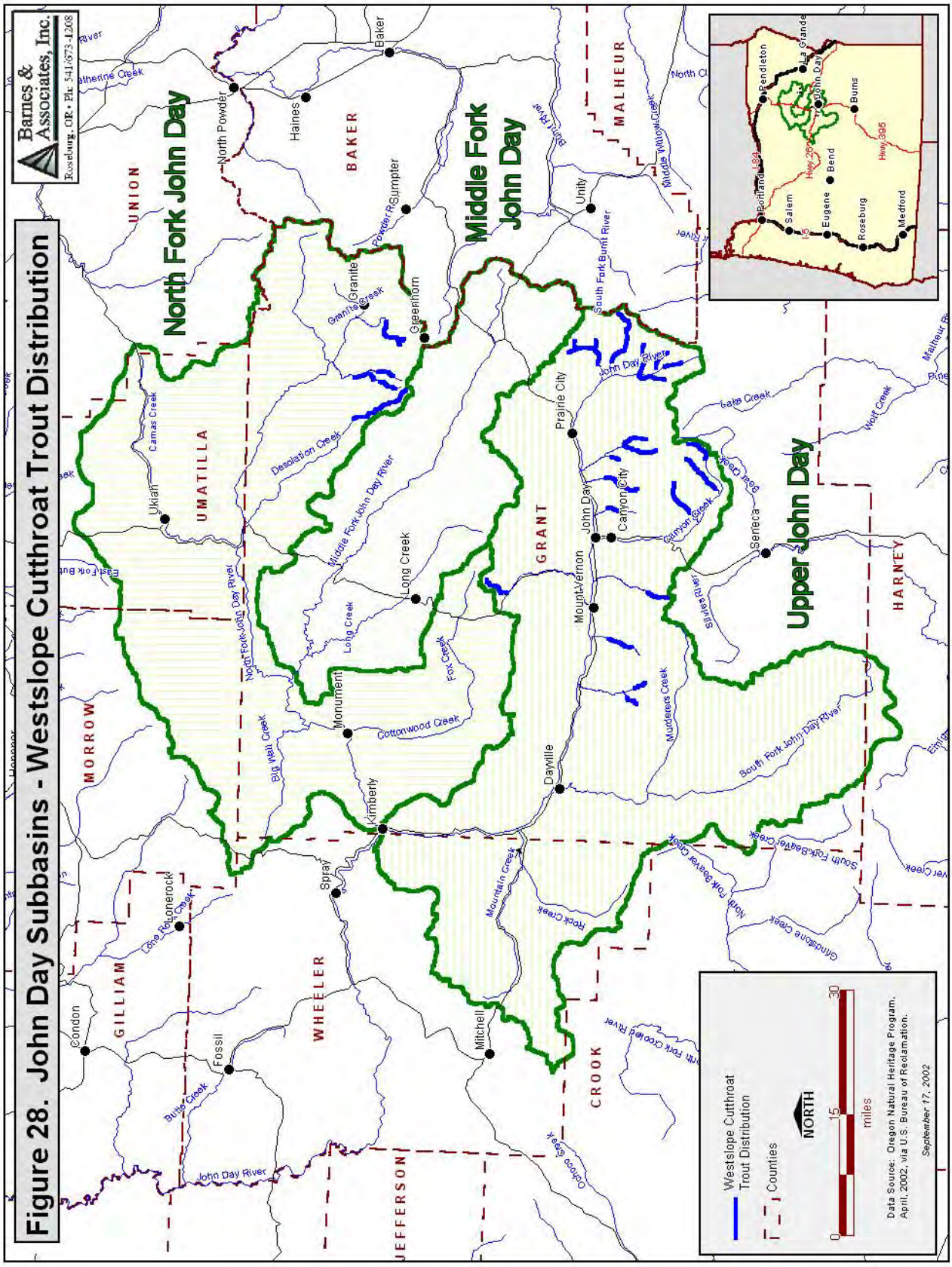
Figure 28. John Day Subbasins - Westslope Cutthroat Trout Distribution
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North Fork John Day
Middle Fork John Day
Upper John Day
UNION
BAKER
MALHEUR
UMATILLA
GRANT
HARNEY
MORROW
GILLIAM
WHEELER
CROOK
JEFFERSON
Baker
North Powder
Haines
Sumpter
Unity
Granite
Greenhorn
Prairie City
John Day
Canyon City
Mount Vernon
Seneca
Long Creek
Ukiah
Monument
Dayville
Kimberly
Spray
Mitchell
Fossil
Condon
Lone Rock
Butte Creek
John Day River
Camas Creek
Desolation Creek
Middle Fork John Day River
North Fork John Day River
Long Creek
Big Wall Creek
Cottonwood Creek
Fox Creek
Granite Creek
Powder River
South Fork Burnt River
Middle Willow Creek
Bear Creek
Canyon Creek
Lake Creek
Wolf Creek
Murderers Creek
South Fork John Day River
Mountain Creek
Rock Creek
North Fork Beaver Creek
South Fork Beaver Creek
Chrome Creek
Pendleton
La Grande
John Day
Burns
Bend
Salem
Eugene
Roseburg
Medford
Portland
Hwy 395
Hwy 26
I-5
Westslope Cutthroat Trout Distribution
Counties
NORTH
0
15
30
miles
Data Source: Oregon Natural Heritage Program, April, 2002, via U.S. Bureau of Reclamation.
September 17, 2002

(Appendix T). Fluvial and resident life history patterns are present within the John Day River Basin. A graduate research study at Oregon State University in Corvallis, Oregon on westslope cutthroat is currently being conducted on Upper John Day River tributaries to study late-fall and early-spring movements and habitat use.

Redband trout are found throughout the basin, although it is difficult to distinguish them from juvenile anadromous steelhead. It is assumed that distribution of redband trout is the same as that for summer steelhead (Figure 25) within the project area, since spawning of the two subspecies overlaps and they are not reproductively isolated, except in the upper South Fork upstream from Izee Falls. Little life history information is available for redband trout in the John Day Basin, although it is assumed they exhibit similar life history traits and lifestage timing as other eastern Oregon populations, similar to those of westslope cutthroat trout (Appendix T).

3.4.1.5 Pacific and western brook lamprey

Currently, remnant populations of anadromous Pacific lamprey and non-anadromous western brook lamprey exist in the basin (Close et al. 1999). However, very little is known about them. Pacific lamprey are anadromous and migrate upstream during the winter and spring, rear year-round, and outmigrate during April and May (Appendix T).

The John Day River once supported a tribal fishery for lamprey (Close et al. 1999), particularly in the Middle and North Fork drainages. Anecdotal information has been collected through tribal surveys and a current USGS research project (*Upstream Migration of Pacific Lampreys in the John Day River*). It is believed that the John Day River may support a run of approximately 10,000 Pacific lamprey, based on an apparent large drop (72 percent) in ladder passage estimates of adult lamprey between John Day Dam (RM 215) and McNary Dam (RM 292) on the Columbia River. Larval and adult stages have been documented in the basin, especially in the North Fork (Jackson et al. 1998). Sampling of juvenile lamprey by CTUIR has shown that the John Day Basin has the highest juvenile densities relative to other subbasins. Tracking of adult lamprey by the USGS has shown erratic movement, possibly temperature related, with most movement in the fall. The primary limiting factor for adult lamprey is probably passage at Columbia River dams, although thermal obstacles to migration may play a role. In addition, juvenile lamprey may be preyed upon by smallmouth bass in the lower John Day and Columbia rivers (Zimmerman 1999). There is no current restoration plan for lamprey in the John Day Basin.

3.4.1.6 Fish habitat

The quality of freshwater habitat in the project area has declined from historical conditions due largely to management activities including irrigated agriculture, forestry, grazing, road construction, mining, and urbanization. Higher water temperatures resulting from lower summer flows and less riparian shading (Li et al. 1994) can affect the metabolism, growth rate, disease resistance, and development and migration timing of salmonids and other fish. Thermal barriers exist in several portions of the project area, where high summer water temperatures inhibit the movement of salmonids, which then tend to concentrate in local areas of colder water.

The only large barriers to upstream migration are Izee Falls on the South Fork (RM 29, natural) and possibly the Canyon Meadows dam on Canyon Creek (RM 24.3, unnatural). Other migration barriers are season al and include diversion dams, reaches dewatered by water withdrawals, and reaches with thermal barriers.

Sedimentation and compaction of streambed gravels from bank erosion and in-channel grading and fill can reduce the survival of incubating eggs and alevins, the amount of escape habitat for fry and juvenile salmonids, and the production of desirable aquatic insects. Water entering the river from agricultural lands and mine tailings can carry pollutants including fine sediment, pesticides, excessive nutrients, and heavy metals that can directly and indirectly reduce fish survival.

North Fork John Day: Some good habitat remains in protected wilderness areas. Past mining practices destroyed in-stream structure in parts of the upper North Fork and its tributaries and altered the floodplain with gravel spoils. In some tributary systems in the North Fork (Granite and Camas creeks), localized toxic mine effluents are a concern. The Granite Creek watershed has been extensively roaded and logged, and has incurred significant floodplain alteration. Most irrigation diversions are pumps in the lower portion of the subbasin.

Middle Fork John Day: High water temperatures, livestock waste, and sediment due to livestock over-grazing, clearing and road building, water withdrawals, and historic mining activity (dredge mine tailings) have degraded the aquatic system. Most irrigation diversions are surface ditches; some rely on pushup dams.

Upper John Day River: High temperatures, livestock waste, and sediment from over-grazing and clearing and road building, water withdrawals, and logging have degraded the aquatic system. Most irrigation diversions are surface ditches and some rely on pushup dams.

Despite human disturbance and development, most ecological processes remain intact for rebuilding and maintaining functioning systems if given the opportunity (ICBEMP 2000). Large segments of steelhead habitat are mostly intact and accessible to returning adults, and core habitats for spring chinook are still intact. The mainstem and tributaries have benefited from past efforts to improve streamside quality; trend analysis indicates that streamside enhancement projects have improved water quality in downstream reaches (Cude 1995).

3.4.2 Environmental Consequences

3.4.2.1 No Action

Pushup dams can negatively affect fish during annual construction and operation. During maintenance work, heavy equipment pushing streambed substrates and fill materials into position can crush or bury juvenile salmonids and incubating eggs and alevins. Associated plumes of suspended sediment may settle into downstream redds, reducing survival of eggs and alevins. Aquatic insects in the streambed are likewise

disturbed or buried locally. Adult salmonids will be directly disturbed if trying to migrate through or spawn near the area. This work typically occurs outside the preferred in-stream work period, when salmonids may be spawning and incubating in the gravel. Because this maintenance is typically an annual (or more often) event, impacts also accumulate temporally.

During low-flow conditions, pushup dams can become obstacles for upstream and downstream movement of adult and juvenile fish as the surface flow passes through, but not over, the dam. Such blockages can prevent anadromous and resident fish from reaching more desirable habitats (e.g. cold water refugia) and effectively trap them in less desirable, or stressful, habitats. Fish that are concentrated at dams are also susceptible to predation and poaching.

Pushup dams have the positive attributes of creating pools which are sometimes used by chinook salmon for holding through the summer months. Turbulence of flow over the dams helps aerate the water and may provide local pockets of higher dissolved oxygen immediately downstream from dams.

Surface and pump diversions are presumed to kill every fish that enters the system, because it is usually difficult or impossible for the fish to exit the system alive, and because dewatering of the system for maintenance or emergency reasons could effectively kill all fish present at any time. Old fish screens (pre-1990s) were designed to protect smolts only, while new screens also protect salmonid fry. Problems associated with old screens include too large of mesh openings, excessive approach velocities, little or no sweeping velocity, small bypass orifices, excessive bypass slope, and improperly-sized drums (Allen 2001). Unscreened diversions presumably cause the death of all fish entrained (smolts and fry), while old-style fish screens reduce mortality to about 10 percent for smolts and 60 percent for fry, and new screens meeting current NMFS criteria reduce mortality to about 0 percent for smolts and 5 percent for fry.

Water withdrawals tend to reduce in-stream flows and the overall amount of wetted habitat available for use by fish and aquatic organisms. In extreme cases, withdrawals can directly dewater local reaches of stream, precluding fish movement and killing aquatic life. This is especially likely in reaches where the channel has widened due to bank erosion and gravel deposition. Such reaches include lower Pine Creek, Cottonwood Creek, and the South Fork John Day. More often, withdrawals tend to reduce habitat quality via reduced water velocity and depth, leading to warmer water with less dissolved oxygen and a stream margin having less contact with the shade and production of vegetated banks.

The desired improvements for fish passage, fish survival at diversions, and fish habitat quality will not occur, or will occur more slowly via other programs such as those from Reclamation's minor presence in the subbasins. Impacts to fish and fish habitat from existing diversion configurations and practices will continue.

3.4.2.2 Proposed Action

The intention of the proposed action is to have a long-term, positive impact on steelhead and other native fish. However, some of the techniques employed to achieve this may cause short-term and local negative impacts. Mitigation measures are designed to minimize the negative impacts while pursuing the positive impacts.

3.4.2.2.1 Replacing pushup dams

There is no complete count of pushup dams in the project area, but local input received during scoping indicates that there may be several hundred across all three subbasins in the project area.

Short-term: In-channel construction activity will expose fish in the immediate vicinity to negative impacts which are less than those from re-construction of a pushup dam. Work will occur during the specified in-water work period so that impacts to spawning salmonids and incubating eggs and alevins will be avoided. Remaining impacts could include general disturbance of adult and juvenile fish, direct disturbance or death of juvenile fish and aquatic invertebrates within the streambed from heavy equipment and streambed excavation, and secondary disturbance of adult and juvenile fish due to temporary plumes of turbidity and suspended sediments. Sediments introduced to the stream during construction may impact the streambed until flushed out during winter high flows. Adult fish holding in diversion pools, or trapped below diversion dams, may be displaced during construction. Construction of pump stations will not affect fish.

Long-term: The negative impacts associated with the annual re-construction of pushup dams (disturbance and death of fish and aquatic insects, erosion of banks and sedimentation of the streambed) will be avoided. Fish passage for adult and juvenile salmonids will be improved during all flows. Fish habitat quality will improve due to reduced erosion and sedimentation, and increased shading, as streambanks and riparian zones in the vicinity recover from the effects of annual pushup dam construction. Because pump stations tend to be located downstream from pushup dam sites, fish habitat in the intermediate reach will improve due to increased flow and lack of pushup dam effects.

Cumulative: Negative, short-term impacts will generally not accumulate because they are local in nature and because construction events will be separated spatially and staggered over many years. If multiple projects occur in close proximity within a short period, the short-term disturbance to fish could accumulate to those individual fish that encounter more than one project. Habitat impacts would remain site-specific and not accumulate due to project proximity. Positive, long-term impacts will gradually accumulate to improve the health of fish habitat and fish populations throughout the John Day Basin.

3.4.2.2.2 Building / upgrading fish screens

According to the Oregon Department of Fish and Wildlife (ODFW), there are 30 to 50 unscreened diversions in the project area upstream of Kimberly (NPPC 2001; USBR 2002), spread across all three subbasins. In addition, there are approximately 150

diversions with screens, spread across all three subbasins, that do not meet NMFS standards (NPPC, 2001).

Short-term: There will be no impacts to fish and aquatic resources during installation of screens at surface diversions because construction will be done in dry conditions and all sources of contamination will be removed or stabilized prior to introducing water into the diversion. Similarly, at pump intakes, screens will be installed while diversions are shut off, and often while pipes are out of the water. For siphons, there may be minor disturbance to fish similar to that described in 3.4.2.2.1 above.

Long-term: The percentage of fish surviving encounters with each new screen will increase to at least 95 percent, with virtually no mortality of salmonid adults or smolts. For siphons, fish will no longer be attracted to irrigation ditches, thus allowing fish full access to habitat upstream of the stream/irrigation ditch intersection.

Cumulative: Positive, long-term impacts will gradually accumulate to decrease the basin-wide entrainment of salmonids into irrigation systems to near zero. Populations should increase, unless limited by other factors such as low flow or water quality.

NMFS sometimes requires fish screens to be designed to protect the smallest life stages of fish (fry), even on main stem reaches where there is little or no spawning habitat. While intended to protect migrating fish, this requirement can significantly increase screen costs relative to the cost of building a screen to protect juvenile fish only. Also, in some locations, screens built to protect small fish are difficult or impossible to keep clean from algae and other debris, rendering the screens useless.

The result of more costly and higher-maintenance screens is that some projects are not cost-effective and cannot be implemented. Some people involved with habitat improvement projects would like to see screen design standards aligned with the life history stages present at any particular stream point. Such modifications would lower screen costs and could result in the installation of more screens.

3.4.2.2.3 Flow increases

Short-term: There will be no short-term negative impacts to fish from increases in summer flow toward more natural conditions. The exception is if construction is required to provide the increased flow (e.g. to remove pushup dams or irrigation headworks), in which case short-term negative impacts may be similar to those associated with annual pushup dam construction.

Long-term: Habitat quality will improve locally and substantial distances downstream as higher flows (if allowed to remain in the channel) help to reduce summer temperatures, dilute pollutants, increase the area of aquatic habitat, improve migration conditions for fish, and sustain riparian vegetation. An exception is river reaches dominated by natural or irrigation induced groundwater inflow, where increases in surface water flow and reduction of cooler groundwater flow may actually increase the overall temperature and decrease dissolved oxygen.

Cumulative: Flow increases, if allowed to remain in the channel, could gradually accumulate to substantially improve all the habitat attributes mentioned above through much of the John Day Basin.

3.4.3 Mitigation

Negative impacts to fish and aquatic resources will be minimized and mitigated by following detailed practices for planning, design, construction, and site recovery as outlined in Section 2.2.5.

3.5 Wildlife

3.5.1 Existing Conditions

The project area hosts at least 293 species of amphibians, birds, mammals, and reptiles (NPPC 2001). Of that number, three amphibians, 27 birds, 15 mammals, and two reptiles that are not federal-listed have other protection status from the state of Oregon, BLM or USFS (see Appendix Q). On private land, special consideration toward these species is not required by law or regulation.

Nineteen of the 47 other-protection-status animals - three amphibians, 11 birds, three mammals, and two reptiles - are closely associated with aquatic, riparian, or wetland habitats of the kind where the proposed action will occur (Table 16).

Table 16. Animal Species Closely Associated with Aquatic, Riparian, or Wetland Habitats, and Having State of Oregon, Bureau of Land Management, or U.S. Forest Service Special Protection Status within the Project Area.

Blackbird, Tricolored	Myotis, Long-legged
Bobolink	Owl, Great Gray
Bufflehead	Sage-grouse, Western Greater
Crane, Greater Sandhill	Sandpiper, Upland
Fisher	Sapsucker, Williamson's
Flycatcher, Eastern Oregon Willow	Swallow, Bank
Frog, Northern Leopard	Toad, Western
Frog, Tailed	Turtle, Northwestern Pond
Goshawk, Northern	Turtle, Painted
Myotis, Fringed	

Of 185 bird species using the project area, 93 are migratory (NPPC 2001; O'Neil et al. 2001). These migratory birds include shorebirds, hummingbirds, flycatchers, warblers, swallows, some sparrows and several raptors. Many of these species winter in Mexico or Central America and are referred to as neotropical migrants. During their breeding season occurrence in the project area, many neotropical migrant species are commonly associated with deciduous tree and shrub habitats.

3.5.2 Environmental Consequences

3.5.2.1 No Action

Water quality degradation and reproductive disruption to amphibians and aquatic reptiles will continue from the construction and maintenance of private land pushup dams and irrigation ditches. Clearing of riparian shrubs and deciduous trees from private land to increase water flow will continue to displace associated species like the Eastern Oregon willow flycatcher and other neotropical migrant birds. Maintenance or new construction activities on private land will continue to directly cause animal disturbance, especially if during the breeding period.

3.5.2.2 Proposed Action

In-stream or streambank excavation for new LFSDs and infiltration galleries on private land would directly cause initial, short-term, water quality degradation. If conducted during the spring breeding period, local amphibian egg masses could be lost for the year of construction. The beneficial improvement of habitat from fewer pushup dams and less water diversion maintenance would offset both effects. Clearing of riparian shrubs and deciduous trees from private land to increase water flow will continue to displace associated species like the Eastern Oregon willow flycatcher and other neotropical migrant birds. Maintenance or new construction activities on private land would directly cause short-term animal disturbance, especially if during the breeding period. Since construction would occur at dispersed sites over a large area and several years, the impact to wildlife is not significant.

3.5.3 Mitigation

No mitigation measures are necessary beyond those incorporated into the project design.

3.6 Threatened and Endangered Species

On April 18th and 19th, 2002, Reclamation solicited lists of listed and proposed threatened and endangered species from NMFS and USFWS, respectively. Those two agencies responded with species lists dated May 31st, 2002, from NMFS and May 17th, 2002, from USFWS. Those two letters are included in Appendix U (for NMFS) and Appendix V (for USFWS).

The analysis in this PEA serves as Reclamation's Biological Evaluation (BE) for Section 7 consultation with USFWS and NMFS under the ESA for the overall program of habitat improvements under Action 149 of the 2000 NMFS BiOp. Reclamation has determined that implementation of the proposed action will have "No Effect" to listed fish in the project area except for Mid-Columbia River steelhead and Columbia River bull trout, for which the conclusion is "May Affect, Not Likely to Adversely Affect" (Table 21). The proposed action will occur in the upper subbasins and its effects are largely local, such that most will not be measurable in the lower John Day River or the Columbia River. In

the project area, however, improved fish passage at dams, protection from direct loss in irrigation systems, and improved flow and habitat conditions will directly and indirectly improve the survival of steelhead and bull trout. The potential for any short-term negative effects from construction will be minimized via the applicable restrictions.

For wildlife, Reclamation has determined that implementation of the proposed action will have "No Effect" to listed species except the bald eagle, for which the determination is "May Affect, Not Likely To Adversely Affect" (Table 21). The bald eagle's "May Affect, Not Likely To Adversely Affect " determination considers that many - though not all - actions will occur distant enough from nesting or winter-roosting sites. Furthermore, a January 1 through August 31 restriction on construction disturbance within ¼-mile of an active nest site will protect a site.

3.6.1 Threatened and Endangered Fish

3.6.1.1 T&E Fish - Existing Conditions

In the John Day Basin, summer steelhead are part of the Mid-Columbia River steelhead ESU which is listed as threatened (Federal Register Vol 64, No. 57, March 25 1999) and bull trout are part of the Columbia River bull trout ESU which is listed as threatened (Federal Register, Vol. 63, No. 111, June 10 1998).

The Mid-Columbia River steelhead ESU occupies the Columbia River Basin from above the Wind River in Washington and the Hood River in Oregon upstream to include the Yakima River in Washington. This region includes some of the driest areas of the Pacific Northwest, generally receiving less than 16 inches of precipitation annually. Summer steelhead are widespread throughout the ESU, while winter steelhead are limited to tributaries downstream from The Dalles dam. The John Day River represents probably the largest native, natural spawning stock of steelhead in the region.

Critical habitat for summer steelhead includes all accessible portions of the project area (Federal Register Vo. 65, No. 32, Feb 16 2000). Steelhead are widely distributed throughout the project area, and juveniles are present year-round. Details about steelhead life history, distribution, and habitat are in Section 3.4.

The Columbia River bull trout ESU is represented by relatively widespread subpopulations that have declined in overall range and numbers of fish. A majority of Columbia River bull trout occur in isolated, fragmented habitats that support low numbers of fish and are inaccessible to migratory bull trout. The few remaining bull trout “strongholds” in the Columbia River Basin tend to be found in large areas of contiguous habitats in the Snake River Basin of central Idaho mountains, upper Clark Fork and Flathead Rivers in Montana, and several streams in the Blue Mountains in Washington and Oregon. The decline of bull trout is primarily due to habitat degradation and fragmentation, blockage of migratory corridors, poor water quality, past fisheries management practices, and the introduction of non-native species.

A proposal to designate critical habitat for bull trout is in progress (Chris Allen, USFWS, personal communication, June 19, 2002). A John Day Recovery Unit Team of state, federal, and tribal entities is in the process of developing recovery strategies for the bull trout population in the John Day Basin. Within the project area, bull trout are widely distributed but in low abundance, and mostly found in the North Fork Subbasin. They are present year-round. Details about bull trout life history, distribution, and habitat are in Section 3.4.

3.6.1.2 T&E Fish - Environmental Consequences

3.6.1.2.1 No Action

If this action is not pursued, the desired improvements for fish passage, fish survival at diversions, and fish habitat quality will not occur, or will occur more slowly via other programs, including Reclamation's minor presence in the subbasins. Negative impacts to fish and fish habitat from existing diversion configurations and practices will continue (see Section 3.4). On the other hand, the relatively minor negative impacts associated with construction of the proposed projects will not occur.

3.6.1.2.2 Proposed Action

The intention of the proposed action is to have a long-term, positive impact on steelhead and other native fish. However, some of the techniques employed to achieve this may cause short-term and local negative impacts. Impacts, both positive and negative, to steelhead, bull trout, and other fish are described in detail in Section 3.4.

Overall, the long-term and cumulative positive impacts to steelhead and bull trout habitat and survival greatly outweigh the short-term negative impacts, especially when mitigation is considered.

3.6.1.3 *Mitigation*

A variety of mitigation measures are planned to minimize the negative impacts to threatened and endangered fish while pursuing the positive impacts. These measures are detailed in Section 2.2.5.

3.6.2 Threatened and Endangered Wildlife and Vegetation

3.6.2.1 T&E Wildlife and Vegetation - Existing Conditions

The U.S. Fish and Wildlife Service (2002) has identified one listed bird species, one listed mammal, two listed fish, no proposed species, one candidate bird, and one candidate amphibian that may occur within the area of offsite-mitigation and habitat improvement activities in the project area (see Appendix Q). The listed bird and listed mammal are discussed below in this section. The listed fish are discussed in Section 3.6.1.

There are no federal-listed endangered or threatened plants for the project area. USFS/BLM/state sensitive plants are discussed in the vegetation section.

Bald Eagle: For this federal threatened species, four breeding sites are known (Isaacs & Anthony 2001) within the project area:

T.8S., R.27E., nest #628 (federal ownership in Grant County; active since 1994)
T.9S., R.32E., nest #1043 (federal ownership in Grant County; active since 2001)
T.11S., R.23E., nests #635 and #792 (private ownership in Wheeler County; active since 1994)
T.13S., R.24E., nests #599, #667, and #897 (federal ownership in Wheeler County; active since 1992)

Because nest sites are typically within one-half mile of fish- or waterfowl-bearing waters, much of the private land where the proposed action would occur is potentially suitable for nesting.

At least 19 winter roosts are known (ONHP 2002):
T.4S., R.31E. (Umatilla County; private ownership)
T.5S., R.33E. (Umatilla County; federal ownership)
T.6S., R.31E. (Umatilla County; private ownership)
T.6S., R.32E. (Umatilla County; private ownership)
T.7S., R.29E. (Grant County; federal ownership)
T.8S., R.28E. (Grant County; federal ownership)
T.8S., R.29E. (Grant County; private ownership)
T.10S., R.29E. (Grant County; private ownership)
T.11S., R.30E. (Grant County; federal ownership)
T.12S., R.26E. (Grant County; federal ownership)
T.12S., R.33E. (Grant County; federal & private ownerships)
T.13S., R.27E. (Grant County; federal, state, & private ownerships)
T.13S., R.29E. (Grant County; private ownership)

Lynx: Only two sightings are reported (ONHP 2002) for this federal threatened species within the project area: T.6S., R.33E. (Umatilla County) in 1980, and T.7S., R.27E. (Grant County) in 1997. The species is secretive, wide-ranging, and prefers high-elevation thick forest. These characteristics make it improbable that the lynx is present on private land within the project area.

3.6.2.2 T&E Wildlife and Vegetation - Environmental Consequences

3.6.2.2.1 No Action
Excavation machinery and explosives on private land will continue to disrupt nesting bald eagles if close enough during courtship, incubation, and rearing.

3.6.2.2.2 Proposed Action
Excavation machinery and explosives used in proposed action construction on private land would disrupt nesting bald eagles if close enough during courtship, incubation, and rearing. Bald eagle winter roosts are less likely to be harmed by proposed action

construction due to a typical roost's upslope position. The impacts to federal listed or candidate species is insignificant if the proposed mitigation is adopted.

3.6.3 Mitigation

Negative impacts to threatened and endangered wildlife and vegetation will be minimized and mitigated by restricting proposed action construction disturbances (including blasting) on private land within 1/4-mile of: (1) an active bald eagle nest between January 1 through August 31, and (2) an active bald eagle winter roost between November 15 through March 15. For nest trees or roost trees having line-of-sight to the construction disturbance, the restrictive distance is 1/2 mile. The restriction for an individual nest or roost site may be modified in writing by ODFW (a) depending upon the actual dates that bald eagles are present and susceptible to disturbance, or (b) if an applicable incidental take permit has been issued by USFWS. For example, the ODFW may weigh the risk to listed fish species from project work extending past August 31 with the risk to nesting bald eagles from project work beginning before September 1 to determine which, if any, restriction date should be modified.

3.7 Essential Fish Habitat (Chinook Salmon)

3.7.1 Existing Conditions

All accessible habitat in the John Day Basin is designated by NMFS as essential fish habitat (EFH) for chinook salmon (NMFS 2002). Chinook salmon are widely distributed in the project area, and present year-round. Details about chinook salmon life history, distribution, and habitat are in Section 3.4.

3.7.2 Environmental Consequences

3.7.2.1 No Action

If this action is not pursued, the desired improvements for fish passage, fish survival at diversions, and fish habitat quality will not occur, or will occur more slowly via other programs, including Reclamation's minor presence in the subbasins. Negative impacts to fish and fish habitat from existing diversion configurations and practices will continue (see Section 3.4). On the other hand, the relatively minor negative impacts associated with construction of the proposed projects will not occur.

3.7.2.2 Proposed Action

The intent of the proposed action is to have a long-term, positive impact on steelhead and other native fish, including chinook salmon and their habitat. However, some of the techniques employed to achieve the positive impacts may cause short-term and local negative impacts. Impacts, both positive and negative, are described in detail in Section 3.4. Overall, the long-term and cumulative positive impacts to EFH (removal of migration barriers, increased flows, less annual stream channel disturbance) greatly outweigh the short-term negative impacts, especially when mitigation is considered.

3.7.3 Mitigation

A variety of mitigation measures are planned to minimize the negative impacts while pursuing the positive impacts. These are detailed in Section 2.2.5.

3.8 Recreation

3.8.1 Existing Conditions

Recreation is a growing industry within the project area, constituting a significant sector of the project area's economy. Hunting, fishing, boating, whitewater rafting, camping, wildlife observation, photography, hiking, picnicking, swimming, recreational gold panning, and driving for pleasure are the most common recreational activities (NPPC 2001, BLM 2000). Fishing and hunting are probably the two biggest recreational activities within the project area.

Recreation occurs primarily on public lands, where most of the camping and other recreational opportunities exist. Recreational use of private lands within the project area is low, primarily because of limited access.

Two segments of the John Day River within the project area are designated as federal Wild and Scenic Rivers under the 1988 Omnibus Oregon Wild and Scenic Rivers Act and are sub-classified as wild, scenic, or recreational. These two segments are: (1) the North Fork from Camas Creek (RM 57) upstream to the headwaters (wild, scenic, and recreational portions), and (2) the South Fork from Smokey Creek (RM 6.5) upstream to the Malheur National Forest boundary (recreational). ORVs of the Wild and Scenic River designation include scenery, recreational opportunities, and fisheries.

Similarly, three segments of the John Day River are designated as State Scenic Waterways within the project area: (1) North Fork from near Monument (RM 20.2) upstream to the North Fork John Day Wilderness, (2) Middle Fork from its confluence with the North Fork upstream to the Crawford Creek Bridge (near RM 71), and (3) South Fork from the north boundary of Phillip W. Schneider (formerly Murderer's Creek) Wildlife Management Area (RM 6) to County Road 63, the Post-Paulina Road (near RM 35). These river segments contain ORVs and provide opportunities for white water rafting, warm-water bass fishing, and wildlife viewing. See Figure 1 for the location of these Wild and Scenic Rivers and State Scenic Waterways.

The John Day Fossils Beds National Monument, managed by the NPS, attracts visitors to its Sheep Rock Unit located in the Upper John Day Subbasin downstream of Dayville (Figure 2). This National Monument contains outstanding fossils of national and international significance. Hiking trails within the monument allow for hiking.

Fishing is permissible in some streams within the project area, but only for certain species at specific times of the year. Trout fishing is allowed from May 25th through

October 31st, except all streams are closed to fishing for bull trout at all times of the year. Fishing for salmon and steelhead is prohibited, except the following stream segments are open for fishing only for steelhead with clipped adipose fins (hatchery fish) from January 1st through April 15th and September 1st through December 31st:

1. Main stem John Day River from North Fork John Day River upstream to Indian Creek.
2. Middle Fork John Day River upstream to Highway 395 bridge.
3. North Fork John Day River upstream to Highway 395 bridge.
4. North Fork John Day River from Highway 395 bridge upstream to bridge at USFS North Fork Campground (with restrictions on bait and lures).

Even though there have been no releases of hatchery anadromous fish in the John Day Basin since 1969, strays from releases of hatchery fish in the Columbia River escape into the John Day River. The limited hatchery fishery noted above is targeted at these strays.

Fishing for largemouth and smallmouth bass is open only during trout and steelhead seasons as defined above. Fishing for crayfish and bullfrogs is open all year. All of the above dates and restrictions are from the "2002 Oregon Sport Fishing Regulations" document (ODFW 2002).

Boating within the project area is limited by low streamflows. The John Day River and its forks rarely contain enough water for boating upstream of Kimberly (BLM 2000). Fences and pushup dams are also constraints to boating. Fences are particularly common on the Upper John Day River. The most heavily used segment for boating is the North Fork John Day River from Camas Creek downstream to Monument. This segment is used for recreational floating with rafts, kayaks, and canoes, among other boats. The Upper John Day River from Kimberly to Dayville and the North Fork John Day from Kimberly to Monument also receive some boating use, primarily associated with fishing. Boating happens primarily from April through early July, with low streamflows too limiting thereafter.

A single state-operated campground – the Clyde Holliday State Recreation Area - exists within the project area. This medium-sized park is located near the main stem John Day River between Mt. Vernon and John Day. Various other developed campgrounds exist throughout the project area, almost exclusively on National Forest and BLM lands. Most camping within the project area occurs in dispersed campsites. These sites are primarily associated with hunting and fishing activities.

3.8.2 Environmental Consequences

3.8.2.1 No Action

Recreational use of the project area would continue to grow. Removal of fish passage barriers, augmentation of streamflows, and installations/upgrades of fish screens would continue via other programs, including Reclamation's minor presence in the subbasins.

Where recreational use of the project area is currently constrained by those elements, these constraints would persist, slowly decreasing over time. Improvements in salmonid and non-ESA fisheries would be relatively slow, as would the opportunities for recreational fishing. Low streamflows would continue to limit boating oppotunities. Improvements to streamflows and removal of pushup dams would still occur, via other programs including Reclamation's minor presence in the subbasins, but at a relatively slow pace, allowing for relatively slow improvements in boating opportunities.

3.8.2.2 Proposed Action

One objective of the proposed action is enhanced and expanded fish habitat. As improved fish habitat leads to increased fish populations over time, recreational fishing opportunities may increase throughout the John Day Basin.

Replacement of pushup dams with infiltration galleries and permanent pump stations will allow for more boating opportunities at all times of the year. Replacement of pushup dams with LFSDs will hinder stream navigation during the irrigation season when the dams are upright. However, LFSDs will not be an obstacle during the non-irrigation season. Diversion consolidation will also improve boating opportunities by removing some diversion obstacles that currently hinder boating. The construction of pushup dam replacements will not impact boating, as the in-season work period starts (July 15th) after the primary boating season typically ends.

Flow enhancement may improve boating opportunities somewhat, as streamflows will remain higher later into the summer. The replacement and upgrade of fish screens will not affect boating, but will result in positive impacts to fisheries as ESA and non-ESA fish mortality is reduced through improved screen technology.

Impacts to camping will be minimal to non-existent, as the campgrounds are located on public lands, whereas all proposed actions will occur on non-public lands. Campground usage may increase, as fishing and boating opportunities improve.

Impacts to the other varieties of recreation, including hunting, wildlife observation, photography, hiking, picnicking, swimming, recreational gold panning, and driving for pleasure, will be minimally impacted. What minimal impacts do result, however, are likely to be positive, as the overall recreational opportunities are improved as a result of the proposed action.

3.8.3 Mitigation

No mitigation measures are necessary beyond those incorporated into the project design.

3.9 Land Use

3.9.1 Existing Conditions

The project area is one of the most sparsely populated regions of Oregon. Density per square mile of land in Grant County averages 1.8 persons, while Morrow County, Umatilla County, and Wheeler County average 5.4, 21.9, and 0.9, respectively (U.S. Census Bureau 2001). The statewide average is 35.6 persons per square mile.

The current economy is heavily based on government, tourism, and agriculture (NPPC 2001). An historically large contribution from timber harvest has declined in the last decade due to a lack of raw materials, sagging domestic lumber market, increased domestic imports, and other factors. Livestock agriculture - mostly cattle and sheep ranching with associated hay production - is still important, with Forest Service and Bureau of Land Management lands contributing to the operational survival of local grazing entities. Mining for gold and other locatable minerals continues on the upper North Fork, upper Middle Fork, and on tributaries of the upper mainstem John Day River.

Table 17 shows that core area farms produce marginal earnings compared to non-farm industries (e.g. farmers in Grant County lost money in reporting year 1997). Table 18 illustrates the importance of irrigation to farming—55 percent of Grant County crop land is irrigated.

Table 17. Earnings (in Thousands of Dollars) by Industry within Counties of the Project Area in 2000. [1]

County	Farm		Non-farm [2]		Total	
	$	%	$	%	$	%
Oregon (all counties)	655,399	1	68,178,228	99	68,833,627	100
Grant County	- 3,354	- 4	94,149	104	90,795	100
Morrow County	29,666	21	109,049	79	138,715	100
Umatilla County	36,887	4	982,837	96	1,019,724	100
Wheeler County	995	10	9,404	90	10,399	100

[1] *Source*: Bureau of Economic Analysis. 2002. *Regional Accounts Data: Local Area Personal Income*. Accessed online May 20, 2002 at www.bea.doc.gov/bea/regional/reis/action.cfm.

[2] Includes government and government enterprises.

Table 18. Farm Acreage Characteristics for Counties Having a Significant Portion within the Project Area.

County	Land in Farms, acres	Average Farm Size, acres	Land in Crops, acres	Irrigated Farm Land, acres
Grant	1,080,756	2,655	86,585	47,939
Morrow	1,118,226	2,662	485,883	95,143
Umatilla	1,345,097	904	706,872	128,658
Wheeler	679,912	4,331	34,728	8,538

Source: USDA National Agricultural Statistics Service. 1997. *Census of Agriculture, 1997*. Accessed online at www.oda.state.or.us/oass/.

The BLM has a cottonwood stock nursery near Clarno where seed from throughout the John Day River Basin is cataloged and planted. Cuttings from this stock are available to plant in suitable areas.

3.9.2 Environmental Consequences

3.9.2.1 *No Action*
No new effects will occur because the level of Reclamation habitat improvement activity from the recent past is expected to decline.

3.9.2.2 *Proposed Action*
The rural character of the study area is not expected to change. Federal and/or state conservation funding programs are available to help pay for new or replacement construction included in the proposed action. Landowners may be required to cost-share in the proposed action activities, but the percentage is unknown at this time. Nonetheless, the direct financial effect to participating farmers is expected to be minor. It is assumed that farmers unwilling to utilize government financial assistance will not participate in activities of the proposed action. Legal protections given to federal Wild and Scenic Rivers and to State Scenic Waterways will remain unchanged.

3.9.3 Mitigation

No mitigation measures are necessary beyond those incorporated into the project design.

3.10 Socioeconomics

3.10.1 Existing Conditions

The vast majority of the project area is economically distressed according to the Oregon Economic & Community Development Department (OECDD 2002). A designation of "distressed" is based on eight measures of economic health, including unemployment rate and per capita personal income, among others. All of Baker, Crook, Grant, Harney, Morrow, and Wheeler counties are designated as distressed. Ninety percent of the project area lies in these counties. The city of Ukiah, the only city in the project area not in a designated distressed county, is identified as a distressed city.

It is useful to compare the economic data from Oregon with that of Grant County. We use Grant County for a comparison, as 75 percent of the project area lies in Grant County. In addition, all of the municipalities within the project area, with the exception of the city of Ukiah, are in Grant County. Following is a table displaying data obtained from the U.S. Census Bureau comparing state of Oregon statistics to those of Grant County:

Table 19. U.S. Census Bureau Data for Grant County and the State of Oregon.

Category	State of Oregon	Grant County
Unemployment Rate, June 2002	7.1%	8.3%
Population, 2000 Census	3,421,399	7,935
Population change, 1990 to 2000	+20.4%	+1.0%
Population change, 4/1/00 - 7/1/01	+1.5%	-4.7%
Population density per square mile	35.6	1.8
Median household income	$37,284	$32,939
Percent persons below poverty	11.6%	14.5%

Source: U.S. Census Bureau, 2002

Additional information from the Oregon Economic & Community Development Department indicates the average annual pay per worker in Grant County is $24,000. Of the total payroll in Grant County, local government makes up 22 percent, the federal government makes up 20 percent and state government makes up six percent, for a total of 47 percent. The federal government average pay per worker is $38,786 while the local government average pay per worker is $23,080.

The private sector payroll is led by lumber and wood products manufacturing with an average pay of $30,890 per worker. These activities are concentrated in the cities of John Day and Prairie City, both being located in the Upper John Day Subbasin. Lumber and wood products manufacturing accounts for 15 percent of the payroll in Grant County. Other key private sector employment is retail trade at nine percent, the services sector at eight percent and the agriculture / forestry / fishing industries at 3.7 percent of the payroll in Grant County. The remaining payroll is distributed among a wide variety of classifications.

There are nine small cities/towns in the project area. The four largest cities are located in the Upper John Day Subbasin: John Day (population 1,821), Prairie City (population 1,080), Canyon City (population 669), and Mount Vernon (population 595). The town of Dayville (population 138) is also located in the Upper John Day Subbasin. The city of Long Creek (population 228) is the only city in the Middle Fork John Day Subbasin. The remaining cities in the project area are in the North Fork John Day Subbasin: Ukiah (population 255), Monument (population 151) and Granite (population 24). These populations are based on the 2000 U.S. census.

3.10.2 Environmental Consequences

3.10.2.1 No Action

Under the no action alternative, Reclamation's involvement with improving fish screens, removing passage barriers, and augmenting streamflows would be limited to providing technical assistance. Various organizations have previously undertaken similar projects in the project area. It is anticipated these activities will continue, but at a smaller scale than would occur under the proposed action. The no action alternative would result in no effect to the socioeconomics of the project area.

3.10.2.2 Proposed Action

The proposed action will have a benefit to the socioeconomics of the entire project area. Jobs required to implement the proposed action are greatly needed due to the economic distress of the area. It is anticipated a majority of the work will be done with local labor. Although the number of jobs created will not be great, the additional jobs will be helpful in this economically depressed area with a low population base. Also, as the project objectives of greater fish populations and improved streamflows are reached, fishing and boating opportunities will increase, thereby expanding the contribution of recreation and tourism to the economy of the project area.

One of the key components of the proposed action is the voluntary nature of the plan. Landowner involvement is totally voluntary. This component will help assure negative impacts to individuals are avoided. In many cases there may be up-front costs to willing participants. However, there will often be an offsetting benefit of reduced operations, maintenance and repair costs in the future.

The habitat improvements will assist in bringing private landowners into compliance with the ESA as well as NMFS and USFWS guidelines. This will allow landowners to continue their operations with less risk of imposed regulations that could have adverse effects on them.

Water acquisitions, via any of the streamflow augmentation actions identified in Section 2.2.3.1, could result in agricultural land being taken out of production. Any loss to the agricultural land base could result in a negative impact to the local economy. These negative impacts could include a lower gross product value and higher unemployment rates from an economy that is already at a distressed level. Another negative impact is land taken out of agricultural production would lower property values for these lands, resulting in lower property tax income to support county government. Other actions not directly linked to streamflow augmentation could indirectly result in water being put into in-stream use. These actions, such as the replacement of inefficient headgates, would have no effect on the local economy.

3.10.3 Mitigation

No mitigation measures are necessary beyond those incorporated into the project design.

3.11 Indian Trust Assets

3.11.1 Affected Environment

Reclamation has an established policy to protect Indian Trust Assets (ITAs) from adverse impacts of its programs and activities and to enable the Secretary of the Interior to fulfill responsibilities to Indian tribes. ITAs are legal interests in assets held in trust by the United States for federally-recognized Indian tribes. Some private lands (fee lands) can be trust lands with Indian legal rights to fish or harvest shellfish. Examples of ITAs

include lands, minerals, hunting and fishing rights, and water rights. ITAs can be found both on-reservation and off-reservation. The United States has an Indian trust responsibility to protect and maintain rights reserved by or granted to Indian tribes or individuals by treaties, statutes, and executive orders.

The CTWSRO include the Wasco, Warm Springs, and Northern Paiute Tribes. The Warm Springs Reservation was created by the Treaty with the Tribes of Middle Oregon on June 25, 1855 and covers an area of 640,000 acres in the Deschutes River Basin within central Oregon. The Warm Springs Tribal territory originally comprised more than 10 million acres. Indians ceded this territory to the United States in return for retaining and preserving the Warm Springs Tribes rights to self-govern, fish, hunt and gather food in usual and accustomed places.

The CTUIR include the Cayuse, Umatilla, and Walla Walla Tribes. In the Treaty of June 9, 1855, the Umatilla Tribes ceded to the United States more than 6.4 million acres in what is now northeastern Oregon and southeastern Washington. In exchange, a parcel of land was designated as the Umatilla Indian Reservation so that the Umatilla Tribes would retain a permanent homeland. As a result of legislation in the late 1800s that diminished its size and allowed purchase and ownership by non-Indians, the Umatilla Indian Reservation now consists of 172,000 acres. Nearly half are owned by non-Indians. In the treaty, the Umatilla Tribes reserved rights to fish, hunt, and gather traditional foods and medicines throughout the ceded lands.

It is important to note that the treaties did not give the Warm Springs and Umatilla Tribes rights to fish, hunt, and gather foods and medicines. These are rights that have always been exercised by the Tribes since time immemorial and were reserved by the Tribes in the treaties. The treaties ensure that future generations will be able to maintain and exercise tribal traditions and customs. The Warm Springs and Umatilla Tribes reserved ITAs are hunting, fishing, and gathering rights on ceded lands. Ceded lands of the Warm Springs Tribes include the John Day River Basin. Ceded lands of the Umatilla Tribes include the North Fork of the John Day River. Other portions of the John Day Basin are joint-use areas. Since the mid-1990s, the Warm Springs Tribes have maintained a Habitat Restoration Office in the John Day Basin. More recently, the Umatilla Tribes established a similar office in the North Fork John Day. Through these programs, the Tribes work with willing landowners to plan, design and implement habitat restoration projects and to acquire lands where critical habitat can be protected. Reclamation has supported the Warm Springs habitat restoration efforts since the office was created and has initiated discussions with the Umatilla Tribal staff to determine how best to coordinate program activities. Reclamation plans to continue to work with the tribes to collaborate on habitat restoration projects.

3.11.2 Environmental Consequences

3.11.2.1 No Action

While ITAs have not been specifically identified, potentially they may be associated with anadromous fish. The operation of inefficient fish passage facilities will continue to

cause indirect loss to anadromous fish as those facilities deteriorate with age. Some improvement is likely due to other programs, including Reclamation's minor presence in the subbasins, but it will not occur as rapidly as if this project proceeds.

3.11.2.2 Proposed Action

Activities identified in this PEA are intended to improve in-stream habitat for anadromous fish species. This objective indirectly benefits treaty rights by increasing fish survival for tribal members and others in American society. Coordination of activities with tribal restoration efforts would ensure that ITAs are protected, maintained, and restored.

3.11.3 Mitigation

No mitigation measures are necessary beyond those incorporated into the project design.

3.12 Historic Properties

3.12.1 Affected Environment

Introduction: Section 106 of the National Historic Preservation Act (NHPA) requires that agencies identify historic properties that will be impacted by a federal undertaking, and seek to protect those properties that are eligible to the National Register of Historic Places (Register). Where Register-eligible properties cannot be protected from damaging impacts, then mitigation actions must occur. These requirements apply even when working on non-federal lands or when the work will be implemented by a non-federal partner. Regulations implementing Section 106, 36 CFR 800 define a consultative process to determine site eligibility, assess impacts, and identify impact avoidance or mitigation actions. Consultation parties are typically the State Historic Preservation Officer (SHPO) and interested Indian tribes, and may also include the Advisory Council on Historic Preservation. When working on privately owned lands, the land owner is also a consulting party. Commitments identified during consultation are documented in a memorandum of agreement or programmatic agreement signed by the consulting parties.

NHPA defines historic properties to include prehistoric and historic period archeological sites, buildings, or places that are of historic significance. Traditional cultural properties (TCPs) are another category of historic properties. TCPs are places of special heritage value to contemporary communities (often, but not necessarily, Indian communities). They are of value because of their association with the cultural practices or beliefs that are important in maintaining the cultural identity of that community. To warrant protection, TCPs must meet the criteria for eligibility to the Register. Historic properties are also frequently referred to as "cultural resources," although the latter term is inclusive of properties outside of the federal mandated responsibilities.

Cultural Overview: Archeological evidence documents human occupation of North America for at least the last 12,000 years. Occupation of the John Day Basin is as yet poorly understood, since much of the area has not been the subject of systematic archeological investigation. Few sites have been found in the basin that predate 7,000 years before present (BP). There is evidence of increasingly intense occupation after about 4,500 BP; by circa 2,000 BP the area appears to have been intensively occupied. Euroamericans entered the area by mid 19th century. Recorded sites include lithic scatters that likely represent short term camps, seasonal base camps, pithouse villages, lithic quarries, cache sites, 19th and early 20th century farmsteads, and early irrigation ditches. Sites are found throughout the landscape, from primary terraces along streams, to ridges overlooking valleys, and on up into the mountains (Aikens 1993; Fagan et al., 1996).

Ethnographic and archeological information indicates that a number of tribes occupied or seasonally used the John Day country at the time of Euroamerican entry into the area, and that tribal distribution had been in flux for at least a few decades. Fagan et al. (1996) hypothesizes that 19th century adjustment of tribal use and occupation areas likely occurred due to acquisition of horses and Euroamerican weapons by the Umatilla, Euroamerican encroachment on lands along the Columbia, depletion of game within the Umatilla homeland, and societal destabilization caused by population losses from epidemics. He further hypothesizes that the Blue Mountain province may have long been a border area used by people from both the Columbia Plateau and Great Basin regions.

Archeological evidence indicates that the Northern Paiute were the primary occupants of the John Day Basin from about 700 BP until about 1840 to 1850. However, by 1850, much of the northern portion of the basin was under the control of the Umatilla. Ethnographic evidence collected from Umatilla, Cayuse, and Walla Walla Indians indicates that important fishing, hunting, and gathering locations on the Middle Fork and North Fork were in joint use by these tribes and the Warm Springs peoples (Suphan, reported in Fagan et al. 1996). Ethnographic information documents the Northern Paiute occupying the Crooked River drainage and southern portions of the John Day Basin (Aikens 1993), and indicates Paiute (the Huni'bui Eaters) winter villages existed on the John Day Rivers in the vicinity of present-day Canyon City and John Day townsite (Ray, reported in Fagan et al. 1996). A map provided by the Warm Springs Tribes indicate that the entire PEA project area lies within the lands they ceded in their 1855 treaty (Warm Springs Tribes nd). A map provided by the CTUIR indicates that at least a portion of the North Fork was within their ceded lands (CTUIR nd), and that they and other tribes shared use of the remainder of the John Day Basin. An Indian Claims Commission map entitled "Indian Land Areas Judicially Established 1978" (1993) indicates the lands where the Commission determined "a tribe [had] proved its original tribal occupancy of a tract…." No such tracts lie within the project area, although tracts associated with the Umatilla and Cayuse lie to the north and a tract associated with the Warm Springs Tribes lies to the northwest. This means that either no tribe exerted a primary occupancy claim for the John Day Basin, or that the Commission determined

the area was within the usual and accustomed use area for multiple tribes, with no tribe clearly demonstrating exclusive use of the area. The latter is the likely case.

Both the Northern Paiute and the Umatilla practiced a lifeway designed to allow travel throughout a geographic area to extract seasonally available resources. For the Paiute, family and camp groups were the basic social, political, and economic unit. Camp groups were comprised of multiple families who occupied a home tract or district. These groups wintered together in sheltered areas, likely where smaller streams entered the main stem rivers. In the spring the camp groups separated into family-based sub-groups to forage throughout the home tract. In April, they moved to locations to harvest *Lomatium sp.* roots. By May, they returned to the rivers to harvest spring run salmon, but continued hunting and gathering activities nearby. After the fish run ended, they resumed travel to locations where game and seed crops were available, then to winter village locations in the late fall. The Umatilla had a village-based social and political system; villages might contain upwards of 700 people. Each village was politically autonomous, and held recognized settlement sites and resource areas. Most villages were centered along the Columbia and lower reaches of the Umatilla River. However, residents hunted, fished, and gathered over a much larger area that was shared with others. Once horses were available, they traveled over an even wider area, including lengthy trips to the Plains to hunt bison or trade horses for hides or other goods. Typically the Umatilla wintered in the villages, and in the spring fished and dug roots within the village resource area. In the late spring and summer families sub-groups moved up the tributaries with the fish runs, to fish and to hunt game and gather roots and berries in upland areas (Fagan et al. 1996).

Regular movement of non-Indians in the mid-Columbia area began by 1811. In 1818, a fur post was established at the mouth of the Walla Walla River, and missions were established at Walla Walla in 1837 and The Dalles in 1838. By the 1840s, emigrants in small numbers began to travel the Oregon Trail, but essentially all continued on to the Willamette Valley. By the late 1840s, some alternative trail routes were explored and used through the John Day and Crooked River drainages. In the 1860s many overland emigrants used a trail route that went from Boise through Canyon City to The Dalles. In 1867, gold discoveries brought prospectors flocking to the John Day country. Displacement and disease caused tension between resident Indians and emigrants/settlers. It first erupted into warfare in 1848, and intermittent fighting occurred in Oregon Territory east of the Cascades through 1868. This caused white settlements to be largely confined to population centers or near forts. After the Northern Paiute surrendered in 1868, American settlement spread rapidly throughout all central Oregon areas that appeared to have the rainfall to support farming or grazing (Lebow, et al. 1990).

3.12.2 Environmental Consequences

3.12.2.1 No Action

As no action would occur under this PEA, there would be no associated impact to historic properties. If existing actions (non-federal construction of pushup dams and

other actions) are already impacting these resources, those damages would continue, but would not be a Reclamation undertaking as defined in NHPA. If Reclamation were, in the future, to participate in or assist other entities with habitat improvement projects in the John Day Basin, then Reclamation would make a case-by-case assessment of whether that action constituted an undertaking under NHPA on Reclamation's part. For those considered undertakings, either Reclamation or another federal partner would complete all actions required to comply with NHPA.

3.12.2.2 Proposed Action

No specific analysis can occur until implementation locations are identified. However, it is possible to identify the kind of impacts that would occur if historic properties were present within a proposed implementation location. Impact analysis is presented below by categories of actions presented in Section 2.2.

Removal of passage barriers: Section 2.2 describes four alternative water diversion strategies, and indicates there would be ground disturbing actions within the stream channel and/or adjacent bank areas to remove existing barriers and build the new structures. Section 2.2 also indicates it may be necessary to provide electrical services to some facilities or to construct ditches to connect new diversion points to existing irrigation. Some additional ground disturbing actions might also occur, including: construction of new access roads or improvement to existing roads; preparation of construction staging areas; disposal of debris or excess material; excavation for construction material. It is also possible that, in some instances, there might be a short-term localized increase in bank erosion while the channel adjusts to changed flow characteristics caused by a new kind of structure or new placement.

Any construction activity that will remove or disturb the soil has the potential to damage or entirely destroy historic properties within the disturbance area. If archeological sites were present, the soil disturbance or removal would destroy evidence of occupation features (house remnants, hearths, refuse piles, etc.); break artifacts; churn the soils so that the original spatial relationships of artifacts and features could no longer be discerned; and contaminate or destroy soil and botanical samples that might be used to date the site or determine its function or season of use. Remnants of historic irrigation ditches or diversion works could be eradicated. Traditionally-important plants would be uprooted, and evidence of past harvesting and processing activities eradicated. If archeological or TCP sites come up to the river bank and new erosion events are triggered, then the soils would be washed away, with much the same impact to the cultural resources as would occur from construction disturbance.

Acquisition of water: Acquisition of water for streamflow is unlikely to trigger impacts to historic properties, since the action simply allows water to remain in the stream rather than be diverted. It would be unlikely to require any construction. The project-related flow is highly unlikely to induce erosion of intact bank sediments, since the purpose of the flow supplement is to increase flows during diversion seasons so that they approach the natural flow levels that the stream channels used to carry.

Replacement of headgates and installation of measuring devices: If the headgates are associated with an historic irrigation system and the headgates themselves are original, then their replacement would damage the historic integrity of the irrigation facility. If excavation around the headgate were necessary to remove the old and install a new gate, then it might damage archeological materials if the excavation extended into sediments that had not been disturbed during original construction. If construction efforts were sufficiently extensive, then the associated access, staging, and debris disposal impacts discussed above might occur. Installation of a measuring device has the potential for the same impacts to archeological sites if it requires excavation to install the device and that excavation extends beyond sediments cut or filled during original construction or subsequent maintenance. Installation of a measuring device, in and of itself, would be unlikely to impact historic integrity of the canal.

Installation/replacement of fish screens: Most screen installation actions occur within the canal cut. But where they extend into sediments that were not previously cut or filled during construction or maintenance, they would have the potential to impact archeological or TCP sites. There might be associated impacts (staging areas, access, electrical service installation) as discussed above. Typically, existing screens on irrigation works date from the 1960s or later, but occasionally a screen that is more than 50 years in age is present. If the screen is more than 50 years in age, then the screen might be considered an historic property and if so, its removal would be an adverse effect. Typically, installation of a new screen is not considered to diminish the historic integrity of the irrigation canal.

Screening of pump intakes: The potential impacts would be as described above for other construction actions. However, it is unlikely that the impacts would extend beyond a very localized area or have the potential to trigger temporary erosional episodes.

3.12.3 Mitigation

Anticipated Section 106 Compliance Processes: As indicated at the opening of this section, Section 106 of NHPA requires that Reclamation determine if an implementation action has the potential to impact historic properties, and then address any identified adverse impacts. It is Reclamation's policy to seek to avoid adverse impacts to historic properties that are eligible to the Register. Therefore, when such properties are identified within the potential impact area of an implementation action, Reclamation will seek to either relocate the action to avoid the historic property, or work around the property so that it is protected from damage.

Archeological surveys and tribal consultations to determine if TCPs are present will likely be necessary for many implementation actions. Reclamation anticipates utilizing a phased strategy to address Section 106 requirements. The historic property investigation phases will be refined to mesh with implementation action planning and design phases, as the latter processes become better understood. However, Reclamation anticipates that the typical strategy would be as follows:

1. When a site location has been determined, a Reclamation cultural resources staff person will examine preliminary information to assess if there is the potential for historic properties at the location. This will likely focus on examining photographs and other materials collected by the study team. The assessment will be provided to the Subbasin Liaison to take into consideration when finalizing project locations.

2. If Reclamation's cultural resources staff person has determined there is the potential for historic properties in the area, then historic property data collection could commence. This data collection would typically include an archeological survey of the location and adjacent areas that might be used for staging or other purposes; historic research to determine the age and historic significance of any existing irrigation works that might be altered; and notification to the appropriate tribes and a request that they inform Reclamation of any known archeological sites, TCPs, or Indian sacred sites in the area.

3. If any historic properties were found within the potential impact area, and if it appeared unlikely that the resource site could be protected from damage, then test excavations would be completed to determine eligibility to the Register. Consultations to determine eligibility would occur using processes defined in 36 CFR 800.

4. If a property were eligible to the Register and adverse effects could not be avoided, then mitigation actions would occur consistent with strategies determined during Section 106 consultation. Again, consultation would use processes as defined in 36 CFR 800. These actions would occur only if an action is selected for implementation. Potential mitigation actions are described below.

Mitigation Actions: Where adverse impacts cannot be avoided, the following mitigation actions will be completed:

1. For archeological sites, mitigation typically would consist of archeological excavation. Any recovered artifacts would remain the property of that landowner, to dispose of as they choose. Mitigation actions for TCPs must be tailored to the nature of the resource and the value it represents for the community that identified the TCP. These will be identified in consultation for specific implementation actions. Again, if mitigation actions involved recovery of any materials, they would belong to the landowner.

2. Mitigation for impacts to historic structures or buildings, such as irrigation works, typically involves historic documentation using Historic American Engineering Record or Historic American Buildings Survey standards. Since Reclamation will be implementing actions under this PEA for a 10-year period, and since it is likely that many of the impacted irrigation works would represent similar kinds of historic events, Reclamation would likely seek to programmatically mitigate the impacts. This might consist of basin or region-wide research addressing a larger theme of small, private irrigation systems of the area and how they contributed to area development.

When warranted, mitigation may also include completing interpretive materials for public enjoyment. Since Reclamation's implementation actions would occur on private land, it is likely that any interpretive actions would occur off-site. They would likely consist of educational displays at existing public destination sites, such as local historical societies or BLM or USFS interpretive sites.

3.13 Paleontological Resources

3.13.1 Affected Environment

The sedimentary deposits of the John Day River valley are internationally recognized as containing some of the richest Tertiary Age fossil deposits in the world. The Tertiary fossil record in the valley spans more than 40 million years, from the late Eocene (circa 50 millions years ago) through the Pliocene (ending about 3 million years ago). These deposits document the evolution of the valley environment from a subtropical forest (found in the Clarno Formation), to deciduous forest (John Day Formation), to mixed grassland/hardwood savanna (Mascall Formation), and finally to grasslands (Rattlesnake Formation). Clarno deposits can contain a wealth of both plant and animal fossils. The Clarno nutbeds preserve hundreds of plant species, many new to science, and the animal fossils document the presence of large mammals. The John Day Formation contains fossil plant localities that indicate vast biological diversity, as well as more than 100 groups of mammals. Multiple volcanic events occurred during deposition of John Day Formation materials. The resulting volcanic tuff is interspersed throughout the fossil-bearing beds, allowing accurate dating. This has aided development of a chronology that is used by scientists to determine the rate at which plants and animals changed as they evolved during the Miocene period. Mascall and Rattlesnake Formations contain animal fossils, including many recognizably ancestral to modern fauna. Quaternary Age glacial and alluvial deposits are present on the valley floor. Mammoth remains have been recovered from Holocene period alluvium (NPS nd; USGS 1970).

Detailed mapping of John Day Basin geological formations was available for the John Day River from Prairie City downstream to Kimberly, and for the North Fork area from the headwaters of Cottonwood Creek to Monument (USGS 1970). This map shows that the John Day River above Picture Gorge cuts through Holocene alluvium, with short, isolated sections cutting into Mascall or Rattlesnake Formation materials. Below Picture Gorge, the river flows through John Day Formation and Holocene soils. The Sheep Rock Unit of the John Day Fossil Beds National Monument is located downstream of Picture Gorge. To the extent shown on the map, it appears that the South Fork flows through Picture Gorge basalt, which is unlikely to contain paleontological materials. Tributaries entering the John Day upstream of the South Fork cut through Clarno or Rattlesnake Formation soils for at least a portion of their lower reaches before entering Holocene alluviums. For the illustrated portion of the North Fork drainage, the river segment below Monument primarily passes through John Day Formation deposits. For much of its course, Cottonwood Creek cuts through Clarno, John Day, or Mascall

Formation deposits. It appears that much of the lower reaches of the Middle Fork, at least to the headwaters of Long Creek, passes primarily through Picture Rock basalt. However, it appears that the upper end of the Middle Fork drainage may pass through areas with Clarno Formation deposits.

3.13.2 Environmental Consequences

3.13.2.1 No Action

As no action would occur, there would be no impact to paleontological resources from a federal undertaking implemented under this PEA. If existing actions (non-federal construction of pushup dams and other actions) are damaging fossil deposits, those damages would continue, but would not be Reclamation undertakings. If Reclamation were, in the future, to participate in or assist other entities with habitat improvement projects in the John Day Basin, then Reclamation would make a case-by-case assessment of whether impacts to significant paleontological resources might occur and if protective actions were warranted.

3.13.2.2 Proposed Action

No specific analysis can occur until implementation locations are identified. Any impacts would typically result from construction actions that involved excavation or disturbance of soils that contain fossil materials. Please refer to Section 3.12 (Historic Properties) for an assessment of the kinds of construction-related soil disturbances that might be anticipated under the PEA.

3.13.3 Mitigation

Anticipated Project-Specific Impact Assessment Processes: It is Reclamation's policy to seek to avoid adverse impacts to scientifically-valuable fossil deposits. Therefore, when such deposits are identified within the potential impact area of an implementation action, Reclamation will seek to either relocate the action to avoid the resource, or to work around the resource location so that it is protected from damage.

Reclamation anticipates utilizing a phased strategy to determine if paleontological deposits are present and will be unacceptably impacted by implementation action. The assessment will occur in conjunction with Section 106 processes defined in Section 3.12.3. Reclamation anticipates that the typical strategy would be as follows:

1. When a site location has been determined, a Reclamation cultural resources staff person will examine preliminary information to assess if there is the potential for paleontological resources at the location. This examination will likely focus on determining if fossiliferous soil formations outcrop in or near the area. Where they outcrop, the John Day Fossil Beds National Monument will be contacted to determine if they are aware of fossil materials in soils in the potential implementation area. If there are a number of possible project locations in specific reaches of watershed streams, then Reclamation would contract for records research to identify known fossil sites in those reaches.

2. When fossiliferous soils are present, an archeological survey crew would conduct investigations to determine if fossils are present at that location. This crew would be directed to watch for fossil materials while completing the archeological survey. If fossils were noted, they would collect a sample and record the location. The samples would then be provided to a professional paleontologist to assess if they might be scientifically important.

3. If it appears the fossils may be scientifically important and it is unlikely that the resource locality could be protected from damage, then a professional paleontologist would visit the site and conduct necessary actions to clearly assess the value of the fossil resource.

4. If a fossil locality were scientifically important and adverse effects could not be avoided, then mitigation actions would be considered. These actions would occur only if an action has been selected for implementation, consistent with conditions discussed below.

Mitigation Actions: Where adverse impacts cannot be avoided, the following mitigation actions will be completed:

1. Mitigation actions will consist, at a minimum, of detailed recordation of the deposit by a professional paleontologist.

2. Actual excavation of fossil deposits would likely occur only where the landowner has agreed to donate the recovered materials to the John Day Fossil Beds National Monument or other appropriate public institution. In most of those cases, fossil collection would likely be limited to a small representative sample. More extensive, systematic scientific excavation of fossil materials and, when warranted, associated environmental samples, would likely be limited to locations of outstanding scientific value. Mitigation would include analysis of collected samples, cataloging, and minimum preparation for curation.

3. Mitigation might also consist of completing or contributing toward preparation of interpretive materials for public enjoyment. This might particularly be used when landowners will not agree to donate fossil materials to an appropriate institution. Reclamation anticipates that interpretive efforts would contribute to existing efforts at the John Day Fossil Beds National Monument or other existing public interpretive program.

3.14 Indian Sacred Sites

3.14.1 Existing Environment

Indian sacred sites are defined in Executive Order (EO) 13007 as “any specific, discrete, narrowly delineated location on federal land that is identified by an Indian tribe,

or Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion." The EO also states that federal responsibility is triggered "...provided that the tribe or appropriately authoritative representative of an Indian religion has informed the agency of the existence of such a site." An agency's responsibility is, to the extent practicable, to accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners and to avoid unnecessarily adversely affecting the physical integrity of such sites.

3.14.2 Environmental Consequences

As indicated above, EO 13007 requirements are limited to federal lands. It is anticipated that actions implemented under the PEA will occur only on private lands. Therefore, the requirements of the EO do not apply. However, Indian sacred sites may still be present in or near locations where implementation actions would occur. If construction activities occurred within the bounds of the sacred site, it might cause alterations that would either make the site no longer usable for its ceremonial function or damage features that characterize its religious significance.

3.14.3 Mitigation

Although EO 13007 requirements do not apply on non-federal lands, if, in the course of NHPA consultations with tribal staff, Reclamation is informed that an Indian sacred site is present, then Reclamation will consider if it is feasible to avoid or minimize damage to such sites. These protective actions would be implemented only when they would not compromise Reclamation's ability to meet responsibilities under the BiOp in an efficient and cost-effective manner.

3.15 Environmental Justice

3.15.1 Existing Conditions

Presidential EO 12898 requires federal agencies to identify and address, if appropriate, disproportionately high and adverse health or environmental impacts from a proposed action upon minority or low-income populations.

For this analysis, three factors were considered: (1) proportion of racial minorities within a community as compared to the statewide average; (2) poverty rate as compared to the statewide average; and (3) proportion of community located within the project area (Table 20). The latter factor is an indicator of the amount of influence the proposed action could have.

Table 20. Demographics of Communities Evaluated for Environmental Justice Effects within the Project Area.

Community [1]	Proportion of Community Located Within Study Area [2]	Minority Population 2000 (State Average = 13.4%) [3]	Poverty Rate 1997 (State Average = 11.6%) [4]	Median Household Income 1997 (State Average = $37,284) [4]
Potential Environmental Justice Community				
Grant County	25/17/37=79%	4.3%	14.5%	$32,939
Canyon City	0/0/100=100%	9.4%	N.A.	N.A.
Dayville	0/0/100=100%	3.6%	N.A.	N.A.
Granite	100/0/0=100%	0.0%	N.A.	N.A.
John Day	0/0/100=100%	3.1%	N.A.	N.A.
Long Creek	0/100/0=100%	3.9%	N.A.	N.A.
Monument	100/0/0=100%	4.6%	N.A.	N.A.
Mt. Vernon	0/0/100=100%	5.7%	N.A.	N.A.
Prairie City	0/0/100=100%	4.4%	N.A.	N.A.
Morrow County	11/0/0=11%	23.7%	7.0%	$33,181
Umatilla County	15/0/0=15%	18.0%	15.6%	$31,454
Ukiah	100/0/0=100%	4.7%	N.A.	N.A.
Wheeler County	<1/0/24=25%	6.7%	12.5%	$23,385
Not Potential Environmental Justice Community				
Baker County	<1/<1/<1=<1%	4.3%	16.8%	$29,203
Crook County	0/0/<1=<1%	7.0%	12.8%	$33,188
Harney County	0/0/<1=<1%	8.1%	14.8%	$29,809
Union County	<1/0/0=<1%	5.7%	13.9%	$32,912

[1] Community is defined as people tied to a particular place because of common interests, backgrounds, occupations, or legal treatment. *Source*: Getches & Pellow 2002.

[2] Percentages are shown individually for the North Fork Subbasin, Middle Fork Subbasin, and Upper John Day Subbasin, respectively, and summed for the entire study area (e.g. 26/5/0=31%).

[3] Minority races are Black or African-American, American Indian or Alaska Native, Asian, Native Hawaiian or other Pacific Islander, and others such as Hispanic/Latino. Data is for persons reporting only one race. Information for cities/towns that are located within the project area is not available (N.A.).
Source: .U.S. Census Bureau. 2001. *People MapStats*. Accessed April 9, 2002 online at www.fedstats.gov/qf/states/41/.

[4] *Source*: U.S. Bureau of Economic Analysis. 2001. *People MapStats*. Accessed April 9, 2002 online at www.fedstats.gov/qf/states/41/.

Grant, Morrow, Umatilla, and Wheeler counties could be susceptible to environmental justice effects. Grant County has a minority population (primarily American Indian) much lower than the state average, but its poverty rate is above the state average and its proportion within the study area is high enough for the proposed action to be influential. Morrow County has a higher proportion of racial minorities (primarily Hispanic/Latino), although its poverty rate is half of the state average and its portion in

the study area is relatively small. Umatilla County also has a higher proportion of minorities (primarily Hispanic/Latino and American Indian) and poverty, but the area for project influence is relatively small. Wheeler County has enough land area for project influence and its poverty rate is slightly above the state average. However, its minority population is half of the state average.

Four other counties are not susceptible to environmental justice effects. Baker, Crook, Harney, and Union counties each have an insignificant proportion of area for influence from the proposed action.

3.15.2 Environmental Consequences

3.15.2.1 No Action
There are no impacts since no new action would occur.

3.15.2.2 Proposed Action
Public scoping meetings - with tribal representatives attending - and comment letters produced no concern that the proposed action might cause disproportionate effects to minority races or low-income persons. An expected increase in anadromous fish survival will benefit all citizens, including Indian Tribes whose culture is historically tied to fish for subsistence. No communities are expected to be affected in any disproportionate way toward minority or low-income populations.

3.15.3 Mitigation

No mitigation measures are necessary beyond those incorporated into the project design.

Chapter 4
Consultation and Coordination

4.1 Agencies and Individuals Contacted

Arrowhead River Adventures, Eagle Point, Oregon – Don Kirkendall, Owner
Bureau of Land Management, John Day, Oregon – John Morris, Fish Biologist
Bureau of Land Management, Prineville, Oregon – Jan Hanf, District Wildlife Biologist
Bureau of Land Management, Prineville, Oregon – Heidi Mottl, Recreation Planner
Bureau of Reclamation, Boise, Idaho – Lynne MacDonald, Regional Archeologist
Bureau of Reclamation, Portland, Oregon – David Nelson, Native American Affairs
Confederated Tribes of the Umatilla Indian Reservation, Pendleton, Oregon – Carl Sheeler, Wildlife Habitat Program
Confederated Tribes of the Umatilla Indian Reservation, Ukiah, Oregon – Tom Macy
Confederated Tribes of the Warm Springs Reservation of Oregon, Canyon City, Oregon – Shaun Robertson, 2001 Subbasin Liaison
Confederated Tribes of the Warm Springs Reservation of Oregon, Canyon City, Oregon – Brent Smith, Habitat Manager
Grant Soil and Water Conservation District, John Day, Oregon – Ken Delano, District Manager
Little Creek Outfitters, LaGrande, Oregon – John Ecklund, Owner
National Marine Fisheries Service, LaGrande, Oregon – Brett Farman, Habitat Biologist
National Marine Fisheries Service, Portland, Oregon – Larry Swenson, Fish Screen Engineer
Oregon Department of Fish & Wildlife, Canyon City, Oregon – Jeff Neal, Assistant District Fish Biologist
Oregon Department of Fish & Wildlife, Canyon City, Oregon – Tim Unterwegner, District Fish Biologist
Oregon Department of Fish & Wildlife, Corvallis, Oregon – Bernie Kepshire, Statewide Fish Screen Coordinator
Oregon Department of Fish & Wildlife, John Day, Oregon – Steve Allen, John Day Screen Shop Manager
Oregon Department of Fish & Wildlife, John Day, Oregon – Joe Vawter, OWEB Project Coordinator
Oregon Department of Fish & Wildlife, John Day, Oregon – Steve Corwin, John Day Screen Shop Engineering Technician
Oregon Natural Heritage Program, Portland, Oregon – Cliff Alton, Conservation Information Assistant
Oregon Water Resources Department, Canyon City, Oregon – Eric Julsrud
Oregon Water Resources Department, Canyon City, Oregon – Kelly Rise, Watermaster
Oregon Water Resources Department, Salem, Oregon – Bob Devyldere, Information Systems Manager
Oregon Water Resources Department, Salem, Oregon – Bob Rice, Coordinator
U.S. Fish and Wildlife Service, Portland, Oregon – Chris Allen, Fish and Wildlife Biologist

U.S. Fish and Wildlife Service, Portland, Oregon – Stacy Stroufe
U.S. Forest Service, John Day, Oregon – Jerry Hensley, Malheur Forest Planner

4.2 Tribal Consultation and Coordination

On a programmatic level, Reclamation meets regularly with various interested parties to provide updates on implementation of its responsibilities under the FCRPS BiOp. Among these parties is the Columbia River Inter-Tribal Fish Commission, which represents the four lower Columbia River tribes – Nez Perce, Umatilla, Warm Springs, and Yakama – that signed treaties with the United States in 1855. These programmatic meetings will continue to be held throughout the duration of the habitat improvement program.

Specific to the John Day Basin, cooperation and collaboration with the on-going habitat restoration programs of the Warm Springs and Umatilla Tribes will be critical to program accomplishment. Reclamation has supported the Warm Springs' habitat restoration office since it was established in the John Day Basin in the mid-1990's and has initiated discussions with the Umatilla tribal staff to determine how best to coordinate program activities. Reclamation will continue to work with these tribes to collaborate on habitat restoration projects.

As specific projects are identified, Reclamation will consult as necessary with tribes to determine whether TCPs or sacred sites may be impacted. If National Register-eligible TCPs are present, appropriate mitigation measures would be determined through these consultations. Reclamation will seek to avoid sacred sites. If human remains are inadvertently discovered during construction, work in the immediate vicinity of the discovery will cease except to secure and protect the remains. Reclamation will contact tribes as required to determine appropriate procedures for consultation and treatment of the human remains. Reclamation will also carry out any other applicable measures of the state of Oregon burial laws.

4.3 National Historic Preservation Act Consultation

As specific projects are identified, Reclamation will determine if a project has the potential to impact historic properties. If that potential is determined to exist (i.e., if the project is an undertaking under NHPA), then all consultation and coordination activities required by Section 106, 36 CFR 800 will be implemented. This might include consultation with SHPO and interested Indian tribes on resource significance, and treatment of adverse impacts. Consultations and impacts mitigation actions will be documented in a memorandum of agreement signed by consulting parties.

4.4 Environmental Consultation and Permit Requirements

4.4.1 Environmental Consultation

Section 7 of the ESA requires federal agencies that propose an action, which could affect an ESA-listed species, to consult with the appropriate federal regulatory agency. NMFS is the federal regulatory agency responsible for anadromous fish. USFWS is the federal regulatory agency responsible for plants and terrestrial, avian, and resident aquatic animals. ESA-listed species are present in all three of the John Day subbasins. The analysis in this PEA serves as Reclamation's BE for Section 7 consultation requirements with USFWS and NMFS under the ESA for the overall program of habitat improvements under Action 149 of the 2000 NMFS BiOp.

For fish, Reclamation has determined that implementation of the proposed action will have "No Effect" to listed fish in the project area except for Mid-Columbia River steelhead and Columbia River bull trout, for which the conclusion is "May Affect, Not Likely to Adversely Affect" (Table 21). The proposed action will occur in the upper subbasins and their effects are largely local, such that most effects will not be measurable in the lower John Day River or the Columbia River. In the project area, however, improved fish passage at barriers, protection from direct loss in irrigation systems, and improved flow and habitat conditions will directly and indirectly improve the survival of steelhead and bull trout. The potential for any short-term negative effects from construction will be minimized via the applicable restrictions.

For wildlife, Reclamation has determined that implementation of the proposed action will have "No Effect" to listed species except the bald eagle. For bald eagle, the "May Affect, Not Likely To Adversely Affect" (Table 21) determination considers that many actions will occur distant from nesting or winter-roosting sites. In addition, a January 1st through August 31st restriction on construction disturbance within ¼-mile of an active nest site will protect a site. See section 3.6.3 for full details on mitigation around bald eagle active nests and active winter roosts.

Table 21. Summary of Effects of Proposed Action on Species Protected under the ESA.

Protected ESU	Biological Evaluation Conclusion	Primary Reasons
Mid-Columbia River steelhead	Not Likely to Adversely Affect	Improved passage, screening, and flow will facilitate fish movement, reduce direct and indirect fish mortality, and increase habitat quality. Construction restrictions will minimize potential for temporary adverse affects.
Columbia River bull trout	Not Likely to Adversely Affect	Improved passage, screening, and flow will facilitate fish movement, reduce direct and indirect fish mortality, and increase habitat quality. Construction restrictions will minimize potential for temporary adverse affects.
bald eagle	Not Likely to Adversely Affect	Construction restrictions will minimize potential for temporary adverse affects.

The analysis in this PEA serves as Reclamation's BE for the habitat improvement actions described in the document and will be used in programmatic consultation with NMFS and USFWS. The purpose of programmatic consultation is to obtain from NMFS and USFWS a programmatic BiOp to identify specific projects that would not require further Section 7 consultation.

Coordination on fish and wildlife issues to meet the requirements of the Fish and Wildlife Coordination Act (FWCA) and the ESA was accomplished by informal consultation with the USFWS and NMFS. Continued coordination with NMFS and USFWS will be needed to resolve ESA issues regarding listed salmon, steelhead, and bull trout. Based on discussions with NMFS and USFWS concerning the types of flow, screen, and barrier projects to be implemented, Reclamation concluded that a "may affect, but unlikely to adversely affect" determination is anticipated for most projects. Consequently, Reclamation will develop a programmatic BA for implementation of Action 149 in Oregon and will continue to consult with NMFS and USFWS. The programmatic BA is intended to provide a basis to obtain concurrence from NMFS and USFWS on the types of projects expected to be implemented that would not require additional consultation and identify the types that would. A mitigation strategy will be developed with NMFS and USFWS for each type of project. For some types of projects no additional consultation will be required beyond any terms and conditions specified in the BiOp developed in response to the programmatic BA; other types of projects will require individual consultation and could include preparation of a site-specific BA with an associated BiOp that could include site-specific terms and conditions.

As Reclamation, NMFS, and USFWS become more experienced with project-specific consultation, additional types of projects may be considered and identified for programmatic consultation. The programmatic consultation could be amended to include these additional types of projects and any new terms and conditions. Reclamation then would be able to implement these additional types of projects without further Section 7 consultation. Prior to implementation of specific projects, coordination will occur with NMFS and USFWS.

Reclamation will complete ESA consultation with NMFS and USFWS before initiating any action that would result in irretrievable and irreversible commitment of resources. This includes consultation at both a programmatic level and for site-specific projects.

4.4.2 Permit Requirements

In addition to the mitigation measures presented in Section 2.2.5 and throughout Chapter 3, there are permit requirements for certain activities proposed under this PEA. It should be noted that all in-stream work must adhere to ODFW's in-stream work period requirements. These work periods are detailed in Section 2.2.5 of this document.

Following are the permit requirements for each of the proposed actions:

Installation of LFSDs and infiltration galleries. A Section 404 (of the Clean Water Act) Removal/Fill Permit is required. This permit is applied for jointly with the DSL and the COE. In almost all cases, the response by the COE is "Discharges of dredged or fill material into waters of the United States associated with the construction or maintenance of irrigation ditches, including diversion structures that are appurtenant and functionally related to the irrigation ditch, are exempt from Corps (U.S. Army Corps of Engineers) regulations under Section 404 of the Clean Water Act." The DSL, however, does not exempt these projects (ORS 196.795-990). Requirements of DSL must still be met before obtaining a permit for installation of LFSDs and infiltration galleries.

In addition, the installation of LFSDs and infiltration galleries must adhere to NMFS guidelines for upstream salmonid passage at small diversion dams (see Table 4). Screens on infiltration galleries must comply with NMFS juvenile fish screen criteria (see Appendix D).

Installation of permanent pump stations. Section 404 Removal/Fill Permits are not required, unless the installation includes streambank disturbance. Either way, screens on pumps must comply with NMFS juvenile fish screen criteria for pump intakes (see Appendix C).

Consolidation of diversions. Section 404 Removal/Fill Permits are required if the consolidation involves removal and/or fill in the waters of the state. Consolidation of diversions would also require a Transfer Application for a Change in Point of Diversion to be filed with the OWRD for the downstream ditch diversions to be moved to the common diversion point. If the point of diversion moves more than ¼ mile or crosses another point of diversion, advertising the proposed change is required.

Acquisition of water for in-stream flow. An application and administrative process through Oregon Water Resources Department must be followed in order to split off seasonal use of, transfer, lease, or cancel a water right of record. However, no formal permits are required.

Replacement of headgates. Replacement of existing headgates is considered a repair, which does not require any permits.

Installation/Replacement of fish screens. Installation and replacement of fish screens does not require any permits. However, a Section 404 Removal/Fill Permit is required where a fish screen installation takes place in a jurisdictional wetland. Typically wetlands are avoided for fish screen installations.

Surface water fish screens (rotary and other designs) as well as screens on permanent pump stations require adherence to NMFS juvenile fish screen criteria (see Appendices D and C, respectively).

Other requirements. An in-water blasting permit would be required from ODFW if bedrock or a very large boulder were encountered and it needed to be broken to install any structures, such as a LFSD. Blasting of this nature is very rare. A new technology exists that accomplishes the same thing, and does not require blasting. This technology is called slow acting S-mite or "boulder blasters" that use a modified shotgun shell.

A cultural resources survey is required on all federally funded projects.

4.5 Public Involvement

Section 1.3 above describes the public scoping process used to develop this PEA. Scoping activities have been documented in the "Scoping Document for Programmatic Environmental Assessment for Implementation of Action 149 of the NMFS 2000 FCRPS BiOp in Three Subbasins of the Mid-Columbia Steelhead ESU in Eastern Oregon", dated June 2002, which is stored in the administrative file for this PEA, along with mailing lists used in the public involvement process.

The draft PEA was made available for public review and comment at the local John Day library. Hard copies were sent via conventional mail to the scoping meeting invitees (as invited by the Lower Columbia Area Office), scoping meeting attendees, individuals registering for draft PEA mailings, stakeholders as identified by the Subbasin Liaison, and other individuals requesting the draft PEA via the PEA contractor.

Four separate comments were received during the public comment period. Those comments and Reclamation's responses are included in Appendix X.

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APPENDICES

Appendix A
Fisheries Enhancement within the Project Area, Past, On-going & Future Projects

John Day Subbasins

Past/On-Going Projects
BPA-Funded Projects **(Source: NPPC 2001)**

Organization	Type of Project	Date	Location	Summary
Reclamation/Water Users/BPA/GSWCD/ NRCS/ODFW/OWRD/ ODA/CTWSRO	Water Conservation Demonstration Project	1991-2000	Upper and Middle Fork John Day subbasins	Reclamation took lead for projects including 3 diversions, 2 pipeline systems, 5 irrigation reorganizations, 4 infiltration galleries, 2 ditch conversions, 2 return flow cooling, 1 aeration and subsoiling
Reclamation/ CTWSRO/GSWCD	Water conservation/flow improvement Passage improvement	ongoing	Entire John Day Basin	Return flow cooling: reroute irrigation return flow to underground to reduce temps and nutrients Replace flood irrigation and open systems with sprinkler and closed systems Pushup dams replaced with pumping systems, infiltration galleries and permanent diversions
ODFW	Fish screens	1995+	Entire John Day Basin, mainly mainstem	86 screens, mostly in mainstem John Day River 3 additional screens funded by OWEB O&M on 314 screens in John Day Basin via NMFS funding 228 existing sreens not meeting NMFS criteria will be funded via BPA and/or OWEB
North Fork Watershed Council	Passage improvement		Lower North Fork John Day	Replace gravel pushup dams with permanent pumping stations at River Meadows and Schultz Ranch
Oregon Wildlife Coalition	Flow improvement	ongoing	John Day Basin	Objective: permanent protection of priority wildlife habitats, through acquisition of in-stream water rights and other methods

BPA	Bonneville Power Administration
CTUIR	Confederated Tribes of the Umatilla Reservation
CTWSRO	Confederated Tribes of the Warm Springs Reservation of Oregon
FSA	Farm Service Agency
GSWCD	Grant Soil and Water Conservation District
NRCS	Natural Resources Conservation Service
ODA	Oregon Department of Agriculture
ODFW	Oregon Department of Fish & Wildlife
OWEB	Oregon Water Enhancement Board
OWRD	Oregon Water Resources Department
Reclamation	U.S. Bureau of Reclamation

John Day Subbasins

Past/On-Going Projects
Non-BPA Funded Projects **(Source: NPPC 2001)**

Organization	Type of Project	Date	Location	Summary
ODFW (funded by OWEB via grant to OWRD)	Streamflow restoration prioritization	1999	Entire John Day Basin	Prioritized streamflow restoration needs based on: physical/biological factors, water use patterns and restoration optimism; identified measures include: transfers and leases to in-stream uses, cancelled water rights, enforcement and monitoring, improved diversion methods, stream inventories, conservation planning, improved efficiencies, and measurement and reporting of use
North Fork Watershed Council	Streamflow restoration		Rudio Creek (Lower North Fork John Day)	Streamflow restoration
GSWCD (funded by Reclamation, private, FSA, OWRD, ODFW & OWEB)	Passage improvement	1992+	GSWCD	Irrigation reorganization, gravity pipeline, infiltration gallery, irrigation return flow cooling GSWCD acts as subcontractor for most of the ODFW, CTWSRO, and Reclamation projects
Reclamation (many with assistance of GSWCD)	Passage improvement Flow improvement	1991+	Upper & Middle Forks John Day	Replace pushup dams with infiltration galleries or pumps Convert from flood to sprinkler or wheel line irrigation, replace open ditches with pipelines Construct subsurface drainage system to return cooler water to the stream
Oregon Water Trust	Flow improvement	2000+	Middle Fork John Day Subbasin: Big Boulder Cr., Big Cr., Hawkins Cr., Middle Fork John Day and tributaries	Oregon Water Trust has negotiated donations of all or part of 18 water rights certificates to convert out-of-stream water rights for in-stream uses; conversions have provided 5 cfs flow in critical chinook and steelhead spawning and rearing habitat; right are held in trust by OWRD
Restoration and Enhancement Board (ODFW)	Passage improvement		South Fork John Day	Passage improvement at two irrigation diversion dams Funding provided by surcharge on angling licenses
John Day Bull Trout Recovery Team	Flow improvement		John Day Basin	Obtained in-stream water rights for bull trout on 24 streams or stream reaches, requested an additional 18 water rights which are being contested

John Day Subbasins

Future Projects
(Source: NPPC 2001)

Organization	Type of Project	Date	Location	Summary
Reclamation	Provide Technical Assistance	On-going	North Fork Middle Fork and Upper John Day subbasins	Provide technical support
ODFW	Fish screens		John Day Basin	Replace 20 out-of-date fish screens per year in the John Day Basin
North Fork Watershed Council	Passage Improvement	2002-06	Lower North Fork John Day	Replace gravel pushup dams with permanent pumping stations
CTWSRO	Passage improvement			Eliminate passage barriers Continuation and expansion of ongoing efforts
Oregon Water Trust	Flow improvement	2002-04	Entire John Day Basin	Proposes to acquire 2.0 cfs in John Day Basin over three years
CTWSRO	Passage improvement Fish screens Flow improvement	2002-06	Oxbow Ranch	Continued management
CTUIR	Passage improvement Flow improvement	2002-06	North Fork John Day	
OWEB	Passage barrier inventory		Entire John Day Basin	Inventory of all forms of barriers, utilizing existing databases; objective is prioritize approach to removing fish barriers
OWRD	Improved measurement and management of water flows		Entire John Day Basin	
ODFW	Develop GIS layers	2002-04	Entire John Day Basin	Obtain or develop GIS maps of fish passage barriers and points of irrigation diversion

Appendix B
John Day River Basin Water Conservation Demonstration Projects

Financial Contributions and Total Project Costs (Source: Reclamation 2000)

PARTNER	Reclamation[1]	GSWCD[2]	BPA	Water Users	NRCS &/or FSA	ODA	OWRD	ODFW	Total Project Cost
PROJECTS – Upper John Day subbasin unless noted otherwise.									
Luce-Long Diversion	$30,400	$4,100		$27,200	$5,000		$1,500	$1,200	$69,400
Holliday Ditch Diversion		$6,300	$17,400	$9,200	$4,000		$300	$600	$37,800
Keerins Diversion		$5,700	$22,000	$7,500	$200			$200	$35,600
Widows Creek Gravity Irrigation Pipeline Systems	$66,400	$9,100		$90,600	$35,400			$25,100	$226,600
Holmes Pipeline[3]		$2,700	$18,500	$3,700				$200	$25,100
Fields Infiltration Gallery	$72,000	$22,200	$64,900	$72,100	$5,200		$200	$300	$236,900
Lemon Infiltration Gallery	$22,000	$7,200		$9,100			$500	$500	$39,300
Courchesne Infiltration Gallery[3]		$4,400	$16,800	$8,900				$200	$30,300
Rudishauser Infiltration Gallery		$3,800		$9,400	$3,200		$500	$300	$17,200
Cathedral Rock Ditches Project	$21,600	$2,900		$86,400	$18,800		$20,000	$3,400	$153,100
Clausen Ditch Conversion	$43,100	$2,200		$70,500	$5,000			$600	$121,400
Kight Irrigation Reorganization	$49,600	$3,300		$43,800	$10,400		$700	$1,500	$109,300
Ediger Irrigation Reorganization	$47,300	$4,400		$36,500	$5,200		$2,400	$2,000	$97,800
Page Irrigation Reorganization	$65,300	$1,900		$62,500		$700			$130,400
Morris-Pike Irrigation Reorganization	$96,200	$7,400	$71,900	$117,800			$800	$1,000	$295,100
Lee Irrigation Reorganization		$9,800	$37,700	$19,700				$300	$67,500
Crown Ranch Return Flow Cooling[4]	$21,000	$8,300		$15,700	$1,200		$300	$200	$46,700
Holliday Ranches Return Flow Cooling[4]	$45,600	$6,100		$36,900	$2,500	$2,200	$500	$500	$94,300
Mullin Aeration and Subsoiling[4]	$3,400	$600		$3,400					$7,400
Total Project Costs	$583,900	$112,400	$249,200	$730,900	$96,100	$2,900	$27,700	$38,100	$1,841,200

[1] Reclamation provided $270,000 to the Tribes for project development, coordination, and monitoring
[2] Reclamation funding was provided to GSWCD to assist with project development and implementation
[3] Middle Fork John Day subbasin
[4] These projects are outside the scope of this PEA

Appendix C
NMFS' Juvenile Fish Screen Criteria For Pump Intakes

Developed by
National Marine Fisheries Service
Environmental & Technical Services Division
Portland, Oregon
May 9, 1996

The following criteria serve as an addendum to current National Marine Fisheries Service gravity intake juvenile fish screen criteria. These criteria apply to new pump intake screens and existing inadequate pump intake screens, as determined by fisheries agencies with project jurisdiction.

Definitions used in pump intake screen criteria

Pump intake screens are defined as screening devices attached directly to a pressurized diversion intake pipe. Effective screen area is calculated by subtracting screen area occluded by structural members from the total screen area. Screen mesh opening is the narrowest opening in screen mesh. Approach velocity is the calculated velocity component perpendicular to the screen face. Sweeping velocity is the flow velocity component parallel to the screen face with the pump turned off.

Active pump intake screens are equipped with a cleaning system with proven cleaning capability, and are cleaned as frequently as necessary to keep the screens clean. Passive pump intake screens have no cleaning system and should only be used when the debris load is expected to be low, and

1) if a small screen (less than 1 cfs pump) is over-sized to eliminate debris impingement, and
2) where sufficient sweeping velocity exists to eliminate debris build-up on the screen surface, and
3) if the maximum diverted flow is less than .01% of the total minimum streamflow, or
4) the intake is deep in a reservoir, away from the shoreline.

Pump Intake Screen Flow Criteria

The minimum effective screen area in square feet for an active pump intake screen is calculated by dividing the maximum flow rate in cubic feet per second (cfs) by an approach velocity of 0.4 feet per second (fps). The minimum effective screen area in square feet for a passive pump intake screen is calculated by dividing the maximum flow rate in cfs by an approach velocity of 0.2 fps. Certain site conditions may allow for a waiver of the 0.2 fps approach velocity criteria and allow a passive screen to be installed using 0.4 fps as design criteria. These cases will be considered on a site-by-site basis by the fisheries agencies.

If fry-sized salmonids (i.e. less than 60 millimeter fork length) are not ever present at the site and larger juvenile salmonids are present (as determined by agency biologists), approach velocity shall not exceed 0.8 fps for active pump intake screens, or 0.4 fps for passive pump intake screens. The allowable flow should be distributed to achieve uniform approach velocity (plus or minus 10%) over the entire screen area. Additional screen area or flow baffling may be required to account for designs with non-uniform approach velocity.

Pump Intake Screen Mesh Material

Screen mesh openings shall not exceed 3/32 inch (2.38 mm) for woven wire or perforated plate screens, or 0.0689 inch (1.75 mm) for profile wire screens, with a minimum 27% open area. If fry-sized salmonids are never present at the site (by determination of agency biologists) screen mesh openings shall not exceed 1/4 inch (6.35 mm) for woven wire, perforated plate screens, or profile wire screens, with a minimum of 40% open area.

Screen mesh material and support structure shall work in tandem to be sufficiently durable to withstand the rigors of the installation site. No gaps greater than 3/32 inch shall exist in any type screen mesh or at points of mesh attachment. Special mesh materials that inhibit aquatic growth may be required at some sites.

Pump Intake Screen Location

When possible, pump intake screens shall be placed in locations with sufficient sweeping velocity to sweep away debris removed from the screen face. Pump intake screens shall be submerged to a depth of at least one screen radius below the minimum water surface, with a minimum of one screen radius clearance between screen surfaces and adjacent natural or constructed features. A clear escape route should exist for fish that approach the intake volitionally or otherwise. For example, if a pump intake is located off of the river (such as in an intake lagoon), a conventional open channel screen should be considered, placed in the channel or at the edge of the river. Intakes in reservoirs should be as deep as practical, to reduce the numbers of juvenile salmonids that approach the intake. Adverse alterations to riverine habitat shall be minimized.

Pump Intake Screen Protection

Pump intake screens shall be protected from heavy debris, icing and other conditions that may compromise screen integrity. Protection can be provided by using log booms, trash racks or mechanisms for removing the intake from the river during adverse conditions. An inspection and maintenance plan for the pump intake screen is required, to ensure that the screen is operating as designed per these criteria.

Appendix D
NMFS' Juvenile Fish Screen Criteria

Developed by
National Marine Fisheries Service
Environmental & Technical Services Division
Portland, Oregon
Revised February 16, 1995

I. GENERAL CONSIDERATIONS:

This document provides guidelines and criteria to be utilized in the development of functional designs of downstream migrant fish passage facilities for hydroelectric, irrigation, and other water withdrawal projects. This material has been prepared by the National Marine Fisheries Service (NMFS) as a direct result of responsibilities for prescribing fishways (including fish screen and bypass systems) under Section 18 of the Federal Power Act, administered by the Federal Energy Regulatory Commission (FERC). This material is also applicable for projects that are undergoing consultation with the NMFS, pursuant to responsibilities for protecting fish under the Endangered Species Act (ESA).

Since these guidelines and criteria are general in nature, there may be cases where site constraints or extenuating circumstances dictate that certain criteria be waived or modified. Conversely, where there is a need to provide additional protection for fish, site-specific criteria may be added. These circumstances will be considered by NMFS on a project-by-project basis.

In designing an effective fish screen facility, the swimming ability of the fish is a primary consideration. Research has shown that swimming ability of fish varies and may depend upon a number of factors relating to the physiology of the fish, including species, size, duration of swimming time required, behavioral aspects, migrational stage, physical condition and others, in addition to water quality parameters such as dissolved oxygen concentrations, water temperature, lighting conditions, and others. For this reason, screen criteria must be expressed in general terms.

To minimize risks to anadromous fish at some locations, the NMFS may require investigation (by the project sponsors) of important and poorly defined site-specific variables that are deemed critical to development of the screen and bypass design. This investigation may include factors such as fish behavioral response to hydraulic conditions, weather conditions (ice, wind, flooding, etc.), river stage-discharge relationships, seasonal operational variability, potential for sediment and debris problems, resident fish populations, potential for creating predation opportunity, and other information. The size of salmonids present at a potential screen site usually is not known, and can change from year to year based on flow and temperature conditions. Thus, adequate data to describe the size-time relationship requires substantial sampling efforts over a number of years. The NMFS will assume that fry-sized salmonids and low water temperatures are present at all sites and apply the appropriate criteria listed below, unless adequate biological investigation proves otherwise. The burden-of-proof is the responsibility of the owner of the screen facility.

Proposed facilities which could have particularly significant impacts on fish, and new unproven juvenile fish protection designs, frequently require: 1) development of a biological basis for the concept; 2) demonstration of favorable fish behavioral response in a laboratory setting; 3) an acceptable plan for

evaluating the prototype installation; and 4) an acceptable alternate plan developed concurrently for a screen and bypass system satisfying these criteria, should the prototype not adequately protect fish. Additional information on unproven juvenile fish protection devices can be found in "Experimental Fish Guidance Devices," Position Statement of the National Marine Fisheries Service, Northwest Region, January 6, 1995.

Screen and bypass criteria for juvenile salmonids are provided below. Specific exceptions to these criteria occur in the design of small screen and bypass systems (less than 25 cubic feet per second). These are listed in Section K, Modified Criteria for Small Screens.

Striped bass, herring, shad, and other anadromous fish species may have eggs and/or very small fry which are moved with any water current (tides, streamflows, etc.). Installations where these species are present may require special screen and/or bypass facilities, including micro-screens and require individual evaluation of the proposed project. In instances where local regulatory agencies require more stringent screening requirements for species of resident or anadromous fish, the NMFS will generally defer to the more conservative criteria.

II. GENERAL PROCEDURAL GUIDELINES

A functional design should be developed that defines type, location, size, hydraulic capacity, method of operation, and other pertinent juvenile fish screen facility characteristics. In the case of applications to be submitted to the FERC and consultations under the ESA, a functional design for juvenile (and adult) fish passage facilities must be developed and submitted as part of the application. It must reflect the NMFS input and design criteria and be acceptable to the NMFS. Functional design drawings must show all pertinent hydraulic information, including water surface elevations and flows through various areas of the structures. Functional design drawings must show general structural sizes, cross-sectional shapes, and elevations. Types of materials must be identified where they will directly affect fish. The final detailed design shall be based on the functional design, unless changes are agreed to by the NMFS.

All juvenile passage facilities shall be designed to function properly through the full range of hydraulic conditions in the lake, tidal area, or stream and in the diversion, and shall account for debris and sedimentation conditions which may occur.

III. SCREEN CRITERIA FOR JUVENILE SALMONIDS

A. Structure Placement

1. Streams and Rivers:

a. Where physically practical and biologically desirable, the screen shall be constructed at the diversion entrance with the screen face generally parallel to river flow. Physical factors that may preclude screen construction at the diversion entrance include excess river gradient, potential for damage by large debris, and potential for heavy sedimentation. For screens constructed at the bankline, the screen face shall be aligned with the adjacent bankline and the bankline shall be shaped to smoothly match the face of the screen structure to prevent eddies in front, upstream, and downstream of the screen. If trash racks are used, sufficient hydraulic gradient is required to route juvenile fish from between the trash rack and screens to safety.

b. Where installation of fish screens at the diversion entrance is not desirable or impractical, the screens may be installed in the canal downstream of the entrance at a suitable location. All screens installed downstream from the diversion entrance shall be provided with an effective bypass system approved by NMFS, designed to collect juvenile fish and safely transport them back to the river with minimum delay. The angle of the screen to flow should be adequate to effectively guide fish to the bypass (see Section F, Bypass Layout).

2. Lakes, Reservoirs and Tidal areas:

a. Intakes shall be located offshore where feasible to minimize fish contact with the facility. Water velocity from any direction toward the screen shall not exceed allowable approach velocities (see Section B, Approach Velocity). When possible, intakes shall be located in areas with sufficient sweeping velocity to minimize sediment accumulation in or around the screen and to facilitate debris removal and fish movement away from the screen face (see Section C, Sweeping Velocity).

b. If a screened intake is used to route fish past a dam, the intake shall be designed to withdraw water from the most appropriate elevation based on providing the best juvenile fish attraction and appropriate water temperature control downstream of the project. The entire range of forebay fluctuation shall be accommodated in design, unless otherwise approved by the NMFS.

B. Approach Velocity - Definition: Approach velocity is the water velocity component perpendicular to and approximately three inches in front of the screen face.

1. Salmonid fry [less than 2.36 inches {60.0 millimeters (mm)} in length]: The approach velocity shall not exceed 0.40 feet per second (fps) {0.12 meters per second (mps)}.

2. Salmonid fingerling {2.36 inches (60.0 mm) and longer}: The approach velocity shall not exceed 0.80 fps (0.24 mps).

3. The total submerged screen area required (excluding area affected by structural components) is calculated by dividing the maximum diverted flow by the allowable approach velocity (also see Section K, Modified Criteria for Small Screens).

4. The screen design must provide for uniform flow distribution over the screen surface, thereby minimizing approach velocity. This may be accomplished by providing adjustable porosity control on the downstream side of screens, unless it can be shown unequivocally (such as with a physical hydraulic model study) that localized areas of high velocity can be avoided at all flows.

C. Sweeping Velocity - Definition: Sweeping velocity is the water velocity component parallel and adjacent to the screen face.

1. Sweeping velocity shall be greater than the approach velocity. This is accomplished by angling the screen face at less than 45° relative to flow (also see Section K, Modified Criteria for Small Screens). This angle may be dictated by site specific canal geometry, hydraulic, and sediment conditions.

D. Screen Face Material

1. Fry criteria - If biological justification can not be provided to demonstrate the absence of fry-sized salmonids {less than 2.36 inches (60.0 mm)} in the vicinity of the diversion intake leading to the screen, fry will be assumed present and the following criteria apply for screen material:

a. Perforated plate: Screen openings shall not exceed 3/32 or 0.0938 inches (2.38 mm).

b. Profile bar screen: The narrowest dimension in the screen openings shall not exceed 0.0689 inches (1.75 mm) in the narrow direction.

c. Woven wire screen: Screen openings shall not exceed 3/32 or 0.0938 inches (2.38 mm) in the narrow direction (example: 6-14 mesh).

d. Screen material shall provide a minimum of 27% open area.

2. Fingerling criteria - If biological justification can be provided to demonstrate the absence of fry-sized salmonids {less than 2.36 inches (60.0 mm)} in the vicinity of the diversion intake leading to the screen, the following criteria apply for screen material:

a. Perforated plate: Screen openings shall not exceed 1/4 or 0.25 inches (6.35 mm).

b. Profile bar screen: The narrowest dimension in the screen openings shall not exceed 1/4 or 0.25 inches (6.35 mm) in the narrow direction.

c. Woven wire screen: Screen openings shall not exceed 1/4 or 0.25 inches (6.35 mm) in the narrow direction.

d. Screen material shall provide a minimum of 40% open area.

3. The screen material shall be corrosion resistant and sufficiently durable to maintain a smooth uniform surface with long term use.

E. Civil Works and Structural Features

1. The face of all screen surfaces shall be placed flush (to the extent possible) with any adjacent screen bay, pier noses, and walls to allow fish unimpeded movement parallel to the screen face and ready access to bypass routes.

2. Structural features shall be provided to protect the integrity of the fish screens from large debris. Provision of a trash rack, log boom, sediment sluice, and other measures may be needed. A reliable, ongoing preventative maintenance and repair program is necessary to assure facilities are kept free of debris and that screen mesh, seals, drive units, and other components are functioning correctly.

3. Screen surfaces shall be constructed at an angle to the approaching flow, with the downstream end of the screen terminating at the entrance to the bypass system.

4. The civil works shall be designed in a manner that eliminates undesirable hydraulic effects (such as eddies and stagnant flow zones) that may delay or injure fish or provide predator habitat or predator access. Upstream training wall(s), or some acceptable variation thereof, shall be utilized to control hydraulic conditions and define the angle of flow to the screen face. Large facilities may require hydraulic modeling to identify and correct areas of concern.

F. Bypass Layout

1. The screen and bypass shall work in tandem to move out-migrating salmonids (including adults) to the bypass outfall with a minimum of injury or delay. The bypass entrance shall be located so that it can easily be located by out-migrants. Screens placed in diversions shall be constructed with the downstream end of the screen terminating at a bypass entrance. Multiple bypass entrances (intermediate bypasses) shall be employed if the sweeping velocity will not move fish to the bypass within 60 seconds, assuming fish are transported at this velocity.

2. The bypass entrance and all components of the bypass system shall be of sufficient size and hydraulic capacity to minimize the potential for debris blockage.

3. In order to improve bypass collection efficiency for a single bank of vertically-oriented screens, a bypass training wall shall be located at an angle to the screens, with the bypass entrance at the apex and downstream-most point. This will aid fish movement into the bypass by creating hydraulic conditions that conform to observed fish behavior. For single or multiple vee screen configurations, training walls are not required, unless a intermediate bypass is used (see Section F, Bypass Layout, Part 1).

4. In cases where there is insufficient flow available to satisfy hydraulic requirements at the bypass entrance (entrances) for the main screens, a secondary screen may be required. This is a screen located in the main screen bypass which allows the prescribed bypass flow to be used to effectively attract fish into the bypass entrance(s) and then allow for all but a reduced residual bypass flow to be routed back (by pump or gravity) for the primary diversion use. The residual bypass flow (not passing through the secondary screen) would then convey fish to the bypass outfall location or other destination.

5. Access is required at locations in the bypass system where debris accumulations may occur.

6. The screen civil works floor shall be designed to allow fish to be routed back to the river safely, if the canal is dewatered. This may entail a sumped drain with a small gate and drain pipe, or similar provisions.

G. Bypass Entrance

1. Each bypass entrance shall be provided with independent flow-control capability, acceptable to NMFS.

2. The minimum bypass entrance flow velocity must be greater than or equal to the maximum flow velocity vector resultant upstream of the screens. A gradual and efficient acceleration of flow into the bypass entrance is required to minimize delay by out-migrants.

3. Ambient lighting conditions are required at, and inside of, the bypass entrance and should extend downstream to the bypass flow control.

4. The bypass entrance must extend from the floor to the canal water surface.

H. Bypass Conduit Design

1. Bypass pipes shall have smooth surfaces and be designed to provide conditions that minimize turbulence. Bypass conduits shall have a smooth joint design to minimize turbulence and the potential for fish injury and shall be satisfactory to the NMFS.

2. Fish shall not be pumped within the bypass system.

3. Fish shall not be allowed to free-fall within a confined shaft in a bypass system.

4. Pressures in the bypass pipe shall be equal to or above atmospheric pressures.

5. Bends shall be avoided in the layout of bypass pipes due to the potential for debris clogging. Bypass pipe center-line radius of curvature (R/D) shall be greater than or equal to 5. Greater R/D may be required for super-critical velocities.

6. Bypass pipes or open channels shall be designed to minimize debris clogging and sediment deposition and to facilitate cleaning as necessary. Therefore, the required pipe diameter shall be greater than or equal to 24 inches {0.610 meters (m)}, and pipe velocity shall be greater than 2.0 fps (0.610 mps), unless otherwise approved by the NMFS, for the entire operational range (also see Section K, Modified Criteria for Small Screens, Part 4).

7. Closure valves of any type are not allowed within the bypass pipe, unless approved by NMFS.

8. The minimum depth of open-channel flow in a bypass conduit shall be greater than or equal to 0.75 feet (0.23 m), unless otherwise approved by the NMFS (also see Section K, Modified Criteria for Small Screens, Part 5).

9. Sampling facilities installed in the bypass conduit shall not impair normal operation of the facility.

10. The bypass pipe hydraulics should not produce a hydraulic jump within the pipe.

I. Bypass Outfall

1. Bypass outfalls should be located such that ambient river velocities are greater than 4.0 fps (1.2 mps).

2. Bypass outfalls shall be located to minimize avian and aquatic predation in areas free of eddies, reverse flow, or known predator habitat.

3. Bypass outfalls shall be located where the receiving water is of sufficient depth (depending on the impact velocity and quantity of bypass flow) to ensure that fish injuries are avoided at all river and bypass flows.

4. Maximum bypass outfall impact velocity (including vertical and horizontal velocity components) shall be less than 25.0 fps (7.6 mps).

5. The bypass outfall discharge into tailrace shall be designed to avoid adult attraction or jumping injuries.

J. Operations and Maintenance

1. Fish screens shall be automatically cleaned as frequently as necessary to prevent accumulation of debris. The cleaning system and protocol must be effective, reliable, and satisfactory to the NMFS. Proven cleaning technologies are preferred.

2. Open channel intakes shall include a trash rack in the screen facility design which shall be kept free of debris. In certain cases, a satisfactory profile bar screen design can substitute for a trash rack.

3. The head differential to trigger screen cleaning for intermittent type cleaning systems shall be a maximum of 0.1 feet (0.03 m) or as agreed to by the NMFS.

4. The completed screen and bypass facility shall be made available for inspection by NMFS, to verify compliance with the design and operational criteria.

5. Screen and bypass facilities shall be evaluated for biological effectiveness and to verify that hydraulic design objectives are achieved.

K. Modified Criteria for Small Screens (Diversion flow less than 25 cfs)

The following criteria vary from the criteria listed above and apply to smaller screens. Twenty-five cfs is an approximate cutoff; however, some smaller diversions may be required to apply more universal criteria listed above, while some larger diversions may be allowed to use the "small screen" criteria listed below. This will depend on site constraints.

1. The screen area required is shown in Section B, Approach Velocity, Parts 1, 2 and 3. Note that "maximum" applies to the greatest flow diverted, not necessarily the water right.

2. Screen orientation:

a. For screen lengths less than or equal to 4 feet, screen orientation may be angled or perpendicular relative to flow.

b. For screen lengths greater than 4 feet, screen-to-flow angles must be less than or equal to 45 degrees (see Section C, Sweeping Velocity, Part 1).

c. For drum screens, the design submergence shall be 75% of drum diameter. Submergence shall not exceed 85%, nor be less than 65% of drum diameter.

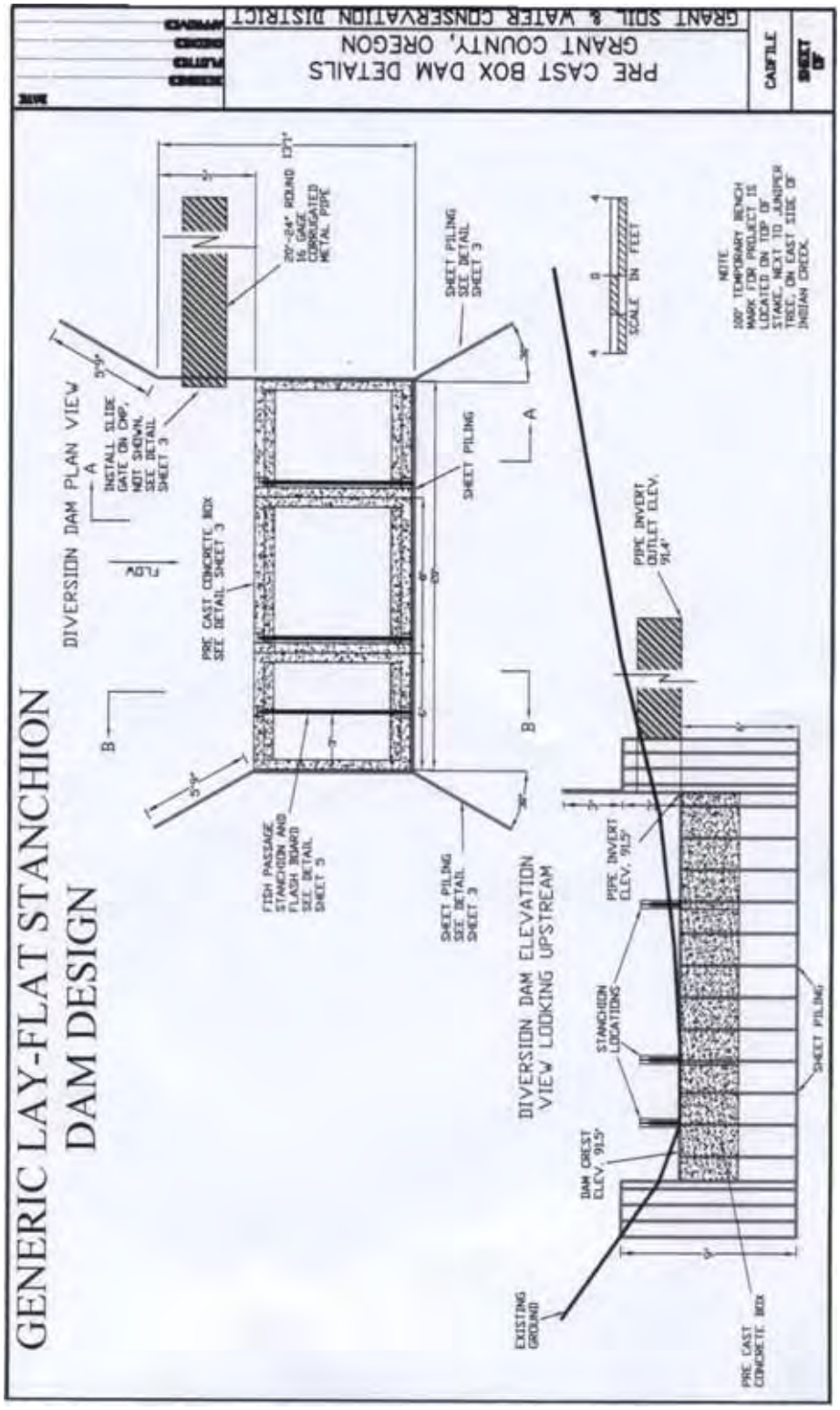
3. The minimum bypass pipe diameter shall be 10 inches, unless otherwise approved by NMFS.

4. The minimum allowable pipe depth is 0.15 feet (1.8 inches or 4.6 cm) and is controlled by designing the pipe gradient for minimum bypass flow.

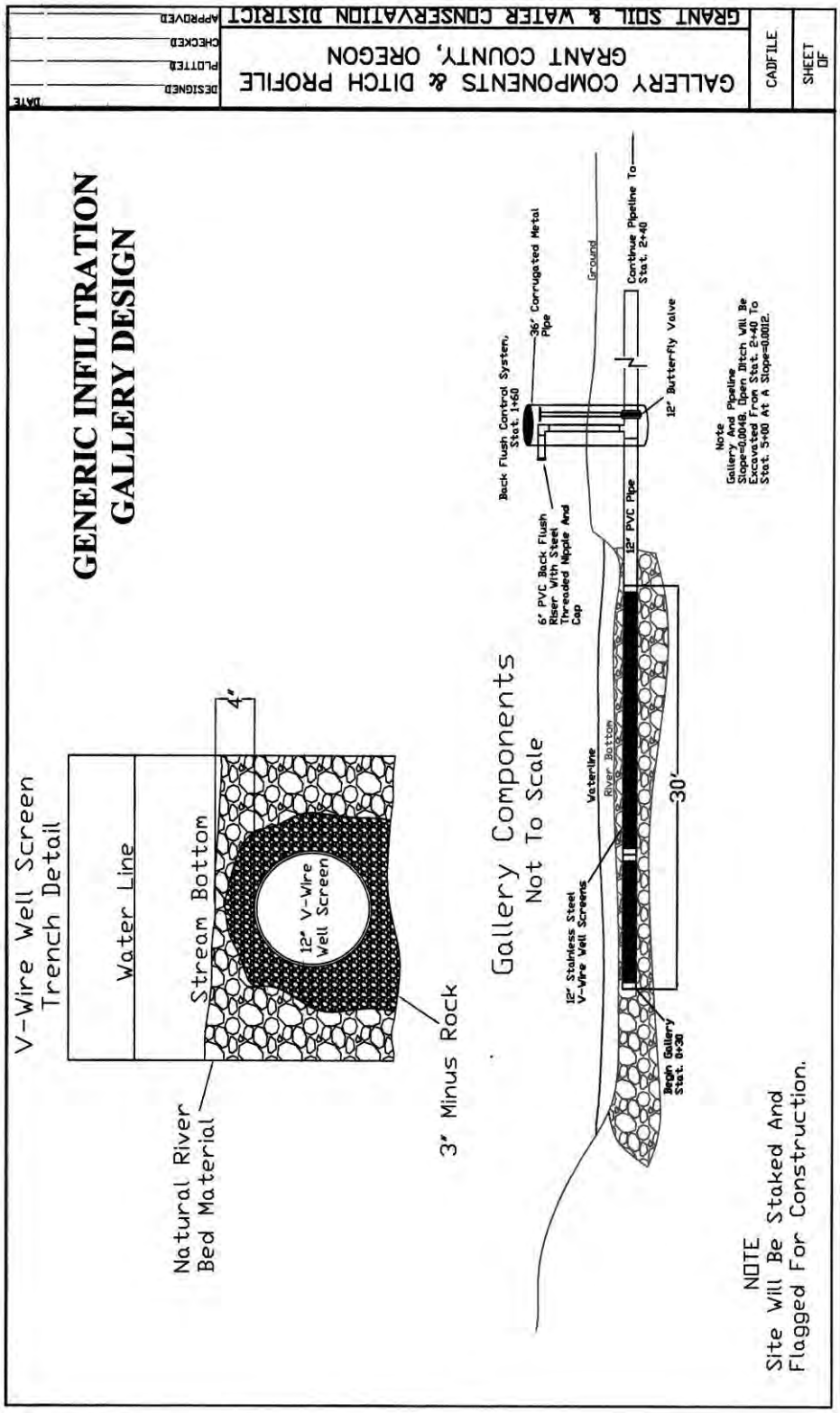
Questions concerning this document can be directed to NMFS Environmental and Technical Services Division Engineering staff, at 503-230-5400.

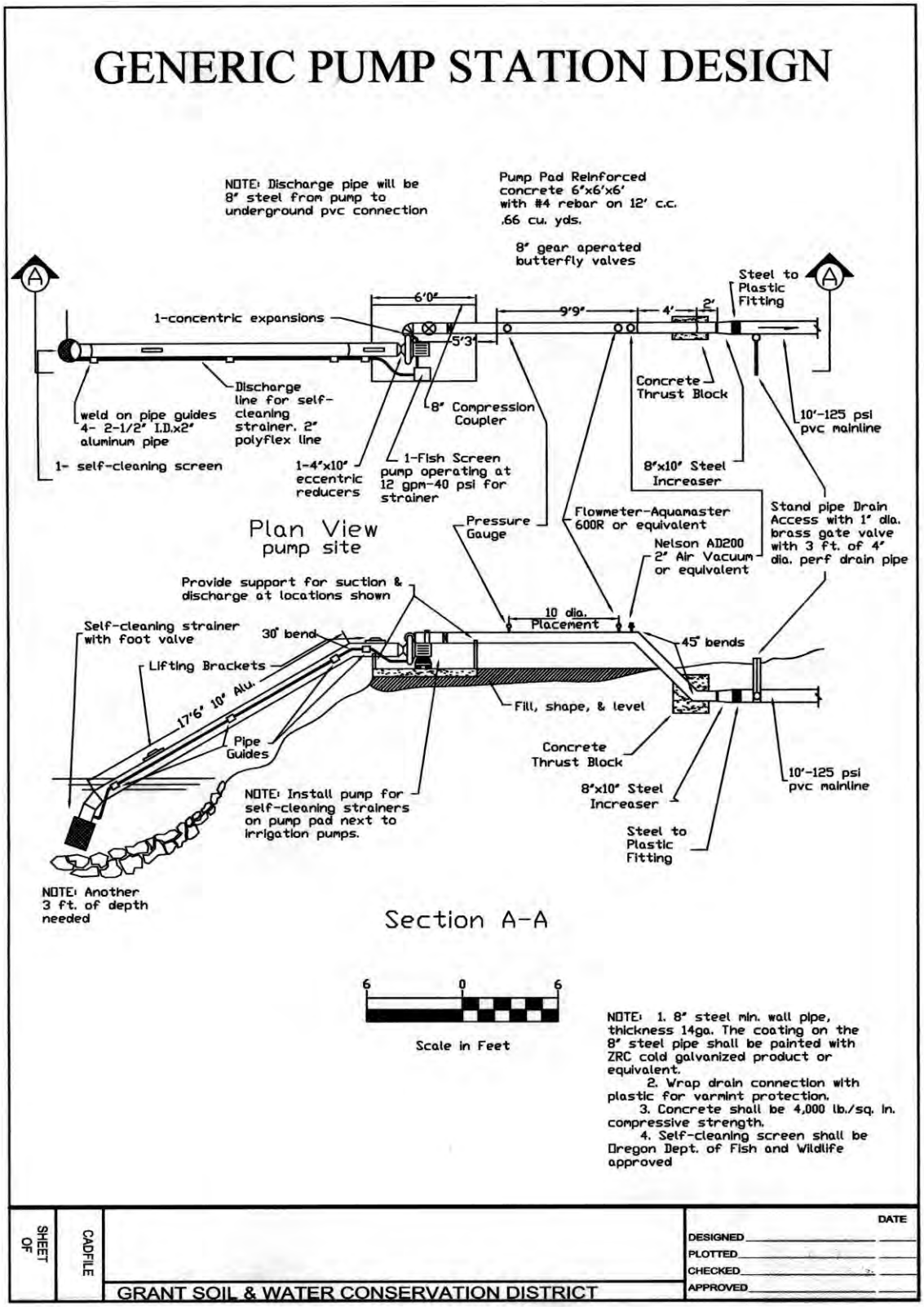
Adopted,
William Stelle, Jr. Date
Regional Director

Appendix E
Generic LFSD Design

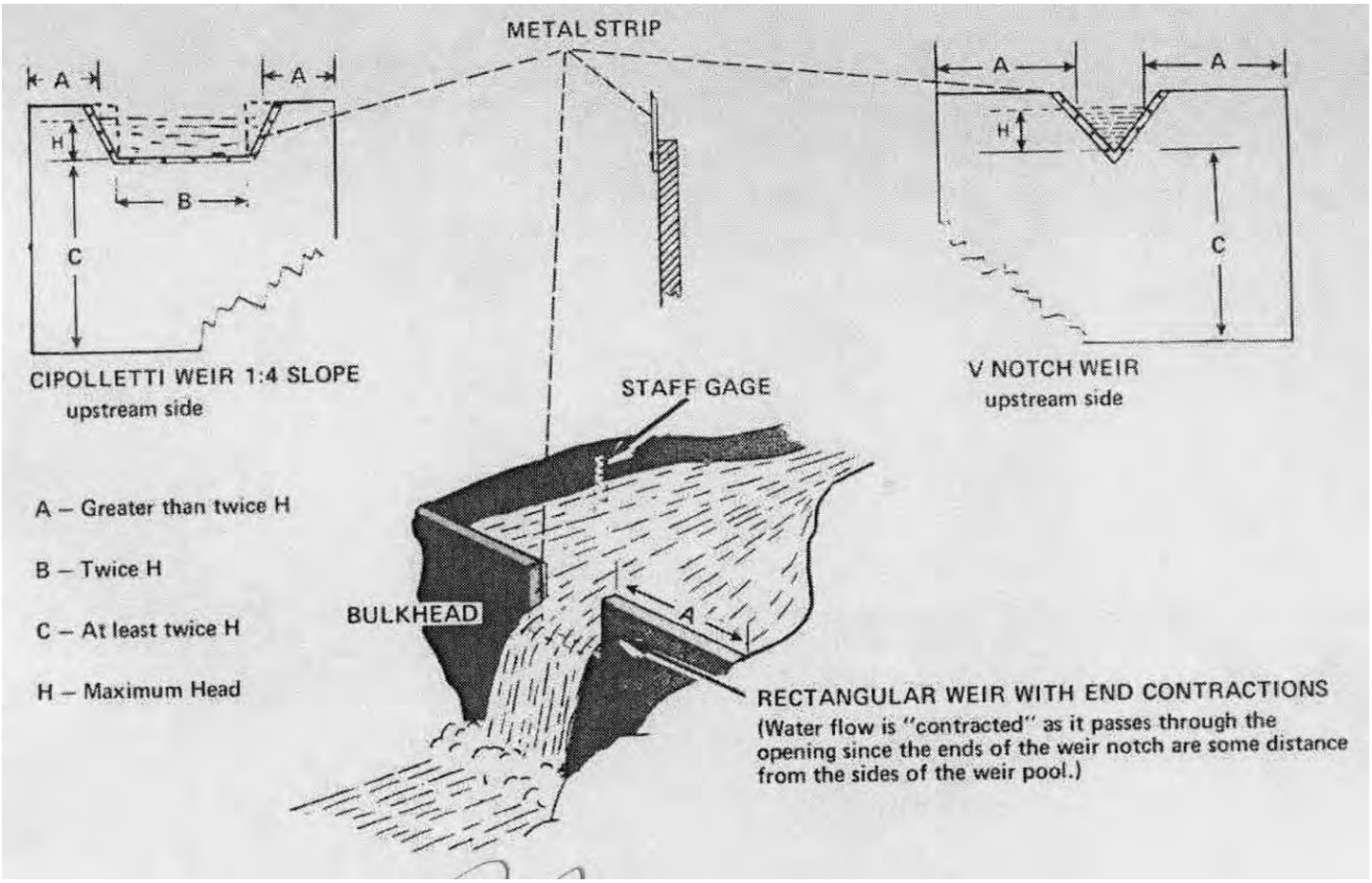


Appendix F
Generic Infiltration Gallery Design

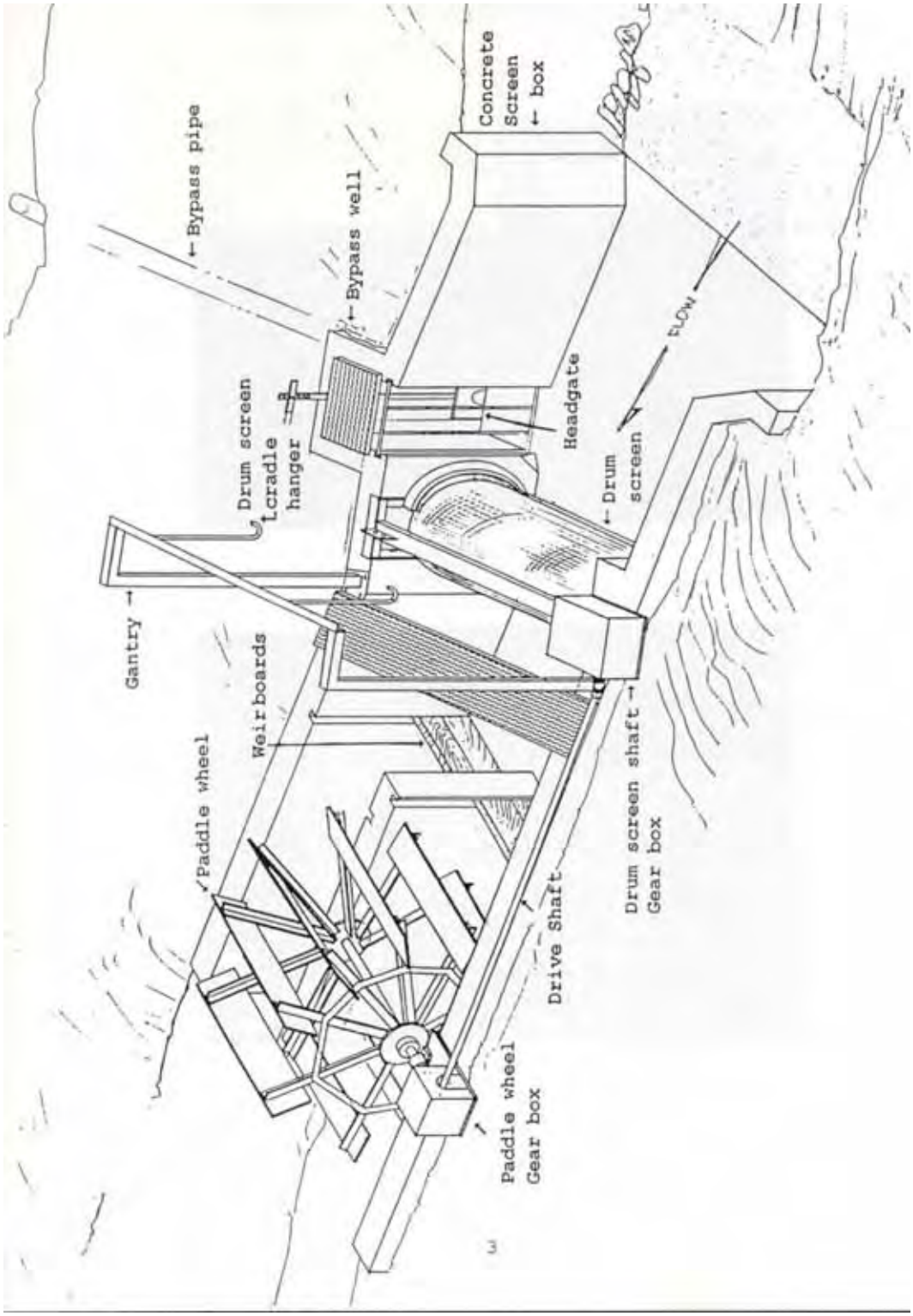



GENERIC PUMP STATION DESIGN
NOTE: Discharge pipe will be 8" steel from pump to underground pvc connection
Pump Pad Reinforced concrete 6'x6'x6' with #4 rebar on 12" c.c. .66 cu. yds.
8" gear aperated butterfly valves
Steel to Plastic Fitting
6'0"
9'9"
4'
2'
5'3"
1-concentric expansions
Discharge line for self-cleaning strainer. 2" polyflex line
weld on pipe guides 4- 2-1/2" I.D.x2" aluminum pipe
1- self-cleaning screen
1-4"x10" eccentric reducers
8" Compression Coupler
1-Fish Screen pump operating at 12 gpm-40 psi for strainer
Concrete Thrust Block
10"-125 psi pvc mainline
8"x10" Steel Increaser
Plan View pump site
Pressure Gauge
Flowmeter-Aquamaster 600R or equivalent
Nelson AD200 2" Air Vacuum or equivalent
Stand pipe Drain Access with 1" dia. brass gate valve with 3 ft. of 4" dia. perf drain pipe
Provide support for suction & discharge at locations shown
10 dia. Placement
Self-cleaning strainer with foot valve
30° bend
45° bends
Lifting Brackets
17'6" 10" Alu. Pipe Guides
Fill, shape, & level
Concrete Thrust Block
8"x10" Steel Increaser
10"-125 psi pvc mainline
Steel to Plastic Fitting
NOTE: Install pump for self-cleaning strainers on pump pad next to irrigation pumps.
NOTE: Another 3 ft. of depth needed
Section A-A
6 0 6
Scale in Feet
NOTE: 1. 8" steel min. wall pipe, thickness 14ga. The coating on the 8" steel pipe shall be painted with ZRC cold galvanized product or equivalent.
2. Wrap drain connection with plastic for varmint protection.
3. Concrete shall be 4,000 lb./sq. in. compressive strength.
4. Self-cleaning screen shall be Oregon Dept. of Fish and Wildlife approved
SHEET OF
CADFILE
GRANT SOIL & WATER CONSERVATION DISTRICT
DATE
DESIGNED
PLOTTED
CHECKED
APPROVED

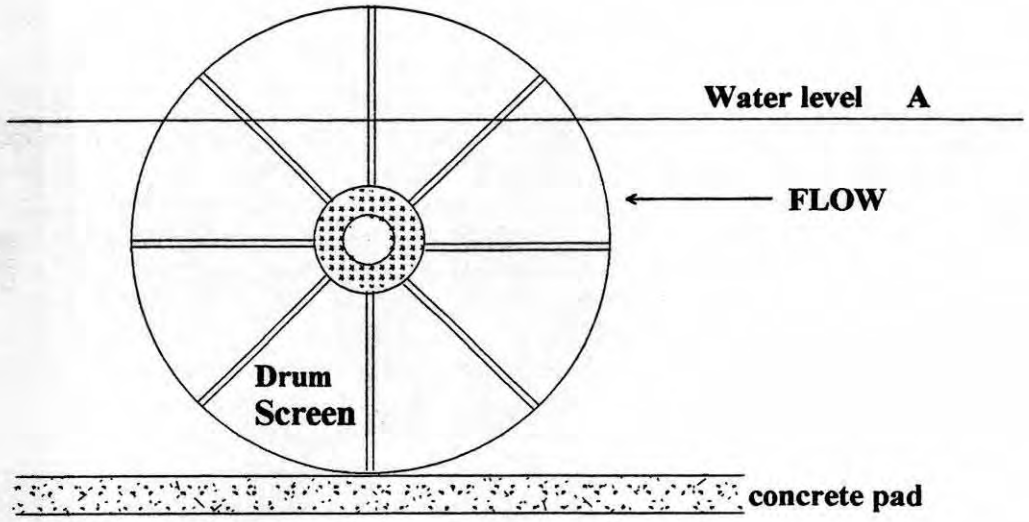
Appendix H
Sharp-crested Weirs



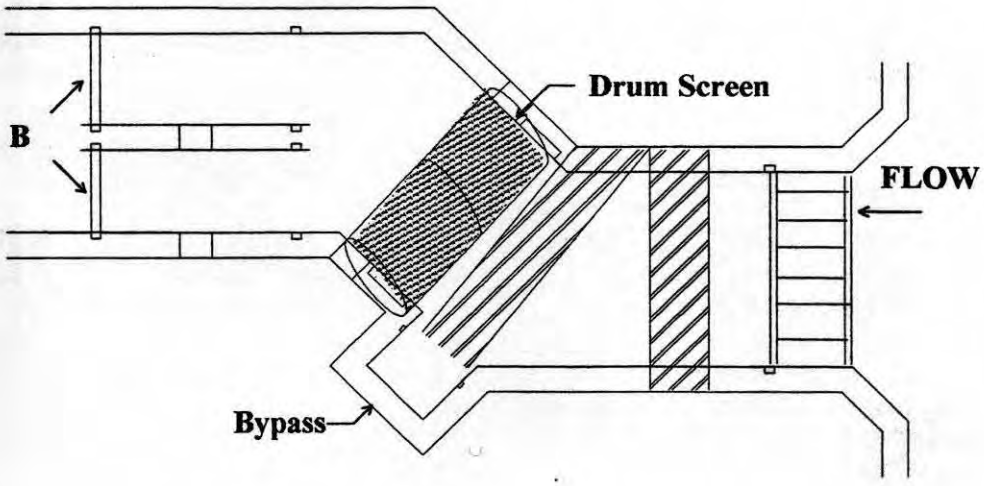
Appendix I
Rotary Fish Screen Design



Appendix J
Rotary Fish Screen Design

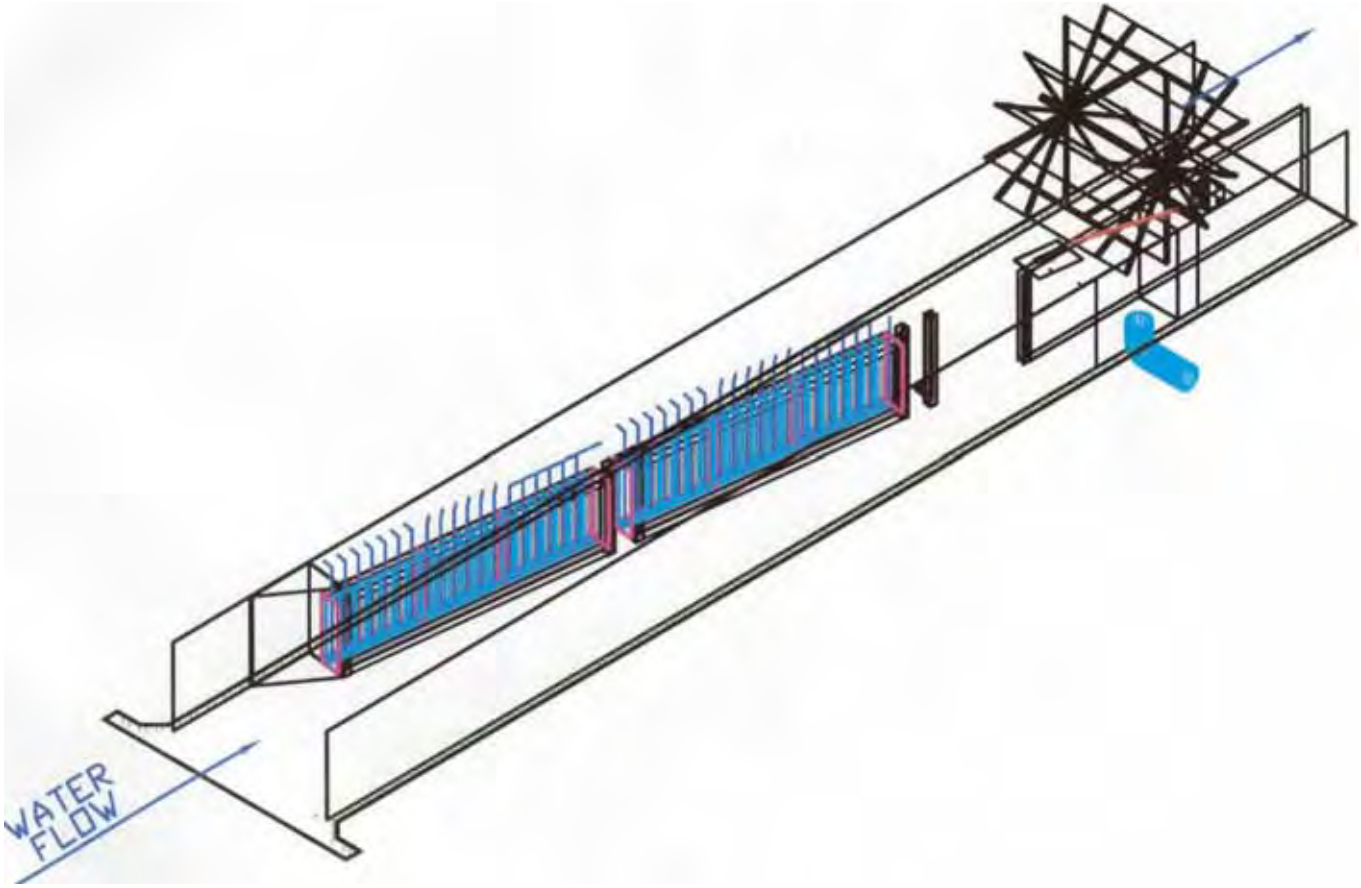


A: Maintain water level at 75% submergence

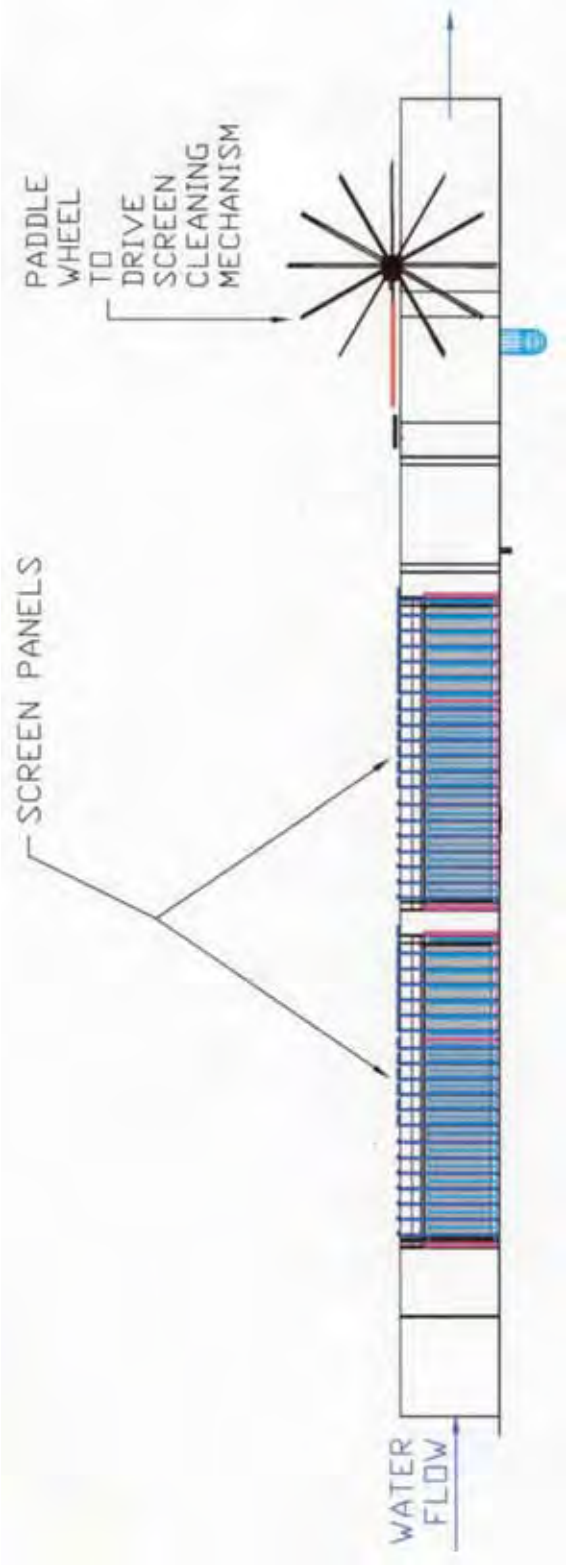


B: Weir boards adjust submergence

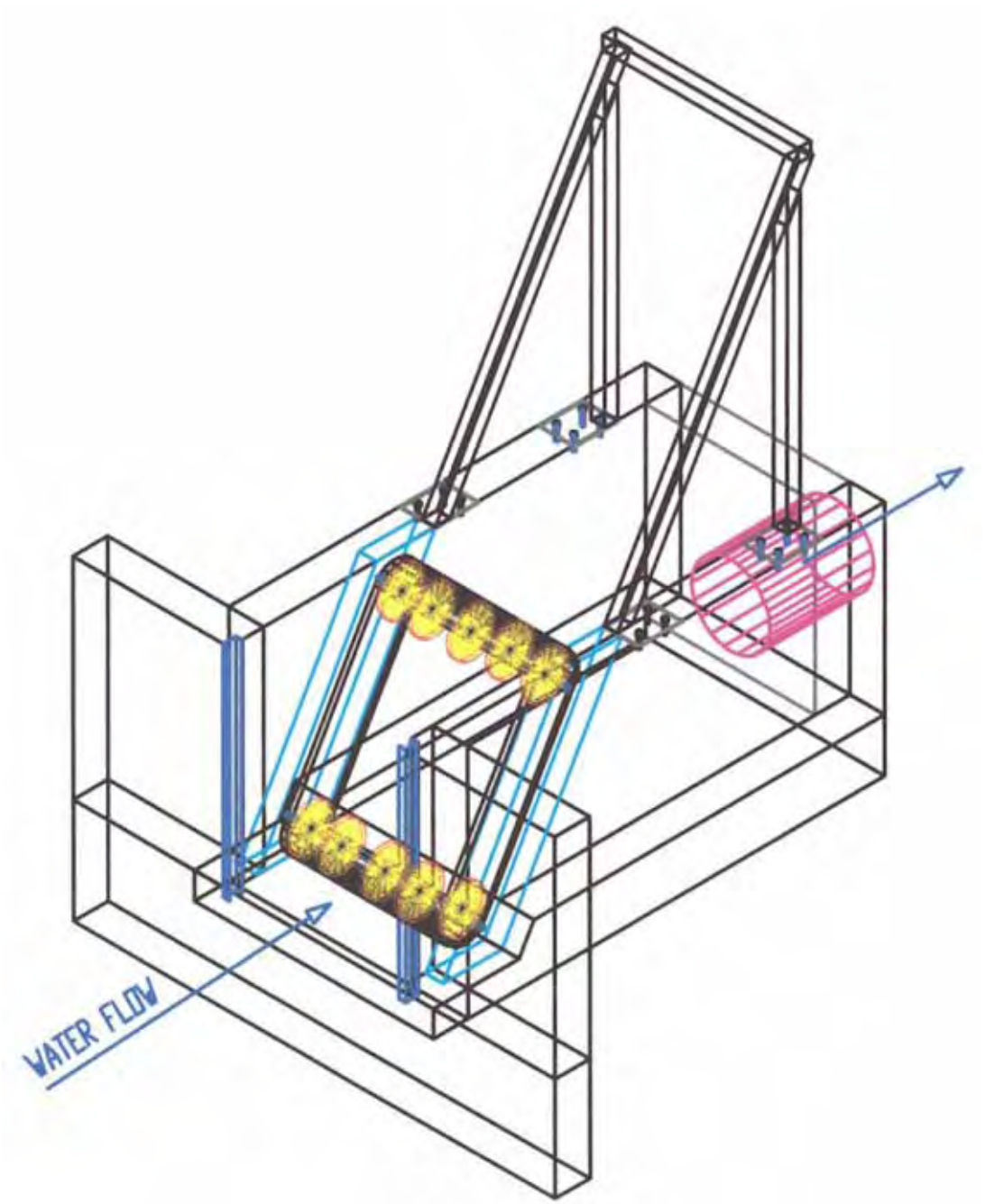
Appendix K
Flat Plate Fish Screen Design



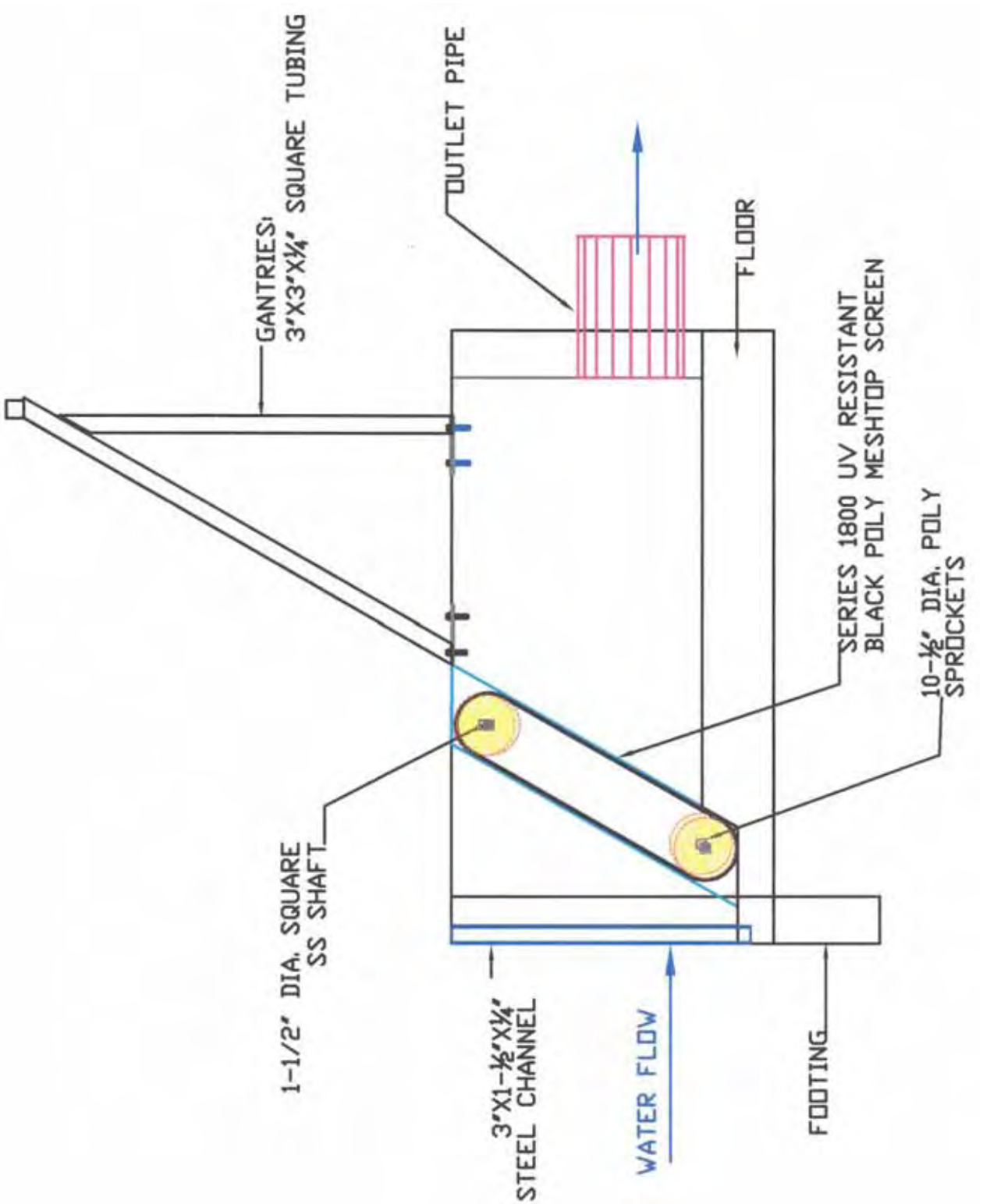
Appendix L
Flat Plate Fish Screen Design



Appendix M
Traveling Belt Fish Screen Design



Appendix N
Traveling Belt Fish Screen Design



Appendix O
Environmental Commitments

The following environmental commitments reflect the mitigation measures identified for the proposed action. These items also appear as general mitigation measures in Section 2.2.5 and issue-specific measures throughout Chapter 3.

General program practices to minimize the negative impacts of the proposed action, and to mitigate for unavoidable negative impacts, include:

A. General
1. Obtain all required federal, state and local permits.
2. Design structures and conservation practices in accordance with Natural Resources Conservation Service technical guidelines and accepted engineering practices.
3. Inspect each project site to determine the presence of threatened and endangered plant and animal species and conduct Section 7 consultations as required.
4. Inspect each project site where there is the potential for historic properties or scientifically-important paleontological sites to exist. If they are present, seek to avoid adverse impacts to the resource site. If adverse impacts cannot be avoided, implement appropriate mitigations actions. Resource significance, project impacts, and mitigation treatment will be determined using processes defined in 36 CFR 800.
5. When appropriate, consult with tribes to determine if Indian sacred sites are present. Seek to avoid damage to those that are identified.
6. Provide landowner or other appropriate personnel with operation and maintenance procedures that will produce optimum conservation benefits over the life of the project.

B. Project design
1. Design fish screens and bypass systems at ditches, pumps, and infiltration galleries to meet NMFS criteria (Appendices E and H).
2. Design fishways to meet NMFS criteria (currently unpublished) for upstream passage of juvenile and adult salmonids.
3. Apply the most recent NMFS protocols (currently NMFS 2001) to ensure that water acquisition projects provide streamflows and water depths which improve the protection of listed steelhead and salmon.
4. Seek to design to avoid impacts to National Register-eligible historic properties, scientifically-important paleontological sites, or Indian sacred sites.

C. Construction timing and location
1. Perform in-stream activities within the ODFW guidelines for timing of in-water work, and coordinate with the District Fish Biologist for emergency extensions of the work window, which is:
   - July 15 to August 15 in the Upper John Day (main stem) upstream from John Day, and the Middle Fork and North Fork John Day upstream from the Highway 395 crossings,

- July 15 to August 31 in the remainder of the reaches downstream from John Day and Highway 395, or
- An alternate work window that may be required by ODFW or NMFS.

2. Time construction to avoid conflicts with bald eagles and other protected wildlife of site-specific concern.
3. Install fish screens and siphons while diversions are shut down to avoid contact with flowing water during construction.
4. Avoid demolition of pushup dams while the adjacent pools are harboring adult chinook salmon or steelhead.
5. Locate infiltration galleries in habitats where salmon and steelhead are not likely to spawn.

D. Construction practices

1. Use appropriate construction methods to isolate in-channel construction areas from flowing water to minimize turbidity and sediment released from site.
2. Insure that petroleum products, chemicals or other harmful materials are not allowed to enter the water.
3. Perform as much machine work as possible from the streambanks to minimize disturbance to the streambed.
4. Minimize disturbance to riparian vegetation.
5. Restore the site to near-original conditions/grade. Remove spoils from the construction area when it is not possible to shape them to near-original conditions.
6. Dispose of construction spoils and waste materials at proper sites away from the stream channel.
7. Use silt screens to minimize the overland flow of fine sediments from construction sites into the stream during precipitation events.
8. Capture salmonids that are inadvertently trapped in sections of ditch or river isolated for construction, and liberate them into adjacent flowing water.
9. If National Register-eligible historic properties, scientifically-important paleontological sites, or Indian sacred sites are present near construction impact areas, implement protective strategies to avoid or minimize damage during construction.

E. Site recovery

1. Stabilize disturbed riparian and streambank soils with native grasses and vegetation, such as willows, red osier dogwood, and cottonwood.
2. Fence riparian areas where existing fences are disturbed by construction, or where fence is required to facilitate vegetation recovery after planting.
3. Vacate construction sites leaving a positive visual impact blending with the natural landscape.

Mitigation measures targeted at specific resources and issues include:

A. Vegetation

Reclamation assisting in directing landowners to the appropriate sources for information and assistance in identifying and controlling noxious weeds. For example, GSWCD has a weed program that landowners can utilize for support with the identification and

control of noxious weeds. GSWCD's program includes a brochure entitled "Weeds of the John Day River Basin."

B. Threatened and Endangered Species

Restrict proposed action construction disturbances (including blasting) on private land within 1/4-mile of: (1) an active bald eagle nest between January 1 through August 31, and (2) an active bald eagle winter roost between November 15 through March 15. For nest trees or roost trees having line-of-sight to the construction disturbance, the restrictive distance is 1/2 mile. The restriction for an individual nest or roost site may be modified in writing by ODFW (a) depending upon the actual dates that bald eagles are present and susceptible to disturbance, or (b) if an applicable incidental take permit has been issued by USFWS. For example, the ODFW may weigh the risk to listed fish species from project work extending past August 31 with the risk to nesting bald eagles from project work beginning before September 1 to determine which, if any, restriction date should be modified.

C. Historic Properties

Anticipated Section 106 Compliance Processes: As indicated at the opening of Section 3.12.1, Section 106 of NHPA requires that Reclamation determine if an implementation action has the potential to impact historic properties, and then address any identified adverse impacts. It is Reclamation's policy to seek to avoid adverse impacts to historic properties that are eligible to the Register. Therefore, when such properties are identified within the potential impact area of an implementation action, Reclamation will seek to either relocate the action to avoid the historic property, or work around the property so that it is protected from damage.

Archeological surveys and tribal consultations to determine if TCPs are present will likely be necessary for many implementation actions. Reclamation anticipates utilizing a phased strategy to address Section 106 requirements. The historic property investigation phases will be refined to mesh with implementation action planning and design phases, as the latter processes become better understood. However, Reclamation anticipates that the typical strategy would be as follows:

1. When a site location has been determined, a Reclamation cultural resources staff person will examine preliminary information to assess if there is the potential for historic properties at the location. This will likely focus on examining photographs and other materials collected by the study team. The assessment will be provided to the Subbasin Liaison to take into consideration when finalizing project locations.

2. If Reclamation's cultural resources staff person has determined there is the potential for historic properties in the area, then historic property data collection could commence. This data collection would typically include an archeological survey of the location and adjacent areas that might be used for staging or other purposes; historic research to determine the age and historic significance of any existing irrigation works that might be altered; and notification to the appropriate tribes and a request that they inform Reclamation of any known archeological sites, TCPs, or Indian sacred sites in the area.

3. If any historic properties were found within the potential impact area, and if it appeared unlikely that the resource site could be protected from damage, then test excavations would be completed to determine eligibility to the Register. Consultations to determine eligibility would occur using processes defined in 36 CFR 800.

4. If a property were eligible to the Register and adverse effects could not be avoided, then mitigation actions would occur consistent with strategies determined during Section 106 consultation. Again, consultation would use processes as defined in 36 CFR 800. These actions would occur only if an action is selected for implementation. Potential mitigation actions are described below.

Mitigation Actions: Where adverse impacts cannot be avoided, the following mitigation actions will be completed:

1. For archeological sites, mitigation typically would consist of archeological excavation. Any recovered artifacts would remain the property of that landowner, to dispose of as they choose. Mitigation actions for TCPs must be tailored to the nature of the resource and the value it represents for the community that identified the TCP. These will be identified in consultation for specific implementation actions. Again, if mitigation actions involved recovery of any materials, they would belong to the landowner.

2. Mitigation for impacts to historic structures or buildings, such as irrigation works, typically involves historic documentation using Historic American Engineering Record or Historic American Buildings Survey standards. Since Reclamation will be implementing actions under this PEA for a 10-year period, and since it is likely that many of the impacted irrigation works would represent similar kinds of historic events, Reclamation would likely seek to programmatically mitigate the impacts. This might consist of basin or region-wide research addressing a larger theme of small, private irrigation systems of the area and how they contributed to area development.

When warranted, mitigation may also include completing interpretive materials for public enjoyment. Since Reclamation's implementation actions would occur on private land, it is likely that any interpretive actions would occur off-site. They would likely consist of educational displays at existing public destination sites, such as local historical societies or BLM or USFS interpretive sites.

D. Paleontological Resources

Anticipated Project-Specific Impact Assessment Processes: It is Reclamation's policy to seek to avoid adverse impacts to scientifically-valuable fossil deposits. Therefore, when such deposits are identified within the potential impact area of an implementation action, Reclamation will seek to either relocate the action to avoid the resource, or to work around the resource location so that it is protected from damage.

Reclamation anticipates utilizing a phased strategy to determine if paleontological deposits are present and will be unacceptably impacted by implementation action. The assessment will occur in conjunction with Section 106 processes defined in Section 3.12.3. Reclamation anticipates that the typical strategy would be as follows:

1. When a site location has been determined, a Reclamation cultural resources staff person will examine preliminary information to assess if there is the potential for paleontological resources at the location. This examination will likely focus on determining if fossiliferous soil formations outcrop in or near the area. Where they outcrop, the John Day Fossil Beds National Monument will be contacted to determine if they are aware of fossil materials in soils in the potential implementation area. If there are a number of possible project locations in specific reaches of watershed streams, then Reclamation would contract for records research to identify known fossil sites in those reaches.

2. When fossiliferous soils are present, an archeological survey crew would conduct investigations to determine if fossils are present at that location. This crew would be directed to watch for fossil materials while completing the archeological survey. If fossils were noted, they would collect a sample and record the location. The samples would then be provided to a professional paleontologist to assess if they might be scientifically important.

3. If it appears the fossils may be scientifically important and it is unlikely that the resource locality could be protected from damage, then a professional paleontologist would visit the site and conduct necessary actions to clearly assess the value of the fossil resource.

4. If a fossil locality were scientifically important and adverse effects could not be avoided, then mitigation actions would be considered. These actions would occur only if an action has been selected for implementation, consistent with conditions discussed below.

Mitigation Actions: Where adverse impacts cannot be avoided, the following mitigation actions will be completed:

1. Mitigation actions will consist, at a minimum, of detailed recordation of the deposit by a professional paleontologist.

2. Actual excavation of fossil deposits would likely occur only where the landowner has agreed to donate the recovered materials to the John Day Fossil Beds National Monument or other appropriate public institution. In most of those cases, fossil collection would likely be limited to a small representative sample. More extensive, systematic scientific excavation of fossil materials and, when warranted, associated environmental samples, would likely be limited to locations of outstanding scientific value. Mitigation would include analysis of collected samples, cataloging, and minimum preparation for curation.

3. Mitigation might also consist of completing or contributing toward preparation of interpretive materials for public enjoyment. This might particularly be used when landowners will not agree to donate fossil materials to an appropriate institution. Reclamation anticipates that interpretive efforts would contribute to existing efforts at the John Day Fossil Beds National Monument or other existing public interpretive program.

E. Indian Sacred Sites

Although EO 13007 requirements do not apply on non-federal lands, if, in the course of NHPA consultations with tribal staff, Reclamation is informed that an Indian sacred site is present, then Reclamation will consider if it is feasible to avoid or minimize damage to such sites. These protective actions would be implemented only when they would not compromise Reclamation's ability to meet responsibilities under the BiOp in an efficient and cost-effective manner.

Design and other criteria can be modified or augmented as part of consultation on individual, site-specific, in-stream projects. All actions related to the implementation of Action 149 will be conditional to the appropriate criteria developed during forthcoming programmatic and site-specific consultation with NMFS and USFWS.

Appendix P
OWRD Minimum Streamflows and In-stream Water Rights in the Project Area
(All values in cfs)

North Fork John Day Subbasin

Crane Creek RM: @ mouth Certificate: 73272

Month	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.
Flow	1.2	1.8	2.6	2.9	3.2	4.3	14.0	14.0	8.0	3.1	1.0	0.8

Trail Creek RM: 2.0 to 0.0 Certificate: 73273

Month	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.
Flow	8.5	7.8	5.6	6.1	6.0	7.3	19.6	50.0	33.0	20.3	10.2	8.3

Granite Creek[1] RM: 7.0 to 0.0 Certificate: 59784

Month	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.[2]	Sept.[2]
Flow	30.0	30.0	55.0	55.0	55.0	71.0	71.0	71.0	55.0	30.0	30.0/ 71.0	71.0/ 30.0

North Fork John Day River RM: 112.0 - 101.0 Certificate: 73271

Month	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.
Flow	28.2	23.5	15.7	16.7	15.4	15.8	32.7	80.0	58.0	40.0	36.3	28.6

Desolation Creek RM: 21.5 to 0.0 Certificate: 62317

Month	Oct.	Nov.	Dec.	Jan.	Feb.[2]	Mar.	Apr.	May	Jun.	Jul.[2]	Aug.[2]	Sept.
Flow	12.0	12.0	30.0	50.0	50.0/ 60.0	60.0	60.0	60.0	50.0	30.0/ 12.0	12.0/ 30.0	30.0

Camas Creek RM: 10.8 to 0.0 Certificate: 62320

Month	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.
Flow	67.6	86.3	105.0	112.0	135.0	163.0	300.0	300.0	200.0	150.0	69.6	58.6

Camas Creek RM: 17.9 to 10.8 Certificate: 62319

Month	Oct.	Nov.	Dec.	Jan.	Feb.[2]	Mar.	Apr.	May	Jun.	Jul.[2]	Aug.	Sept.
Flow	15.0	40.0	60.0	60.0	60.0/ 75.0	75.0	75.0	75.0	60.0	40.0/ 15.0	15.0	15.0

Camas Creek RM: 23.0 to 17.9 Certificate: 62318

Month	Oct.	Nov.	Dec.	Jan.	Feb.[2]	Mar.	Apr.	May	Jun.	Jul.[2]	Aug.	Sept.
Flow	12.0	40.0	55.0	55.0	55.0/ 70.0	70.0	70.0	70.0	55.0	40.0/ 12.0	12.0	12.0

North Fork John Day River RM: 101.0 - 65.4 Certificate: 72646

Month	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.
Flow	67.6	86.3	105.0	112.0	135.0	163.0	300.0	300.0	200.0	150.0	69.6	58.6

Big Wall Creek RM: 15.0 - 4.5 Certificate: 63259

Month	Oct.	Nov.	Dec.	Jan.	Feb.[2]	Mar.	Apr.	May	Jun.	Jul.[2]	Aug.	Sept.
Flow	7.0	15.0	25.0	30.0	30.0/ 44.0	4.0	44.0	44.0	30.0	15.0/ 7.0	7.0	7.0

Big Wall Creek RM: 4.5 - 0.0 Certificate: 63257

Month	Oct.	Nov.	Dec.	Jan.	Feb.[2]	Mar.	Apr.	May	Jun.	Jul.[2]	Aug.	Sept.
Flow	14.0	30.0	50.0	50.0	50.0/ 66.0	66.0	66.0	66.0	50.0	30.0/ 14.0	14.0	14.0

Cottonwood Creek[1] RM: @ mouth Certificate: 59783

Month	Oct.	Nov.	Dec.	Jan.	Feb.[2]	Mar.	Apr.	May	Jun.	Jul.[2]	Aug.	Sept.
Flow	3.0	10.0	10.0	10.0	10.0/ 15.0	15.0	15.0	15.0	10.0	7.0/ 3.0	3.0	3.0

Cottonwood Creek RM: 17.6 to 0.0 Certificate: 63251

Month	Oct.	Nov.	Dec.	Jan.	Feb.[2]	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.
Flow	6.0	10.0	25.0	25.0	25.0/ 33.0	33.0	33.0	33.0	25.0	10.0	6.0	6.0

North Fork John Day River[1] RM: 60.2 to 0.0 Certificate: 59792

Month	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.
Flow	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0

North Fork John Day River[1] RM: 15.3 - 0.0 Certificate: 66611

Month	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.
Flow	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0

North Fork John Day River RM: 15.0 - 0.0 Certificate: 72643

Month	Oct.	Nov.	Dec.	Jan.	Feb.[2]	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.
Flow	168.0	235.0	235.0	235.0	235.0/ 380.0	380.0	380.0	380.0	235.0	175.0	157.0	140.0

Middle Fork John Day Subbasin

Vinegar Creek RM: 4.0 - 0.0 Certificate: 64192

Month	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.[2]	Aug.	Sept.
Flow	3.0	3.0	7.0	15.0	15.0	25.0	25.0	25.0	15.0	7.0/ 3.0	3.0	3.0

Clear Creek[1] RM: @ mouth Certificate: 59782

Month	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.[2]	Aug.[2]	Sept.[2]
Flow	10.0	10.0	10.0	18.0	18.0	25.0	25.0	25.0	18.0	10.0/ 4.0	4.0/ 25.0	25.0/ 10.0

Camp Creek RM: 3.0 - 0.0 Certificate: 63256

Month	Oct.	Nov.	Dec.	Jan.	Feb.[2]	Mar.	Apr.	May	Jun.	Jul.[2]	Aug.	Sept.
Flow	7.0	15.0	35.0	35.0	35.0/ 48.0	48.0	48.0	48.0	35.0	15.0/ 7.0	7.0	7.0

Long Creek RM: 31.2 to 25.6 Certificate: 63254

Month	Oct.	Nov.	Dec.	Jan.	Feb.[2]	Mar.	Apr.	May	Jun.	Jul.[2]	Aug.	Sept.
Flow	3.0	8.0	15.0	15.0	15.0/ 20.0	20.0	20.0	20.0	15.0	8.0/ 3.0	3.0	3.0

Long Creek RM: 25.6 to 0.0 Certificate: 63255

Month	Oct.	Nov.	Dec.	Jan.	Feb.[2]	Mar.	Apr.	May	Jun.	Jul.[2]	Aug.	Sept.
Flow	5.0	10.0	15.0	15.0	15.0/ 25.0	25.0	25.0	25.0	15.0	10.0/ 5.0	5.0	5.0

Middle Fork John Day River[1] RM: 14.9 - 0.0 Certificate: 66610

Month	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.
Flow	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0

Middle Fork John Day River[1] RM: 10 to 0.0 Certificate: 59789

Month	Oct.	Nov.	Dec.	Jan.	Feb.[2]	Mar.	Apr.	May	Jun.	Jul.[2]	Aug.[2]	Sept.[2]
Flow	50.0	80.0	80.0	80.0	80.0/ 125.0	125.0	125.0	125.0	80.0	50.0/ 25.0	25.0/ 125.0	125.0/ 50.0

Upper John Day Subbasin

Indian Creek RM: 7.0 to 0.0 Certificate: 64193

Month	Oct.	Nov.	Dec.	Jan.	Feb.[2]	Mar.	Apr.	May	Jun.	Jul.[2]	Aug.	Sept.
Flow	5.0	10.0	20.0	20.0	20.0/ 26.0	26.0	26.0	26.0	20.0	10.0/ 5.0	5.0	5.0

John Day River[1] RM: 275.7 Certificate: 59788

Month	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.[2]	Sept.
Flow	25.0	25.0	25.0	25.0	25.0	34.0	34.0	34.0	25.0	15.0	15.0/ 34.0	34.0

Canyon Creek[1] RM: 15.3 to 0.0 Certificate: 59781

Month	Oct.	Nov.	Dec.	Jan.	Feb.[2]	Mar.	Apr.	May	Jun.	Jul.[2]	Aug.	Sept.
Flow	9.0	15.0	25.0	25.0	25.0/ 34.0	34.0	34.0	34.0	25.0	15.0/ 9.0	9.0	9.0

East Fork Canyon Creek RM: 8.0 - 1.0 Certificate: 73270

Month	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.
Flow	2.7	4.1	4.7	4.8	5.8	11.9	22.0	22.0	15.0	6.6	2.6	2.1

Middle Fork Canyon Creek RM: 8.0 - 0.0 Certificate: 73269

Month	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.
Flow	1.4	2.1	2.4	2.5	3.1	6.3	15.6	20.4	11.1	2.9	1.3	1.1

Beech Creek[1] RM: 11.3 to 0.0 Certificate: 59779

Month	Oct.	Nov.	Dec.	Jan.	Feb.[2]	Mar.	Apr.	May	Jun.	Jul.[2]	Aug.	Sept.
Flow	8.0	15.0	30.0	30.0	30.0/ 44.0	44.0	44.0	44.0	30.0	15.0/ 8.0	8.0	8.0

East Fork Beech Creek RM: 8.0 to 4.0 Certificate: 63252

Month	Oct.	Nov.	Dec.	Jan.	Feb.[2]	Mar.	Apr.	May	Jun.	Jul.[2]	Aug.	Sept.
Flow	2.0	2.0	8.0	8.0	8.0/ 10.0	10.0	10.0	10.0	8.0	4.0/ 2.0	2.0	2.0

East Fork Beech Creek RM: 4.0 to 0.0 Certificate: 63253

Month	Oct.	Nov.	Dec.	Jan.	Feb.[2]	Mar.	Apr.	May	Jun.	Jul.[2]	Aug.	Sept.
Flow	4.0	8.0	15.0	15.0	15.0/ 22.0	22.0	22.0	22.0	15.0	8.0/ 4.0	4.0	4.0

John Day River[1] RM: 251 Certificate: 59787

Month	Oct.	Nov.	Dec.	Jan.	Feb.[2]	Mar.	Apr.	May	Jun.	Jul.[2]	Aug.	Sept.
Flow	50.0	80.0	80.0	80.0	80.0/ 118.0	118.0	118.0	118.0	80.0	150.0/ 30.0	30.0	30.0

South Fork John Day River[1] RM: 14.9 to 0.0 Certificate: 59794

Month	Oct.	Nov.	Dec.	Jan.	Feb.[2]	Mar.	Apr.	May	Jun.	Jul.[2]	Aug.	Sept.
Flow	25.0	50.0	100.0	100.0	100.0/ 133.0	133.0	133.0	133.0	100.0	50.0/ 25.0	25.0	25.0

Murderers Creek RM: 7.0 - 0.0 Certificate: 63258

Month	Oct.	Nov.	Dec.	Jan.	Feb.[2]	Mar.	Apr.	May	Jun.	Jul.[2]	Aug.	Sept.
Flow	8.0	8.0	15.0	30.0	30.0/ 41.0	41.0	41.0	41.0	30.0	15.0/ 8.0	8.0	8.0

John Day River[1] RM: 211.3 Certificate: 59786

Month	Oct.	Nov.	Dec.	Jan.	Feb.[2]	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.
Flow	60.0	120.0	120.0	120.0	120.0/ 160.0	160.0	160.0	160.0	120.0	60.0	60.0	60.0

Rock Creek[1] RM: 5.0 to 0.0 Certificate: 59793

Month	Oct.	Nov.	Dec.	Jan.	Feb.[2]	Mar.	Apr.	May	Jun.	Jul.[2]	Aug.	Sept.
Flow	10.0	20.0	35.0	35.0	35.0/ 50.0	50.0	50.0	50.0	35.0	20.0/ 10.0	10.0	10.0

[1] Originally established as minimum streamflows, then converted to in-stream water rights between 1989 and 1991.

[2.] Split streamflow data "x/y" where x = minimum in-stream water right for first half of the month, y = minimum in-stream water right for second half of the month.

Appendix Q

Animal and Plant Species Having Special Protection Status within the Project Area. [1]

		PROTECTION STATUS [2]				
SCIENTIFIC NAME	COMMON NAME	FEDERAL	STATE [3]	BLM	FS	HABITAT
FEDERAL LISTED, PROPOSED, OR CANDIDATE SPECIES						
Oncorhynchus mykiss	Steelhead, Summer (Mid-Columbia River ESU)	LT	SV	-	-	Cool headwater streams and mainstem rivers, gravel riffles for spawning and feeding, pools for holding and hiding.
Salvelinus confluentus	Trout, Bull	LT	SC	-	-	Cold, complex headwater streams and mainstem rivers, deep pools.
Haliaeetus leucocephalus	Eagle, Bald	LT	LT	-	-	Nests in a tall open-canopied tree (typically live, but occasionally dead) within 1/2-mile of water body that harbors fish or waterfowl prey.
Lynx canadensis	Lynx	LT	-	-	-	Dense boreal forests with meadow, bog, or rock-outcrop openings.
Coccyzus americanus	Cuckoo, Yellow-billed	C	SC	-	-	Thick, closed-canopy, riparian forest of cottonwood or willow with a dense shrubby understory.
Rana luteiventris	Frog, Columbia Spotted	C	SU	-	M, U	Ponds, springs, marshes, and slow-moving streams having a bottom layer of decaying vegetation.
Other AMPHIBIANS						
Rana pipiens	Frog, Northern Leopard	-	SC	BS	U	Marshes, wet meadows, vegetated irrigation canals, ponds, and reservoirs with quiet or slow-flowing water.
Ascaphus truei	Frog, Tailed	SoC	SV	-	-	Clear, cold, fast-flowing permanent streams with riparian vegetation.
Bufo boreas	Toad, Western	-	SV	-	-	Forested or non-forested habitats, with loose soil or rodent burrows for daytime hiding places and seasonal water for breeding.

Animal and Plant Species Having Special Protection Status within the Project Area. [1]

		PROTECTION STATUS [2]				
SCIENTIFIC NAME	COMMON NAME	FEDERAL	STATE [3]	BLM	FS	HABITAT
Other BIRDS						
Agelaius tricolor	Blackbird, Tricolored	SoC	SP	AS	M	Marshes with emergent vegetation such as cattails, willows, or other tall shrubs in northern Umatilla and Wheeler counties.
Dolichonyx oryzivorus	Bobolink	-	SV	-	M	Wet or irrigated meadows, grasslands, pastures, or grain cropland, especially if mowed or grazed to create favorable conditions for small nesting colonies.
Bucephala albeola	Bufflehead	-	SU	AS	M	Mountain lakes surrounded by open forest containing snags for cavity-nesting. Uses low elevation lakes in winter.
Grus canadensis tabida	Crane, Greater Sandhill	-	SV	-	-	Marshes, wet meadows, lakes with shoreline of emergent vegetation, or drier pastures remote from human intrusion.
Falco peregrinus anatum	Falcon, American Peregrine	-	LE	BS	M, U	Nests on the ledge of tall cliffs that overlook open (or patchy forested) areas with an ample supply of bird prey.
Empidonax traillii adastus	Flycatcher, Eastern Oregon Willow	SoC	SU	-	-	Thickets of willow or other tall shrubs at the edge of streams, springs, seeps, marshes, or meadows. Less-common in tall shrubs of forest clearings near surface water.
Empidonax wrightii	Flycatcher, Gray	-	-	-	M, U	Arid shrublands -- or open forests of ponderosa pine or juniper -- having big sagebrush, bitterbrush, or mountain mahogany.
Contopus cooperi	Flycatcher, Olive-sided	SoC	SV	-	-	Open coniferous or deciduous forest with an uneven canopy and tall snags for perching.

Animal and Plant Species Having Special Protection Status within the Project Area. [1]

		PROTECTION STATUS [2]				
SCIENTIFIC NAME	COMMON NAME	FEDERAL	STATE [3]	BLM	FS	HABITAT
Accipiter gentilis	Goshawk, Northern	SoC	SC	BS	-	Coniferous forest or aspen/cottonwood groves with dense canopy cover of mature trees.
Buteo regalis	Hawk, Ferruginous	SoC	SC	BS	-	Open juniper woodlands, sagebrush flats, or grasslands with cliff ledge or isolated tree for nest platform.
Buteo swainsoni	Hawk, Swainson's	-	SV	-	-	Open juniper woodlands, sagebrush flats, or grasslands with tree for nest platform.
Sitta pygmaea	Nuthatch, Pygmy	-	SC/SV[4]	BS	-	Open ponderosa pine forest with mature trees and large-diameter decayed snags for its nest or roost cavity.
Aegolius funereus	Owl, Boreal	-	SU	-	-	Mountainous high-elevation forest of Engelmann spruce, subalpine fir, Douglas fir, or lodgepole pine with large-diameter snags for nest cavity.
Otus flammeolus	Owl, Flammulated	-	SC	BS	-	Open ponderosa pine forest, with large-diameter defective live trees or snags for a nest cavity and grassy openings for foraging.
Strix nebulosa	Owl, Great Gray	-	SV	-	-	Mid-elevation, mature forest of mixed conifer species, lodgepole pine, or ponderosa pine with meadows or other forest openings (e.g. clearcuts).
Athene cunicularia hypugaea	Owl, Western Burrowing	SoC	SC	BS	-	Sagebrush, grasslands, pastures, or roadsides where vegetation is sparse, terrain is level, and ground squirrel or badger burrows are available for underground nesting.

Animal and Plant Species Having Special Protection Status within the Project Area. [1]

		PROTECTION STATUS [2]				
SCIENTIFIC NAME	COMMON NAME	FEDERAL	STATE [3]	BLM	FS	HABITAT
Glaucidium gnoma	Pygmy-owl, Northern	-	SC	BS	-	Coniferous or coniferous-deciduous forests having large-diameter defective live trees or snags for a nest cavity.
Oreortyx pictus	Quail, Mountain	SoC	SU	-	-	Open ponderosa pine forest with abundant brushy undergrowth, especially shrubs producing berry fruits.
Centrocercus urophasianus phaios	Sage-grouse, Western Greater	SoC	SV	BS	M	Shrubland dominated by big sagebrush that covers15-50% of the ground. Interspersed meadows are extremely valuable as brood-rearing sites.
Bartramia longicauda	Sandpiper, Upland	SoC	SC	BS	M, U	For breeding, partially-flooded, high-elevation meadows with grasses, sedges, and forbs often surrounded by sagebrush. Nesting known on private lands of southern Grant and Umatilla Counties.
Sphyrapicus thyroideus	Sapsucker, Williamson's	-	SU	-	-	Open high-elevation forest of mature ponderosa pine, lodgepole pine, grand fir, Douglas fir, or aspen with defective live trees or snags for nest cavity.
Lanius ludovicianus	Shrike, Loggerhead	-	SV	-	-	Sagebrush and juniper steppe having big sagebrush, bitterbrush, or greasewood of western Grant County and eastern Wheeler County.
Riparia riparia	Swallow, Bank	-	SU	-	-	Grassland, pasture, or agricultural areas near surface water, with vertical dirt embankments for its excavated nest burrow.

Animal and Plant Species Having Special Protection Status within the Project Area. [1]

		PROTECTION STATUS [2]				
SCIENTIFIC NAME	COMMON NAME	FEDERAL	STATE [3]	BLM	FS	HABITAT
Picoides arcticus	Woodpecker, Black-backed	-	SC	BS	-	Forest of mature lodgepole pine, ponderosa pine, or occasionally other tree species with defective live trees or snags for its nest cavity.
Dryocopus pileatus	Woodpecker, Pileated	-	SV	-	-	Forest of mature Douglas fir, grand fir, or mixed conifers with abundant large snags for its nest cavity and logs for foraging on carpenter ants.
Picoides tridactylus	Woodpecker, Three-toed	-	SC	BS	-	High-elevation forest of mature lodgepole pine, grand fir, subalpine fir, or Engelmann spruce with large defective live trees or snags for its nest cavity.
Picoides albolarvatus	Woodpecker, White-headed	SoC	SC	BS	-	Forest of mature ponderosa pine or mixed conifers that include ponderosa pine, with large snags for its nest cavity.
Other FISH						
Lampetra tridentata	Lamprey, Pacific	SoC	SV	-	-	Cool mainstem rivers with gravel for spawning and sediment for burrowing.
Cottus bairdi spp.	Sculpin, Malheur Mottled	SoC	SC	-	M	Cool, clear streams with moderate to rapid current, and rubble, gravel, or rocky substrate.
Cottus marginatus	Sculpin, Margined	SoC	SV	-	U	Deep pools or glides in streams with small gravel or silt substrate and water temperatures preferably below 20° C (68° F).
Oncorhynchus mykiss	Trout, Interior Redband	SoC	SV	-	M, U	Cool headwater streams and mainstem rivers, gravel riffles for spawn-ing and feeding, pools for holding and hiding.

Animal and Plant Species Having Special Protection Status within the Project Area. [1]

		PROTECTION STATUS [2]				
SCIENTIFIC NAME	COMMON NAME	FEDERAL	STATE [3]	BLM	FS	HABITAT
Oncorhynchus clarki lewisi	Trout, Westslope Cutthroat	SoC	SV	-	M, U	Cool headwater streams and mainstem rivers, gravel riffles for spawning and feeding, pools for holding and hiding.
Other MAMMALS						
Corynorhinus townsendii palescens	Bat, Pale Western Big-eared	SoC	SC	BS	-	Any vegetation type with rock crevice, bridge, or building for male roosting, and cave or mine for maternity roosting and winter hibernation.
Antrozous pallidus pallidus	Bat, Pallid	-	SV	-	-	Open ponderosa pine forest, juniper woodland, or sagebrush with rock crevices, caves, mines, or buildings for roosting.
Lasionycteris noctivagans	Bat, Silver-haired	SoC	SU	-	-	Mature or over-mature forest of Douglas fir, grand fir, ponderosa pine, or juniper with loose-barked snags for roosting.
Euderma maculatum	Bat, Spotted	SoC	-	AS	-	A wide variety of habitats -- from ponderosa pine forest to desert -- having cliffs or canyon walls with crevices for roosting.
Martes pennanti	Fisher	SoC	SC	BS	M	Extensive closed-canopy forest of mature coniferous or deciduous trees with abundant snags and streams in the vicinity.
Vulpes velox	Fox, Kit	-	LT	-	-	Arid desert valleys dominated by shadscale, greasewood, or big sagebrush with loose soils to dig burrows for denning.
Lepus townsendii	Jackrabbit, White-tailed	-	SU	-	-	Arid bunchgrass areas with few or no shrubs.
Martes americana	Marten, American	-	SV	-	-	Closed-canopy forest of mature lodgepole pine, Douglas fir, grand fir with abundant large-diameter snags and logs.

Animal and Plant Species Having Special Protection Status within the Project Area. [1]

		PROTECTION STATUS [2]				
SCIENTIFIC NAME	COMMON NAME	FEDERAL	STATE [3]	BLM	FS	HABITAT
Myotis thysanodes	Myotis, Fringed	SoC	SV	-	-	A wide variety of habitats -- forests, or riparian areas within sagebrush shrubland, may be preferred -- having caves or buildings for roosting.
Myotis evotis	Myotis, Long-eared	SoC	SU	-	-	Coniferous forest, deciduous forest, or arid shrubland with rock crevices, caves, mines, bridges, hollow trees, or loose bark for roosting.
Myotis volans	Myotis, Long-legged	SoC	SU	-	-	Forest of ponderosa pine, lodgepole pine, grand fir, Douglas fir, or riparian deciduous trees with cliff faces, rock outcrops, abandoned buildings, or caves for roosts.
Myotis ciliolabrum	Myotis, Western Small-footed	SoC	SU	-	-	Coniferous forest or arid shrubland with rock crevices for roosting, or caves and mines for winter hibernation.
Brachylagus idahoensis	Rabbit, Pygmy	SoC	SV	AS	M	Shrubland or juniper woodland with tall (031-35 inches) big sagebrush (028 percent canopy cover) growing on deep (019-21 inches), friable soil for burrow excavation. Historic range was east of line connecting Redmond and Klamath Falls, but is now east of Millican and Paulina.
Ovis canadensis canadensis	Sheep, Rocky Mountain Bighorn	-	-	-	U	Open areas on rocky slopes, ridges, rimrocks, cliffs, and canyon walls having adjacent grasslands or meadows with few trees.
Gulo gulo luteus	Wolverine, California	SoC	LT	-	M, U	Isolated alpine areas or high-elevation forests.

Animal and Plant Species Having Special Protection Status within the Project Area. [1]

		PROTECTION STATUS [2]				
SCIENTIFIC NAME	COMMON NAME	FEDERAL	STATE [3]	BLM	FS	HABITAT
Other REPTILES						
Clemmys marmorata marmorata	Turtle, Northwestern Pond	SoC	SC	-	-	Marshes, sloughs, oxbows, ponds, vernal pools, reservoirs, or slow-water rivers and streams below 2,500' elevation (sometimes up to 4,000'). Single isolated records from the John Day River system in western Grant County.
Chrysemys picta	Turtle, Painted	-	SC	BS	U	Still or slow-moving waters with soft substrates, basking sites, and abundant aquatic vegetation.
Other PLANTS						
Achnatherum hendersonii	Ricegrass, Henderson's	-	C	BS	M	Dry, rocky soils in association with *Poa secunda*, *Artemisia rigida*, *Danthonia unispicata*, and *Lomatium* spp.
Achnatherum wallowensis	Ricegrass, Wallowa	SoC	-	BS	M	Scablands with basalt or lithosol soils.
Allium robinsonii	Onion, Robinson's	-	-	AS	-	Sand and gravel deposits of river valley benches in association with *Artemisia arbuscula* and *Poa secunda*.
Astragalus collinus var. laurentii	Milk-vetch, Laurence's	SoC	LT	BS	-	Basaltic grassland and sagebrush desert.
Astragalus diaphanus var. diurnus	Milk-vetch, South Fork John Day	-	LT	BS	M	Thin, gravelly soils usually overlaying basalt within open juniper woodlands.
Astragalus tegetarioides	Kentrophyta, Bastard	-	C	BS	M	Ponderosa pine forest.
Botrychium ascendens	Moonwort, Upward-lobed	SoC	C	-	-	Moist meadows, riparian areas, or moist roadsides.
Botrychium crenulatum	Moonwort, Crenulate	SoC	C	-	M, U	Moist meadows, riparian areas, or moist roadsides.
Botrychium fenestratum		-	-	-	U	Moist meadows, riparian areas, or moist roadsides.

Animal and Plant Species Having Special Protection Status within the Project Area. [1]

		PROTECTION STATUS [2]				
SCIENTIFIC NAME	COMMON NAME	FEDERAL	STATE [3]	BLM	FS	HABITAT
Botrychium lanceolatum ssp. lanceolatum	Grape-fern, Lance-leaved	-	-	-	M, U	Moist meadows, riparian areas, or moist roadsides.
Botrychium lunaria	Moonwort	-	-	-	U	Moist meadows, riparian areas, or moist roadsides.
Botrychium minganense	Moonwort, Gray	-	-	-	U	Moist meadows, riparian areas, or moist roadsides.
Botrychium montanum	Grape-fern, Mountain	-	-	-	U	Moist meadows, riparian areas, or moist roadsides.
Botrychium paradoxum	Moonwort, Twin-spike	SoC	C	-	U	Moist meadows, riparian areas, or moist roadsides.
Botrychium pedunculosum	Moonwort, Stalked	SoC	C	-	U	Moist meadows, riparian areas, or moist roadsides.
Botrychium pinnatum	Grape-fern, Pinnate	-	-	-	M, U	Moist meadows, riparian areas, or moist roadsides.
Calochortus longebarbatus var. longebarbatus	Mariposa-lily, Long-bearded	-	-	-	U	Moist meadows or riparain areas in dry forests.
Calochortus longebarbatus var. peckii	Mariposa-lily, Peck's	-	C	BS	M	Along dry streambeds, intermittent drainages, or seasonally-wet meadows within ponderosa pine forest and juniper woodland.
Calochortus macrocarpus var. maculosus	Mariposa-lily, Green-band	-	-	-	U	Grasslands or ridgetops.
Calochortus nitidus	Mariposa-lily, Broad-fruit	-	-	-	U	Grasslands or ridgetops.
Camissonia pygmaea	Evening-primrose, Dwarf	-	C	BS	M, U	Sagebrush uplands.
Carex backii	Sedge, Back's	-	-	-	M, U	Moist, shady forest or other warm, moist plant associations.
Carex crawfordii	Sedge, Crawford's	-	-	-	U	Moist or wet places.
Carex eleocharis	Sedge, Involute-leaved	-	-	AS	-	Open, dry to moderately moist, often grassy places.
Carex hystericina	Sedge, Porcupine	-	-	AS	U	Wet ground near riparian areas, meadows, or roadside ditches.

Animal and Plant Species Having Special Protection Status within the Project Area. [1]

		PROTECTION STATUS [2]				
SCIENTIFIC NAME	COMMON NAME	FEDERAL	STATE [3]	BLM	FS	HABITAT
Carex interior	Sedge, Inland	-	-	AS	M, U	Swamps, bogs, or other wet places.
Carex parryana	Sedge, Idaho	-	-	-	M	Moist meadows or riparian areas.
Cymopterus nivalis	Spring-parsley, Snowline	-	-	AS	-	Rocky places at high elevation.
Cypripedium fasciculatum	Lady's-slipper, Clustered	SoC	C	-	M, U	Fir or ponderosa pine forest.
Dryopteris filix-mas	Fern, Male	-	-	AS	-	Streambanks or moist forest.
Erigeron disparipilus	Erigeron, White Cushion	-	-	-	U	Scablands with basalt or lithosol soils.
Eriogonum crosbyae	Buckwheat, Crosby's	SoC	LT	-	-	Sparsely-vegetated outcrops of tuffaceous parent material with little soil development -- or deep clay with rhyolite -- within sagebrush at 5,100-6,000' elevation.
Eriogonum cusickii	Eriogonum, Cusick's	SoC	C	BS	-	Stony sagebrush desert.
Juncus torreyi	Rush, Torrey's	-	-	AS	-	Moist areas at seeps, springs, ponds, or rivers.
Leptodactylon pungens ssp.hazeliae	Prickly-phlox, Hazel's	SoC	C	-	U	Basalt cliffs or ridges.
Lomatium erythrocarpum	Lomatium, Red-fruited	SoC	LE	-	M	Talus slopes, ridges, or argillite rocky areas.
Lomatium ravenii	Lomatium, Raven's	-	-	AS	M	Scablands with lithosol soils.
Lomatium salmoniflorum	Lomatium, Salmon River	-	-	-	U	Grasslands or open rocky areas.
Luina serpentina	Luina, Colonial	SoC	LT	BS	M	Rocky outcrops or talus slopes, commonly on basalt and marine sediments.
Lycopodium complanatum	Cedar, Ground	-	-	-	U	Forests or disturbed areas with decayed logs.
Mimulus clivicola	Monkeyflower, Bank	-	-	-	U	Vernal, moist open slopes or draws.
Mimulus evanescens	Monkeyflower, Disappearing	SoC	C	BS	M	Meadows, seeps, and riparian or seasonally-moist areas within sagebrush desert.
Mimulus jungermannioides	Monkeyflower, Hepatic	-	C	BS	-	Steep-sided canyons with vertical, basalt walls that seep water during much of the year.

Animal and Plant Species Having Special Protection Status within the Project Area. [1]

		PROTECTION STATUS [2]				
SCIENTIFIC NAME	COMMON NAME	FEDERAL	STATE [3]	BLM	FS	HABITAT
Pellaea bridgesii	Cliffbrake, Bridge's	-	-	-	M	Talus slopes, ridges, or argillite/granite rocky areas.
Phacelia minutissima	Phacelia, Dwarf	-	C	-	M, U	Vernal wet seeps, meadow edges, or playas.
Phlox multiflora	Phlox, Many-flowered	-	-	-	U	Basalt cliffs or rocky outcrops.
Pleuropogon oregonus	Semaphoregrass, Oregon	SoC	LT	-	M	Wet meadows or riparian areas within sagebrush.
Rorippa columbiae	Cress, Columbia	-	C	BS	-	Riparian areas with moist, sandy soil.
Suksdorfia violacea	Suksdorfia, Violet	-	-	-	U	Moist, mossy cliffs or wet talus slopes.
Thelypodium eucosmum	Thelypody, Arrow-leaf	SoC	LT	BS	M, U	Springs, seeps, streambanks, or underneath isolated trees within juniper woodland.
Thelypodium howellii ssp. howellii	Thelypody, Howell's	-	-	AS	-	River valleys and moist plains.
Trifolium douglasii	Clover, Douglas	SoC	-	-	U	Moist meadows or riparian areas.
Trifolium leibergii	Clover, Leiberg's	SoC	C	-	-	Sagebrush desert or ponderosa pine forest.

[1] *Sources*:
(a) Oregon Natural Heritage Program. 2001. *Rare, Endangered and Threatened Plants and Animals of Oregon*. Accessed online at www.abi.org/nhp/us/or/tebook/pdf.
(b) Hanf, Jan. 2002. *Prineville District 2002 Special Status Animal Species List*. Bureau of Land Management, Prineville, OR 3 pp.
(c) Bureau of Land Management. 2002. *Prineville District Special Status Plant List, Including Other Plants of Interest*. Accessed online at www.or.blm.gov/prineville/Botany/district_list.htm.
(d) USDA Forest Service. 2000. *Pacific Northwest Regional Forester's Sensitive Animal List* (updated November 15, 2000).
(e) USDA Forest Service. 1999. *Pacific Northwest Regional Forester's Sensitive Plant List* (updated April 1999).

[2] - = No status
BA = Bureau of Land Management assessment species
BS = Bureau of Land Management sensitive species
C = Candidate for listing as endangered or threatened species
LE = Listed as endangered species
LT = Listed as threatened species
M = Forest Service sensitive species on Malheur NF
SC = State of Oregon sensitive - critical species
SoC= Species of concern
SP = State of Oregon sensitive - peripheral species
SU = State of Oregon sensitive - unknown species
SV = State of Oregon sensitive - vulnerable species
U = Forest Service sensitive species on Umatilla NF

[3] Oregon law, as specified in ORS 496.192 for wildlife and ORS 564.135 for plants, does not require a private landowner to protect *state-listed* species or restrict the use of private land. Because *state-sensitive* species are potentially eligible for state-listing, they are identified for the express purpose of encouraging actions that improve their status and prevent state-listing. Private landowners who voluntarily improve or protect habitat for state-listed or state-sensitive species help society to avoid future restrictions that a federal listing might require by authority of the Endangered Species Act of 1973 (as amended).

[4] SC in Blue Mountain ecoregion/province; SV in High Lava Plains ecoregion/province

Appendix R

Oregon Department of Agriculture-Designated Noxious Weeds Known to Occur in Counties of the Project Area. [1]

SCIENTIFIC NAME	COMMON NAME	ODA [2] DESIGNATION			COUNTY [3]			
		A	B	T	G	M	U	W
Agropyron repens	Quackgrass		●				●	
Ambrosia artemisiifolia	Ragweed		●				●	
Anchusa officinalis	Common bugloss		●				●	
Cardaria draba	Whitetop		●		●	●	●	●
Cardaria pubescens	Hairy whitetop		●			●	●	●
Carduus nutans	Musk thistle		●		●	●	●	
Centaurea diffusa	Diffuse knapweed		●		●	●	●	●
Centaurea maculosa	Spotted knapweed		●	●	●	●	●	●
Centaurea repens	Russian knapweed		●		●	●	●	●
Centaurea solstitialis	Yellow starthistle		●	●	●	●	●	●
Centaurea virgata	Squarrose knapweed	●		●	●			
Chondrilla juncea	Rush skeletonweed		●	●		●	●	
Cirsium arvense	Canada thistle		●		●	●	●	●
Cirsium vulgare	Bull thistle		●		●	●	●	●
Conium maculatum	Poison hemlock		●		●	●	●	●
Convulvulus arvensis	Field bindweed		●		●	●	●	
Crupina vulgaris	Bearded creeper		●				●	
Cynoglossum officinale	Houndstongue		●		●		●	
Equisetum telmateia	Giant horsetail		●				●	
Euphorbia esula	Leafy spurge		●	●	●		●	●
Hemizonia pungens	Spikeweed		●		●	●	●	●
Hypericum perforatum	St. Johnswort		●		●	●	●	●
Kochia scoparia	Kochia		●			●		
Lepidium latifolium	Perennial pepperweed		●		●		●	●
Linaria dalmatica	Dalmation toadflax		●		●	●	●	●
Linaria vulgaris	Yellow toadflax		●			●	●	
Lythrum salicaria	Purple loosestrife		●	●	●	●	●	●
Onopordum acanthium	Scotch thistle		●		●	●	●	●
Potentilla recta	Sulfur cinquefoil		●		●	●	●	
Salvia aethiopis	Mediterranean sage		●		●			●
Senecio jacobaea	Tansy ragwort		●	●	●	●	●	●
Silybum marianum	Milk thistle		●				●	
Solanum elaegnifolium	Silverleaf nightshade	●					●	
Sorghum halepense	Johnsongrass		●			●	●	
Sphaerophysa salsula	Austrian peaweed		●			●		
Taeniatherum caput-medusae	Medusahead rye		●		●	●	●	●

Oregon Department of Agriculture-Designated Noxious Weeds Known to Occur in Counties of the Project Area. [1]

SCIENTIFIC NAME	COMMON NAME	ODA [2] DESIGNATION			COUNTY [3]			
		A	B	T	G	M	U	W
Tribulus terrestris	Puncturevine		●		●	●		●
Xanthium spinosum	Spiny cocklebur		●			●	●	●

[1] *Sources*:
(a) Oregon Department of Agriculture. 2001. *Oregon Noxious Weed Strategic Plan*. Accessed online June 8, 2002 at www.oda.state.or.us/Plant/Weed_Control/plan/contents.html.
(b) Rice, P.M. 2002. *INVADERS Database System*. University of Montana, Missoula, MT. Accessed May 14, 2002 online at www.invader.dbs.umt.edu.
(c) Sheley, R.L., and J.K. Petroff. 1999. *Biology and Management of Noxious Rangeland Weeds*. Oregon State University Press, Corvallis, OR. 438 pp.

[2] **A** ="A" designated weed has known economic importance and (1) occurs in Oregon in small enough infestations to make eradication/containment possible, or (2) is not known to occur in Oregon but its presence in neighboring states makes future Oregon occurrence seem imminent.
RECOMMENDED ACTION: Intensive control when and where found.

B ="B" designated weed has known economic importance and is regionally abundant but may have limited distribution in some counties.
RECOMMENDED ACTION: Intensive control at the state or county level as determined on a case-by-case basis. Biological control is the main approach where implementation of a fully integrated statewide management plan is not feasible.

T ="T" designated weed is given priority by the State Weed Board for implementing a statewide management plan.

Source: Oregon Department of Agriculture. 2002. *Noxious Weed Policy and Classification System*. Accessed May 14, 2002 online at www.oda.state.or.us/Plant/weed_control/Weed_Policy.pdf.

[3] Only those counties with significant acreage in the project area are included here.
G = Grant County
M = Morrow County
U = Umatilla County
W = Wheeler County

Appendix S

Characteristics of wetlands likely to occur on private lands of the John Day River Basin. [1]

USFWS NWI CLASS [2]	LAND FORM [3]	MNF/UNF WETLAND PLANT ASSOCIATION[4]	DOMINANT PLANTS [5]	MEETS CRITERIA FOR JURISDICTIONAL WETLAND [6]		
				VEG	SOIL	HYDR
Persistent Emergent (map-coded PEM1, or R3/4SB7, or R3/4US5)	BV	Small-fruit Bulrush PA	Small-fruit bulrush, Large-leaf avens, Small-winged sedge, Tall mannagrass	Y	Y	Y
		Torrent Sedge PCT	Torrent sedge, Creeping bentgrass, Field mint, Common willow-herb	Y	?	?
	BV+NV	Common Horsetail PA	Common horsetail, Field mint, Common monkey-flower, Tall mannagrass	Y	Y	Y
	NV	American Speedwell PA	American speedwell, Common monkey-flower, Musk monkey-flower, Fowl bluegrass, Tall mannagrass	Y	?	?
		Arrowleaf Groundsel PA	Arrowleaf groundsel, False bugbane, Oak fern, Soft-leaved sedge, Tall mannagrass	Y	?	?
		Tall Mannagrass PA	Tall mannagrass, Lady fern, Dewey's sedge, Common horsetail, Stinking currant	Y	Y	Y/N
Broad-leaved Deciduous Scrub-Shrub (map-coded PSS1)	BV	Coyote Willow PA	Coyote willow, Common horsetail, Rigid willow, Pacific willow, Creeping bentgrass	Y	?	Y
		Willow/Mesic Forb PCT	Booth willow, Stinking currant, Mountain alder, Musk monkey-flower, Tall mannagrass	Y	?	?
		Rigid Willow PCT	Rigid willow, Pacific willow, Prairie sage, Fowl bluegrass, Creeping bentgrass	Y	?	?
		Mountain Alder/ Bladder Sedge PA	Mountain alder, Bladder sedge, Aquatic sedge, Woolly sedge, Cusick's sedge	Y	Y/N	Y
		Mountain Alder, Kentucky Bluegrass PCT	Mountain alder, Kentucky bluegrass, Starry false-Solomon's seal, Blue wildrye, Common cowparsnip	Y/N	Y/N	N

Characteristics of wetlands likely to occur on private lands of the John Day River Basin. [1]

USFWS NWI CLASS [2]	LAND FORM [3]	MNF/UNF WETLAND PLANT ASSOCIATION[4]	DOMINANT PLANTS [5]	MEETS CRITERIA FOR JURISDICTIONAL WETLAND [6]		
				VEG	SOIL	HYDR
	BV+NV	Mountain Alder - Red-osier Dogwood/Mesic Forb PA	Mountain alder, Red-osier dogwood, Prickly currant, Common snowberry, Enchanter's nightshade	Y	Y/N	Y
		Mountain Alder/ Dewey's Sedge PCT	Mountain alder, Dewey's sedge, Thimbleberry, Nodding fescue, Common horsetail	Y	Y/N	Y/N
		Red-osier Dogwood PA	Red-osier dogwood, Common snowberry, Stinking currant, Rocky Mtn. maple, Tall mannagrass	Y	Y	N
		Black Hawthorn PCT	Black hawthorn, Common snowberry, Alder-leaved buckthorn, Western meadowrue, Enchanter's nightshade	Y/N	Y/N	Y/N
	NV	Water Birch/ Mesic Forb PCT	Water birch, Stinking currant, Mountain alder, Common snowberry, Creeping bentgrass	Y	?	?
		Mountain Alder-Currants/Mesic Forb PA	Mountain alder, Stinking currant, Prickly currant, Brook saxifrage, Enchanter's nightshade	Y	Y	Y
		Mountain Alder/ Common Horsetail PA	Mountain alder, Common horsetail, Tall mannagrass	Y	N	Y
		Mountain Alder/ Ladyfern PA	Mountain alder, Lady fern, Drooping woodreed, Stinking currant, Prickly currant	Y	Y	Y
		Mountain Alder/ Tall Mannagrass PA	Mountain alder, Tall mannagrass, Stinking currant, Common horsetail	Y	Y	Y
		Sitka Alder/ Drooping Woodreed PA	Sitka alder, Drooping woodreed, Stinking currant, Tall mannagrass, Prickly currant	Y	Y	Y
Broad-leaved Deciduous Forest (map-coded PFO1)	BV	Quaking Aspen/ Kentucky Bluegrass PA	Quaking aspen, Kentucky bluegrass, Woods strawberry, False-hellebore, Common snowberry	Y/N	N	N

Characteristics of wetlands likely to occur on private lands of the John Day River Basin. [1]

USFWS NWI CLASS [2]	LAND FORM [3]	MNF/UNF WETLAND PLANT ASSOCIATION[4]	DOMINANT PLANTS [5]	MEETS CRITERIA FOR JURISDICTIONAL WETLAND [6]		
				VEG	SOIL	HYDR
		Quaking Aspen/ Mesic Forb PCT	Quaking aspen, Sweetmarsh butterweed, Starry false-solomon's seal, Prickly currant, Leafy (Meadow) arnica	Y	?	?
		Black Cottonwood/ Pacific Willow PA	Black cottonwood, Pacific willow, Creeping bentgrass, Kentucky bluegrass, Rigid willow	Y	Y	Y
		Black Cottonwood/ Mountain Alder-Red-osier Dogwood PA	Black cottonwood, Mountain alder, Red-osier dogwood, False bugbane, Western thimbleberry	Y	Y	Y/N
		Black Cottonwood/ Common Snowberry PCT	Black cottonwood, Common snowberry, Black hawthorn, Kentucky bluegrass, Starry false-solomon's seal	N	N	N
	BV+NV	Quaking Aspen/ Common Snowberry PA	Quaking aspen, Common snowberry, Kentucky bluegrass, Blue wildrye, Western blue flag	N	Y/N	Y
Needle-leaved Evergreen Forest (map-coded PFO4)	BV	Ponderosa Pine/Kentucky Bluegrass PCT	Ponderosa pine, Kentucky bluegrass, Bearded wheatgrass, Red fescue, Beardless bluebunch	N	?	?
		Grand Fir/ Common Snowberry - Floodplain PCT	Common snowberry, Grand fir, Mountain alder, Engelmann spruce, Prickly currant	Y/N	?	?
	BV+NV	Ponderosa Pine/Common Snowberry - Floodplain PA	Ponderosa pine, Common snowberry, Kentucky bluegrass, Black hawthorn, Starry false-solomon's seal	N	N	N
		Douglas Fir/Common Snowberry - Floodplain PA	Common snowberry, Douglas fir, Elk sedge, Black hawthorn, Blue wildrye	N	N	Y
	NV	Grand Fir/Rocky Mountain Maple - Floodplain PA	Rocky Mtn. maple, Grand fir, Common snowberry, Bald-hip rose, Lewis' mock-orange	Y/N	N	?
		Grand Fir/ Ladyfern PA	Lady fern, Grand fir, Sitka alder, Alpine mitrewort, Clasp-leaf twistedstalk	Y	N	Y/N

[1] John Day/Clarno Formation Physiographic Unit and Mesic Forest Zone 1 Physiographic Unit. *Source*: Crowe, E.A., and R.R. Clausnitzer. 1997. *Mid-Montane Wetland Plant Associations of the Malheur, Umatilla and Wallowa-Whitman National Forests*. R6-NR-ECOL-TP-22-97. 299 pp.

[2] National Wetland Inventory (NWI) maps are primarily derived from stereoscopic analysis of high altitude aerial photographs, usually without onsite verification. *Source of classifications*: Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. FWS/OBS-79/31. 103 pp.

[3] **BV** = Broad or moderately broad valley with low gradient (≤2%), where stream channels are of moderately high sinuosity and a pool/riffle bedform with well-developed floodplains.

NV = Narrow "V"-shaped valley with moderate-or-high gradient (2-4%), where stream channels are moderately entrenched, of low sinuosity, and riffle-dominated.

[4] **MNF** = Malheur National Forest

UNF = Umatilla National Forest

PA = "Plant Association", defined as an assemblage of native vegetation in equilibrium with the environment on a specific fluvial surface.

PCT = "Plant Community Type", defined as a set of plant communities (i.e. assemblage of plants living together and interacting among themselves in a specific location) with similar structure and floristic composition.

[5] Listed in approximate descending order of aerial coverage.

[6] *Source*: U.S. Army Corps of Engineers. 1987. *Corps of Engineers Wetlands Delineation Manual*. Technical Report Y-87-1. 92 pp. + 4 appendices (Internet version).

VEG = Hydrophytic vegetation indicators require that more than 50 percent of the dominant species are classified as OBL, FACW, FAC+, or FAC. The "50/20 rule" is the recommended method for selecting dominants when quantitative data are available.

SOIL = Hydric soil indicators are many, including Crowe & Clausnitzer's (1997) description of redoximorphic features (zones of iron and/or manganese concentration/depletion) found within 10" (25 cm) of the ground surface.

HYDR = Wetland hydrology indicators are many, including Crowe & Clausnitzer's (1997) description of a water table within 16" (40 cm) of the ground surface during the plant-growing season. This suggests the site is inundated or saturated at least 12.5% of an average growing season, thereby satisfying the hydrology indicator.

Y = Probable

Y/N = Possible

N = Improbable

? = Data in Crowe & Clausnitzer (1997) not provided.

Appendix T
Fish Life History Charts of North Fork and Middle Fork John Day River

Mouth North Fork John Day River upstream to Camas Creek - Anadromous Species

Life Stage/Activity/Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Upstream Adult Migration												
Summer Steelhead	X X	X X	X X	X X	X X				X X	X X	X X	X X
Spring Chinook				X X	X X							
Fall Chinook							Likely no use					
Pacific Lamprey							Need more information					
Adult Spawning												
Summer Steelhead			X X	X X	X X	X						
Spring Chinook							Likely no use					
Fall Chinook							Likely no use					
Pacific Lamprey							Need more information					
Adult Holding												
Summer Steelhead							Not applicable					
Spring Chinook							Information unavailable					
Fall Chinook							Not applicable					
Pacific Lamprey							Not applicable					
Egg Incubation through Fry Emergence												
Summer Steelhead			X X	X X	X X	X X						
Spring Chinook							Likely no use					
Fall Chinook							Likely no use					
Pacific Lamprey							Need more information					
Juvenile Rearing												
Summer Steelhead	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Spring Chinook	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Fall Chinook							Likely no use					
Pacific Lamprey												
Downstream Juvenile Migration												
Summer Steelhead												
Spring Chinook			X X	X X	X X	X X						
Fall Chinook							Likely no use					
Pacific Lamprey							Need more information					

Each block represents a two-week time period.

Represents periods of peak use based on professional opinion.
Represents lesser level of use based on professional opinion.
Represents periods of presence - no level of use indicated.
X Represents periods of use based on reported observation from # 203320.

Streamnet ID # 203320 - Stock Summary Reports for Columbia River Anadromous Salmonids.

Note: Peak use equates to 90% of life stage activity occurring in this time frame. Lesser use equates to 10% of life stage activity occurring in this time frame.

Mouth North Fork John Day River upstream to Camas Creek - Non-Anadromous

Life Stage/Activity/Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Adult Fluvial/Adfluvial Migration												
Bull Trout Fluvial, sub-adults												
Red Band Trout Fluvial												
Westslope Cutthroat Trout												
Adult/Sub-Adult Rearing												
Bull Trout Fluvial					Not applicable							
Red Band Trout Fluvial					Not applicable							
Westslope Cutthroat Trout Fluvial					Not applicable							
Adult Spawning												
Bull Trout Fluvial												
Red Band Trout Fluvial												
Westslope Cutthroat Trout Fluvial												
Egg Incubation through Fry Emergence												
Bull Trout Fluvial												
Red Band Trout Fluvial												
Westslope Cutthroat Trout Fluvial												
Juvenile Rearing												
Bull Trout Fluvial												
Red Band Trout Fluvial												
Westslope Cutthroat Trout Fluvial												
Juvenile Migration												
Bull Trout Fluvial												
Red Band Trout Fluvial												
Westslope Cutthroat Trout Fluvial												

Each block represents a two-week time period.

Represents periods of peak use based on professional opinion.
Represents lesser level of use based on professional opinion.
Represents periods of presence - no level of use indicated.

Note: Peak use equates to 90% of life stage activity occurring in this time frame. Lesser use equates to 10% of life stage activity occurring in this time frame.

North Fork John Day R. above Camas Creek - Anadromous Species

Life Stage/Activity/Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Upstream Adult Migration												
Summer Steelhead	X X	X X	X X	X X	X X							
Spring Chinook					X X							
Adult Holding												
Summer Steelhead					Not applicable							
Spring Chinook						X X	X X	X X				
Adult Spawning												
Summer Steelhead			X	X X	X X	X						
Spring Chinook									X X			
Egg Incubation through Fry Emergence												
Summer Steelhead					X X	X X	X					
Spring Chinook	X X	X X	X X	X X					X X	X X	X X	X X
Juvenile Rearing												
Summer Steelhead	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Spring Chinook	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Downstream Juvenile Migration												
Summer Steelhead				X X	X X	X X						
Spring Chinook				X X	X X	X X						

Each block represents a two-week time period.

Represents periods of peak use based on professional opinion.
Represents lesser level of use based on professional opinion.
Represents periods of presence - no level of use indicated.
X Represents periods of use based on reported observation from # 203320, # 51857 and/or # 51333.

Streamnet ID # 51857 - John Day Basin Spring Chinook Salmon Escapement and Productivity Monitoring Annual Progress Report.
Streamnet ID # 51333 - Annual Progress Report: Spring Chinook Studies in the John Day River.
Streamnet ID # 203320 - Stock Summary Reports for Columbia River Anadromous Salmonids.
Note: Primary source of information is document # 203320.

Note: Peak use equates to 90% of life stage activity occurring in this time frame. Lesser use equates to 10% of life stage activity occurring in this time frame.

North Fork John Day R. above Camas Creek - Non-Anadromous Species

Life Stage/Activity/Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Adult Fluvial/Adfluvial Migration												
Bull Trout Fluvial, sub-adults												
Red Band Trout Fluvial												
Westslope Cutthroat Trout												
Adult/Sub-Adult Rearing												
Bull Trout Fluvial					Not applicable							
Red Band Trout Fluvial					Not applicable							
Westslope Cutthroat Trout Fluvial					Not applicable							
Adult Spawning												
Bull Trout Fluvial												
Red Band Trout Fluvial												
Westslope Cutthroat Trout Fluvial												
Egg Incubation through Fry Emergence												
Bull Trout Fluvial												
Red Band Trout Fluvial												
Westslope Cutthroat Trout Fluvial												
Juvenile Rearing												
Bull Trout Fluvial												
Red Band Trout Fluvial												
Westslope Cutthroat Trout Fluvial												
Juvenile Migration												
Bull Trout Fluvial												
Red Band Trout Fluvial												
Westslope Cutthroat Trout Fluvial												

Each block represents a two-week time period.

Represents periods of peak use based on professional opinion.
Represents lesser level of use based on professional opinion.
Represents periods of presence - no level of use indicated.

Note: Peak use equates to 90% of life stage activity occurring in this time frame. Lesser use equates to 10% of life stage activity occurring in this time frame.

Mouth Middle Fork John Day River upstream to US Highway 395 - Anadromous Species

Life Stage/Activity/Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Upstream Adult Migration												
Summer Steelhead	X X	X X	X X						X X	X X	X X	X X
Spring Chinook				X X	X X							
Pacific Lamprey							Need more information					
Adult Spawning												
Summer Steelhead				X X	X X	X						
Spring Chinook					Likely no use							
Pacific Lamprey												
Adult Holding												
Summer Steelhead					Not applicable							
Spring Chinook					Need more information							
Pacific Lamprey					Not applicable							
Egg Incubation through Fry Emergence												
Summer Steelhead			X X	X X	X X	X X						
Spring Chinook					Likely no use							
Pacific Lamprey					Not applicable							
Juvenile Rearing												
Summer Steelhead	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Spring Chinook	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Pacific Lamprey												
Downstream Juvenile Migration												
Summer Steelhead				X X	X X	X X						
Spring Chinook				X X	X X	X X						
Pacific Lamprey							Need more information					

Each block represents a two-week time period.

Represents periods of peak use based on professional opinion.
Represents lesser level of use based on professional opinion.
Represents periods of presence - no level of use indicated.
X Represents periods of use based on reported observation from # 203320.

Streamnet ID # 203320 - Stock Summary Reports for Columbia River Anadromous Salmonids.

Note: Peak use equates to 90% of life stage activity occurring in this time frame. Lesser use equates to 10% of life stage activity occurring in this time frame.

Mouth Middle Fork John Day River upstream to US Highway 395 - Non-Anadromous Species

Life Stage/Activity/Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Adult Fluvial/Adfluvial Migration												
Bull Trout, sub-adults			No documented use - needs more study									
Red Band Trout Fluvial												
Adult Spawning												
Bull Trout Fluvial					Likely no use							
Red Band Trout Fluvial												
Adult/Sub-Adult Rearing												
Bull Trout Fluvial					Not applicable							
Red Band Trout Fluvial					Not applicable							
Egg Incubation through Fry Emergence												
Bull Trout Fluvial					Likely no use							
Red Band Trout Fluvial												
Juvenile Rearing												
Bull Trout Fluvial					Likely no use							
Red Band Trout Fluvial												
Juvenile Migration												
Bull Trout Fluvial					Likely no use							
Red Band Trout Fluvial												

Each block represents a two-week time period.

Represents periods of peak use based on professional opinion.
Represents lesser level of use based on professional opinion.
Represents periods of presence - no level of use indicated.

Note: Peak use equates to 90% of life stage activity occurring in this time frame. Lesser use equates to 10% of life stage activity occurring in this time frame.

Middle Fork John Day River above US Highway 395 - Anadromous Species

Life Stage/Activity/Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Upstream Adult Migration												
Summer Steelhead		X X	X X	X X								
Spring Chinook					X X							
Lamprey					Need more information							
Adult Holding												
Summer Steelhead												
Spring Chinook						X X	X X	X X				
Lamprey												
Adult Spawning												
Summer Steelhead			X	X X	X X	X						
Spring Chinook									X X			
Lamprey					Need more information							
Egg Incubation through Fry Emergence												
Summer Steelhead				X X	X X	X X	X					
Spring Chinook	X X	X X	X X						X X	X X	X X	X X
Lamprey					Need more information							
Juvenile Rearing												
Summer Steelhead	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Spring Chinook	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X	X X
Lamprey					Need more information							
Downstream Juvenile Migration												
Summer Steelhead					X X	X X						
Spring Chinook			X X	X X	X X	X X						
Lamprey					Need more information							

Each block represents a two-week time period.

Represents periods of peak use based on professional opinion.
Represents lesser level of use based on professional opinion.
Represents periods of presence - no level of use indicated.
X Represents periods of use based on reported observation from # 203320.

Streamnet ID # 203320 - Stock Summary Reports for Columbia River Anadromous Salmonids.

Note: Peak use equates to 90% of life stage activity occurring in this time frame. Lesser use equates to 10% of life stage activity occurring in this time frame.

Middle Fork John Day River above US Highway 395 - Non-Anadromous

Life Stage/Activity/Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Adult Fluvial/Adfluvial Migration												
Bull Trout Fluvial, sub-adults												
Red Band Trout Fluvial												
Adult/Sub-Adult Rearing												
Bull Trout Fluvial					Not applicable							
Red Band Trout Fluvial					Not applicable							
Adult Spawning												
Bull Trout Fluvial												
Red Band Trout Fluvial												
Egg Incubation through Fry Emergence												
Bull Trout Fluvial												
Red Band Trout Fluvial												
Juvenile Rearing												
Bull Trout Fluvial												
Red Band Trout Fluvial												
Juvenile Migration												
Bull Trout Fluvial												
Red Band Trout Fluvial												

Each block represents a two-week time period.

Represents periods of peak use based on professional opinion.
Represents lesser level of use based on professional opinion.
Represents periods of presence - no level of use indicated.

Note: Peak use equates to 90% of life stage activity occurring in this time frame. Lesser use equates to 10% of life stage activity occurring in this time frame.

Appendix U
NMFS' Listed and Proposed Species List

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
525 NE Oregon Street
PORTLAND, OREGON 97232-2737

JUN - 4 2002

Refer to:
OHB2002-0110-SL

May 31, 2002

6500 KAB 6/12

Mr. Ronald J. Eggers, Area Manager
U.S. Department of the Interior
Bureau of Reclamation
Pacific Northwest Region
Lower Columbia Area Office
825 NE Multnomah Street, Suite 1110
Portland, OR 97232-2135

Re: Request for Updated Species List for Federal Columba River Power System's Offsite Mitigation, Habitat Improvement Activities in the John Day Basin, Oregon

Dear Mr. Eggers:

The National Marine Fisheries Service (NMFS) has received your April 18, 2002, letter requesting an updated list of threatened and endangered anadromous fish species which may be affected by Federal Columba River Power System's Offsite Mitigation, Habitat Improvement Activities in the John Day River Basin, Oregon. We have enclosed a list of those anadromous fish species that are listed as endangered or threatened under the Endangered Species Act (ESA), those that are proposed for listing, and those that are candidates for listing in Oregon. This inventory includes only the species under NMFS' jurisdiction occurring in the Pacific Northwest. The U.S. Fish and Wildlife Service should be contacted regarding the presence of species falling under its jurisdiction.

Available information indicates that twelve ESA-listed anadromous fish species are known to be present within or downstream from the proposed action.

- Snake River (SR) fall chinook salmon (*Onchorynchus tshawytscha*)
- SR spring/summer chinook salmon (*O. tshawytscha*)
- Upper Columbia River spring chinook salmon (*O. tshawytscha*)
- Lower Columbia River chinook salmon (*O. tshawytscha*)
- Upper Willamette River chinook salmon (*O. tshawytscha*)
- SR sockeye salmon (*O. nerka*)
- SR Basin steelhead (*O. mykiss*)
- Lower Columbia River steelhead (*O. mykiss*)
- Middle Columbia River steelhead (*O. mykiss*)
- Upper Columbia River steelhead (*O. mykiss*)
- Upper Willamette River steelhead (*O. mykiss*)
- Columbia River chum salmon (*O. keta*)

Enclosure

Endangered, Threatened, Proposed, and Candidate Species That Occur under National Marine Fisheries Service Jurisdiction in Oregon
(T=threatened, E=endangered, CH=critical habitat)

Listed Species:

Coho Salmon (*Oncorhynchus kisutch*)
- -S. Oregon/N. California Coasts Evolutionarily Significant Unit(ESU)(T)
- -Oregon Coast ESU (T)

Chinook Salmon (*O. tshawytscha*)
- -Snake River Fall-run ESU (T)(CH)
- -Snake River Spring/Summer-run ESU (T)(CH)
- -Lower Columbia River ESU (T)(CH)
- -Upper Willamette River ESU (T)(CH)
- -Upper Columbia River Spring-run ESU (E)(CH)

Chum Salmon (*O. keta*)
- -Columbia River ESU (T)(CH)

Sockeye Salmon (*O. nerka*)
- -Snake River ESU (E)(CH)

Steelhead (*O. mykiss*)
- -Upper Columbia River ESU (E)(CH)
- -Snake River Basin ESU (T)(CH)
- -Lower Columbia River ESU (T)(CH)
- -Upper Willamette River ESU (T)(CH)
- -Middle Columbia River ESU (T)(CH)

Proposed for Listing:
- -None

Candidates for Listing:

-Coho Salmon (*O. kisutch*)
- Lower Columbia River/SW Washington ESU

-Steelhead (*O. mykiss*)
- Oregon Coast ESU

In addition, habitat in and along the length of the Columbia River has been designated as critical habitat for SR chinook salmon. Additional information on listed species' distribution, copies of Federal Register documents designating listed species status, and links to various ESA consultation policies and tools may be found on our web site at: www.nwr.noaa.gov. For information on the ESA section 7 consultation process, please refer to the ESA section 7 implementing regulations, 50 CFR Part 402.

Additional information on ESA-listed species' distribution, copies of Federal Register documents designating listed species status, and links to various ESA consultation policies and tools may be found on our web site at: www.nwr.noaa.gov. For information on the ESA section 7 consultation process, please refer to the ESA section 7 implementing regulations, 50 CFR Part 402.

In addition, please be aware that the Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act (SFA) of 1996 (Public Law 104-297), requires Federal agencies to consult with NMFS on activities that may adversely affect designated essential fish habitat (EFH). All accessible habitat in the John Day River and Columbia River has been designated as EFH for chinook salmon.

This letter constitutes the required notification of the presence of federally-listed threatened or endangered species or critical habitat under NMFS' jurisdiction in the area that may be affected by the proposed project. Questions regarding this letter should be directed to Brett Farman, of my staff, at 541.975.1835 ext. 228.

Sincerely,

Michael Tehan, Chief
Oregon State Branch
Habitat Conservation Division

Enclosure (1)

cc: Karen Blakney, BOR
Jennifer O'Reilly, USFWS
Tim Unterwegner, ODFW

Appendix V
USFWS' Listed and Proposed Species List

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Oregon Fish and Wildlife Office
2600 S.E. 98th Avenue, Suite 100
Portland, Oregon 97266
(503) 231-6179 FAX: (503) 231-6195

Reply To: 8330.6291(02)
File Name: Sp629.wpd
TS Number: 02-4911

May 17, 2002

Ronald Eggers
U.S. Bureau of Reclamation
825 NE Multnomah Street, Suite 1110
Portland, OR 97232-2135

Subject: Offsite-Mitigation and Habitat Improvement Activities in the John Day Basin Project
USFWS Reference # (1-7-02-SP-629)

Dear Mr. Eggers:

This is in response to your memorandum, dated April 19, 2002, requesting information on listed and proposed endangered and threatened species that may be present within the area of the Offsite-Mitigation and Habitat Improvement Activities in the John Day Basin Project in Sherman County. The U.S. Fish and Wildlife Service (Service) received your correspondence on April 19, 2002.

We have attached a list (Attachment A) of threatened and endangered species that may occur within the area of the Offsite-Mitigation and Habitat Improvement Activities in the John Day Basin Project. The list fulfills the requirement of the Service under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*). U.S. Bureau of Reclamation (BR) requirements under the Act are outlined in Attachment B.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems on which they depend may be conserved. Under section 7(a)(1) and 7(a)(2) of the Act and pursuant to 50 CFR 402 *et seq.*, BR is required to utilize their authorities to carry out programs which further species conservation and to determine whether projects may affect threatened and endangered species, and/or critical habitat. A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) which are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (NEPA) (42 U.S.C. 4332 (2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to the Biological Assessment be prepared to determine whether they may affect listed and proposed species. Recommended contents of a Biological Assessment are described in Attachment B, as well as 50 CFR 402.12.

If BR determines, based on the Biological Assessment or evaluation, that threatened and endangered species and/or critical habitat may be affected by the project, BR is required to consult with the Service following the requirements of 50 CFR 402 which implement the Act.

Printed on 100% chlorine free/50% post-consumer content paper

Attachment A includes a list of candidate species under review for listing. The list reflects changes to the candidate species list published October 30, 2001, in the Federal Register (Vol. 66, No. 210, 54808) and the addition of "species of concern." Candidate species have no protection under the Act but are included for consideration as it is possible candidates could be listed prior to project completion. Species of concern are those taxa whose conservation status is of concern to the Service (many previously known as Category 2 candidates), but for which further information is still needed.

If a proposed project may affect only candidate species or species of concern, BR is not required to perform a Biological Assessment or evaluation or consult with the Service. However, the Service recommends addressing potential impacts to these species in order to prevent future conflicts. Therefore, if early evaluation of the project indicates that it is likely to adversely impact a candidate species or species of concern, BR may wish to request technical assistance from this office.

Your interest in endangered species is appreciated. The Service encourages BR to investigate opportunities for incorporating conservation of threatened and endangered species into project planning processes as a means of complying with the Act. If you have questions regarding your responsibilities under the Act, please contact Stacy Sroufe at (503) 231-6179. All correspondence should include the above referenced file number. For questions regarding salmon and steelhead trout, please contact National Marine Fisheries Service, 525 NE Oregon Street, Suite 500, Portland, Oregon 97232, (503) 230-5400.

Sincerely,

for Kemper M. McMaster
State Supervisor

Attachments
1-7-02-SP-629

cc: OFWO-ES
ODFW (nongame)

ATTACHMENT A

FEDERALLY LISTED AND PROPOSED ENDANGERED AND THREATENED SPECIES, CANDIDATE SPECIES AND SPECIES OF CONCERN THAT MAY OCCUR WITHIN THE AREA OF THE OFFSITE-MITIGATION AND HABITAT IMPROVEMENT ACTIVITIES IN THE JOHN DAY BASIN PROJECT
1-7-02-SP-629

LISTED SPECIES[1/]

Mammals		
Canada lynx[2/]	*Felis lynx canadensis*	T
Birds		
Bald eagle[3/]	*Haliaeetus leucocephalus*	T
Fish		
Steelhead (Middle Columbia River)[4/]	*Oncorhynchus mykiss*	T**
Bull trout (Columbia River Basin)[5/]	*Salvelinus confluentus*	T

PROPOSED SPECIES

None

CANDIDATE SPECIES[6/]

Birds	
Yellow-billed cuckoo	*Coccyzus americanus*
Amphibians and Reptiles	
Columbia spotted frog	*Rana luteiventris*

SPECIES OF CONCERN

Mammals	
Pygmy rabbit	*Brachylagus idahoensis*
Pale western big-eared bat	*Corynorhinus townsendii pallescens*
Spotted bat	*Euderma maculatum*
California wolverine	*Gulo gulo luteus*
Silver-haired bat	*Lasionycteris noctivagans*
Pacific fisher	*Martes pennanti pacifica*
Small-footed myotis (bat)	*Myotis ciliolabrum*
Long-eared myotis (bat)	*Myotis evotis*
Fringed myotis (bat)	*Myotis thysanodes*
Long-legged myotis (bat)	*Myotis volans*
Yuma myotis (bat)	*Myotis yumanensis*
California bighorn	*Ovis canadensis californiana*
Preble's shrew	*Sorex preblei*

Birds	
Northern goshawk	*Accipiter gentilis*
Upland sandpiper	*Bartramia longicauda*
Ferruginous hawk	*Buteo regalis*
Greater sage-grouse	*Centrocercus urophasianus*
Black tern	*Chlidonias niger*
Olive-sided flycatcher	*Contopus cooperi*
Willow flycatcher	*Empidonax trailli adastus*
Yellow-breasted chat	*Icteria virens*
Lewis' woodpecker	*Melanerpes lewis*
Mountain quail	*Oreortyx pictus*
White-headed woodpecker	*Picoides albolarvatus*
Amphibians and Reptiles	
Northern sagebrush lizard	*Sceloporus graciosus graciosus*
Fishes	
Malheur mottled sculpin	*Cottus bairdi* ssp.
Pacific lamprey	*Lampetra tridentata*
Westslope cutthroat trout	*Oncorhynchus clarki lewisi*
Interior redband trout	*Oncorhynchus mykiss gibbsi*
Invertebrates	
California floater (mussel)	*Anodonta californiensis*
Lynn's clubtail dragonfly	*Gomphus lynnae*
Plants	
Wallowa ricegrass	*Achnatherum wallowaensis*
Upward-lobed moonwort	*Botrychium ascendens*
Crenulate grape-fern	*Botrychium crenulatum*
Twin spike moonwort	*Botrychium paradoxum*
Stalked moonwort	*Botrychium pedunculosum*
Colonial luina	*Luina serpentina*
Disappearing monkeyflower	*Mimulus evanescens*
Little mousetail	*Myosurus minimus* ssp. *apus* (= var. *sessiliflorus*)
Oregon semaphore grass	*Pleuropogon oregonus*
Arrow-leaf thelypody	*Thelypodium eucosmum*
Douglas clover	*Trifolium douglasii*

(E) - Listed Endangered *(T) - Listed Threatened* *(CH) - Critical Habitat has been designated for this species*
(PE) - Proposed Endangered *(PT) - Proposed Threatened* *(PCH) - Critical Habitat has been proposed for this species*
(S) - Suspected *(D) - Documented*

Species of Concern - Taxa whose conservation status is of concern to the Service (many previously known as Category 2 candidates), but for which further information is still needed.

(CF) - Candidate: National Marine Fisheries Service designation for any species being considered by the Secretary for listing for endangered or threatened species, but not yet the subject of a proposed rule.

** *Consultation with National Marine Fisheries Service may be required.*

- U. S. Department of Interior, Fish and Wildlife Service, October 31, 2000, Endangered and Threatened Wildlife and Plants, 50 CFR 17.11 and 17.12
- Federal Register Vol. 65, No. 58, Mar 24, 2000. Final Rule - Canada lynx
- Federal Register Vol. 60, No. 133, July 12, 1995 - Final Rule - Bald Eagle
- Federal Register Vol. 64, No. 57, March 25, 1999, Final Rule - Middle Columbia and Upper Willamette River Steelhead
- Federal Register Vol. 63, No. 111, June 10, 1998, Final Rule - Columbia River and Klamath River Bull Trout
- Federal Register Vol. 66, No. 210, October 30, 2001, Notice of Review - Candidate or Proposed Animals and Plants

ATTACHMENT B

FEDERAL AGENCIES RESPONSIBILITIES UNDER SECTION 7(a) and (c) OF THE ENDANGERED SPECIES ACT

SECTION 7(a)-Consultation/Conference

Requires:

1) Federal agencies to utilize their authorities to carry out programs to conserve endangered and threatened species;

2) Consultation with FWS when a Federal action may affect a listed endangered or threatened species to insure that any action authorized, funded or carried out by a Federal agency is not likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of Critical Habitat. The process is initiated by the Federal agency after they have determined if their action may affect (adversely or beneficially) a listed species; and

3) Conference with FWS when a Federal action is likely to jeopardize the continued existence of a proposed species or result in destruction or adverse modification of proposed Critical Habitat.

SECTION 7(c)-Biological Assessment for Major Construction Projects[1]

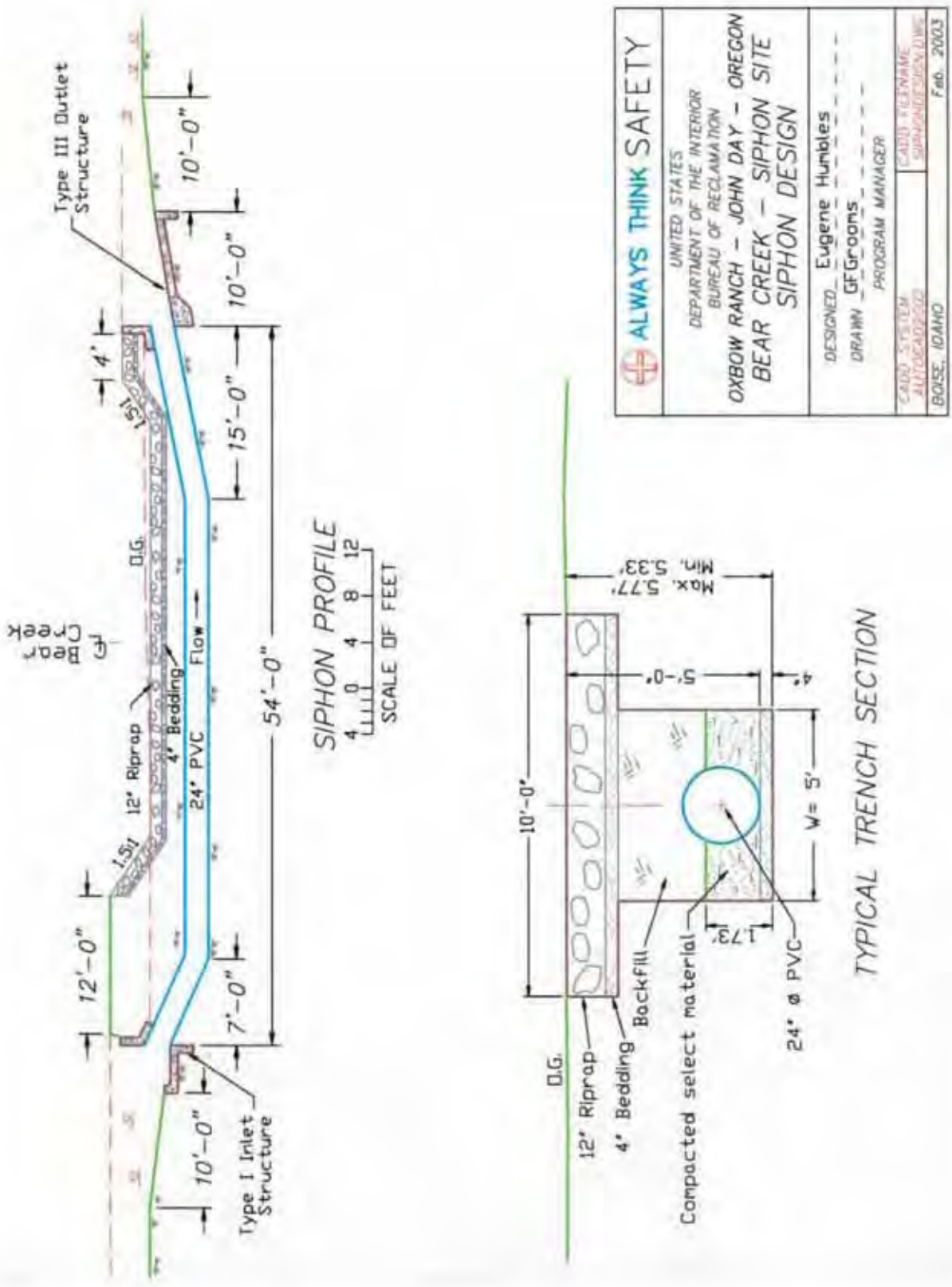
Requires Federal agencies or their designees to prepare a Biological Assessment (BA) for construction projects only. The purpose of the BA is to identify proposed and/or listed species which are/is likely to be affected by a construction project. The process is initiated by a Federal agency in requesting a list of proposed and listed threatened and endangered species (list attached). The BA should be completed within 180 days after its initiation (or within such a time period as is mutually agreeable). If the BA is not initiated within 90 days of receipt of the species list, the accuracy of the species list should be informally verified with our Service. No irreversible commitment of resources is to be made during the BA process which would foreclose reasonable and prudent alternatives to protect endangered species. Planning, design, and administrative actions may be taken; however, no construction may begin.

To complete the BA, your agency or its designee should: (1) conduct an on-site inspection of the area to be affected by the proposal which may include a detailed survey of the area to determine if the species is present and whether suitable habitat exists for either expanding the existing population or for potential reintroduction of the species; (2) review literature and scientific data to determine species distribution, habitat needs, and other biological requirements; (3) interview experts including those within FWS, National Marine Fisheries Service, State conservation departments, universities, and others who may have data not yet published in scientific literature; (4) review and analyze the effects of the proposal on the species in terms of individuals and populations, including consideration of cumulative effects of the proposal on the species and its habitat; (5) analyze alternative actions that may provide conservation measures and (6) prepare a report documenting the results, including a discussion of study methods used, any problems encountered, and other relevant information. The BA should conclude whether or not a listed species will be affected. Upon completion, the report should be forwarded to our Portland Office.

---

[1] A construction project (or other undertaking having similar physical impacts) which is a major Federal action significantly affecting the quality of the human environment as referred to in NEPA (42 U.S.C. 4332. (2)c). On projects other that construction, it is suggested that a biological evaluation similar to the biological assessment be undertaken to conserve species influenced by the Endangered Species Act.

Appendix W
Siphon Design



Appendix X
Comment Letters and Reclamation Responses

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
525 NE Oregon Street
PORTLAND, OREGON 97232-2737

Refer to:
OHB2002-0334-CL

January 22, 2003

Ms. Karen Blakney
Bureau of Reclamation
Pacific Northwest Region
Lower Columbia Area Office
825 NE Multnomah Street, Suite 1100
Portland, OR 97232-2135

Dear Ms. Blakney:

Thank you for the opportunity to review the Bureau of Reclamation's (BOR) "Programmatic Environmental Assessment" (PEA). The PEA covers implementation of the reasonable and prudent alternative (RPA) #149 fish habitat improvement measures from the December 2000 National Marine Fisheries Service (NOAA Fisheries) biological opinion on the Federal Columbia River Power System (FCRPS) in three John Day River subbasins within the Mid-Columbia River (MCR) steelhead (*Oncorhynchus mykiss*) evolutionarily significant unit (ESU). The PEA has been prepared in accordance with the National Environmental Policy Act (NEPA). Because NOAA Fisheries has no regulatory authority over NEPA compliance, the comments below are directed toward subsequent Endangered Species Act (ESA) section 7 compliance.

Overall, the proposed action and associated activities comport with the requirements of the FCRPS 2000 RPA #149. However, we would like to see additional detail and specificity in: (1) The description of the proposed activities; and (2) the environmental consequences of the proposed activities (*i.e.*, the proposed action impact on the MCR steelhead ESU).

We note that the environmental assessment is a programmatic assessment under NEPA. If the BOR intends to use the final PEA as a biological assessment (BA) to meet the requirements of a subsequent ESA section 7 consultation, we suggest that it specifically address the following issues:

1. How would the issues of instream flow be handled? If multiple diversion improvements or replacements are planned in a given watershed, the potential effect of these diversion replacements or improvements on flow need to be addressed.

2. Regarding the replacement of push-up dams (*i.e.*, diversion replacements or improvements), how would the new diversion structures be appropriately sized, ensure fish passage for all life stages, be screened, and allow for water use measurement?

3. Designs for infiltration galleries are not developed to the level of reliability needed to support their use programmatically under section 7 of the ESA. We suggest removing that activity from any incoming programmatic BA, and analyzing infiltration galleries under individual ESA section 7 consultations until guidelines for the construction, maintenance, and operation of infiltration galleries are available. We would like to work with your engineers and other specialists to develop such guidelines.

4. Improving water transmission and irrigation efficiencies (*i.e.*, reducing seepage and evaporation losses) as a strategy for increasing stream flows was not considered in the PEA. The BOR is uniquely qualified in this area, and we believe that BOR could significantly improve stream flows by helping irrigators to reduce unnecessary transmission and application losses.

Regulations implementing the Magnuson-Stevens Act (MSA) at 50 CFR Part 600 Subpart K require the BOR to consult on activities that may adversely affect essential fish habitat (EFH) designated in Federal fishery management plans. The proposed project area has been designated as EFH for chinook salmon (*O. tshawytscha*). MSA consultation requirements can be satisfied using ESA procedures if your BA has a section identified as an EFH Assessment that included the following analyses: (1) Effects of the proposed project on EFH, the managed species, and associated species, such as major prey species, including affected life history stages; (2) the BOR's views regarding the effects of the action on EFH; and (3) proposed mitigation, if applicable. Please be sure to include an EFH assessment in the BA for the proposed activities.

Again, we thank you for the opportunity to review and respond to the draft NEPA EA and hope that our comments are helpful. NOAA Fisheries looks forward to working with the BOR during the development of the draft BA for the proposed activities. As part of the consultation process, we would be happy to review and provide comments on a draft BA as soon as one is available. Please address any further comments regarding your proposed activities associated with implementation of the FCRPS December 2000 Biological Opinion RPA #149 to Nora Berwick of my staff in the Oregon Habitat Branch at 503.231.6887, or by e-mail at: nora.berwick@noaa.gov.

Sincerely,

Michael Tehan
Chief, Oregon Habitat Branch

cc: Jerry Cordova, USFWS
Chris Furey, USFWS
Nancy Gilbert, USFWS
Gary Miller, USFWS

United States Department of the Interior

BUREAU OF RECLAMATION
Pacific Northwest Region
Lower Columbia Area Office
825 NE Multnomah Street, Suite 1110
Portland, Oregon 97232-2135

REPLY REFER TO:
PN-3420
ENV-1.10

MAR 10 2003

Ms. Nora Berwick
United States Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Oregon Habitat Branch
525 N.E. Oregon Street
Portland, OR 97232-2737

Subject: Review Comments on "Programmatic Environmental Assessment for Implementation of Action 149 Fish Habitat Improvement Measures from the December 2000 National Marine Fisheries Service Biological Opinion of the Federal Columbia River Power System in Three John Day Subbasins in the Mid-Columbia River Steelhead Evolutionary Significant Unit in Central Oregon"

Dear Ms. Berwick:

The biological opinion for the Federal Columbia River Power System issued by the National Marine Fisheries Service in December 2000, directs the Bureau of Reclamation to engage in certain forms of fish habitat improvement activities in the Middle Fork, North Fork, and Upper Mainstem of the John Day River subbasins. As part of implementing activities associated with this biological opinion, and in compliance with the National Environmental Policy Act (NEPA), Reclamation prepared a draft programmatic Environmental Assessment (EA) concerning this habitat improvement program and requested Public comment during December 2002 and January 2003.

We appreciate your response and your comments were considered in the final preparation of the programmatic EA which is scheduled for publication this spring.

In summary, Reclamation does not intend to use the programmatic EA as a biological assessment to meet the subsequent ESA section 7 consultation at this time. However, we did address several of your comments.

1. All instream flow issues will be handled in accordance with Oregon State Water Law. In order to comply with Oregon State Water Law, headgates will be sized to permit the full rate of diversion of the associated water rights unless the water right holder **willingly** chooses to abandon or sell a portion of his water right for instream uses. The combination of a new diversion with properly functioning headgate and measurement structures will expedite regulation by the Watermaster, therefore ensuring that the water right rate and duty is adhered to.

2. All new diversions will be appropriately designed in accordance with applicable acceptable fish passage criteria for all life stages. As part of the overall project to replace a diversion, Reclamation will coordinate with Oregon Department of Fish and Wildlife's John Day Screen Shop to ensure that a fish screen is in place that meets applicable acceptable screen criteria. Headgates will be sized to the appropriate delivery rate in accordance with Oregon State Water Law. Water measurement devices will be appurtenant features of all of our designs as needed.

3. At this time we are including infiltration galleries in the programmatic EA. We appreciate your offer to work with us to develop guidelines. We would greatly welcome this opportunity and plan to supplement the EA with these guidelines as they become available.

4. Improving water transmission and irrigation efficiencies (water conservation) was not considered as a strategy at this time as it is outside the scope as agreed to by your Regional Administrator and our Regional Director. These activities may be addressed indirectly or under other programs within Reclamation or other agencies.

Again we would like to thank you for your comments and greatly appreciate your offer to work with us on infiltration gallery guidelines. Please advise us on whom to contact to discuss how to set this process in motion.

Printed and CD copies of the final programmatic EA will be forwarded to you after it is published.

If you have questions concerning Reclamation's habitat improvement program in the John Day River subbasins or this particular NEPA compliance activity, you may contact Ms. Blakney at 503.872.2798.

Sincerely,

Ronald J. Eggers
Area Manager

cc: PN-3400, PN-1720, PN-3420

OREGON DEPARTMENT OF FISH & WILDLIFE -- MEMORANDUM

DATE: 1/7/03

TO: Ms. Karen Blakney

FROM: Steve Allen, Manager John Day Screen Shop

SUBJ: Comments on "Programmatic Environmental Assessment"

We only reviewed the screening and passage portion and found a couple of minor corrections, as follows:

Page 1-10 Third paragraph; We are now at approximately 150 screens that do not meet current NMFS criteria.

Page 1-12 Fifth paragraph; No one at this facility is aware of the Forest Service staff ever replacing a screen in the Middle Fork area, without involvement of the ODFW Screens Crew.

Page 2-14 First paragraph; There are three examples of screening irrigation return flow in the John Day Basin. 1) John Day River irrigation flow screened with a rotary drum prior to entering Riley Creek. 2) John Day River irrigation flow siphoned under Laycock Creek prior to intersecting creek. 3. John Day River irrigation flow siphoned under Bear Creek, prior to intersecting creek.

Where irrigation flows cross over tributaries NMFS prefers the use of siphons so there is not an interchange of water, several of this type need to be addressed. When irrigation return flows end at a stream and do not continue on, then the use of a physical barrier is needed, we are aware of a couple of this type and they need to be addressed.

United States Department of the Interior

BUREAU OF RECLAMATION
Pacific Northwest Region
Lower Columbia Area Office
825 NE Multnomah Street, Suite 1110
Portland, Oregon 97232-2135

IN REPLY REFER TO:

PN-3420
ENV-1.10

MAR 12 2003

Mr. Steve Allen
Manager
John Day Screen Shop
Oregon Department of Fish and Wildlife
P.O. Box 515
John Day, OR 97845

Dear Mr. Allen:

Thank you for your response to the Draft Programmatic Environmental Assessment for Implementation of Action 149 Fish Habitat Improvement Measures for the December 2000 National Marine Fisheries Services Biological Opinion of the Federal Columbia River Power System in Three John Day Subbasins in the Mid-Columbia River Steelhead Evolutionarily Significant Unit in Central Oregon. We sincerely appreciate you taking the time to review the document and provide us feedback.

As a result of your comments we are making the following changes to the document:

1) Draft Page 1-10 third paragraph: We are changing the document to note that there are approximately 150 screens that do not meet current NMFS criteria.

2) Draft Page 1-12 fifth paragraph: We have contacted the U.S. Forest Service and have learned that all fish screens installed on the Malheur N.F. was installed by the Oregon Department of Fish and Wildlife with cooperation of the Malheur N.F. We will clarify this in the final report.

3) Draft page 2-14 first paragraph: We are incorporating a discussion on siphons into the document.

Again, thank you for commenting on the Draft Programmatic Environmental Assessment. Your comments will result in an improved final document. A copy of the final document will be delivered to you when it is complete.

Sincerely,

Karen A. Blakney

for Ronald J. Eggers
Area Manager

cc: PN-3400, PN-3420, PN-1720

NORTH FORK JOHN DAY WATERSHED COUNCIL

P. O. Box 95 • Monument, Oregon 97864 • (541) 934-2141 • FAX (541) 934-2312

January 10th, 2003

Dear Ms. Blakney,

I write on behalf of the North Fork John Day Watershed Council, a locally-based organization that is striving to improve watershed conditions in the North and Middle Fork sub-basins of the John Day River. We are glad to have the Bureau of Reclamation as a partner in our efforts, and applaud your commitment to running a voluntary program that builds on the many existing watershed improvement programs in the basin. We also have some concerns about the program that is laid out in the draft environmental assessment for implementation of RPA Action 149 in the John Day Basin.

The BOR's plans for mitigation actions under RPA Action 149 have been the subject of discussion at several of our recent meetings. The topic that has received the most attention is the proposal to address low-flow problems through the purchase of water rights for transfer to in-stream use. Our council membership is diverse, and member's opinions about the purchase of water for transfer to in-stream use vary widely. Some members actively promote such transfers. Others have mixed feelings, and some are adamantly opposed to the concept. Yet all council members present at the most recent meeting at which the BOR program was discussed agreed that BOR's narrow interpretation of how to address flow problems greatly reduces the potential effectiveness of its program.

RPA Action 149 instructs the BOR to "address all flow problems." There are many possible approaches to improving stream flows in the region. Irrigation systems can be made more efficient so that conserved water can be kept in-stream. Riparian improvement projects can enhance critical late-season flows by retaining spring runoff for release in the late summer and fall. Upland vegetation management projects can increase water yields. Yet BOR has unfortunately chosen to limit itself to using a single tool—the purchase of water rights for transfer to in-stream use. While there will be occasions when this tool can be put to use, they will be limited at best. Unless BOR broadens its perspective, far more opportunities for flow enhancement will be forgone.

We hope that the BOR will reconsider its narrow interpretation of RPA Action 149 and instead bring to the basin a full toolbox that can, when all the tools in it are used in combination, make real progress towards meeting both BOR's mandate under the FCRPS Biological Opinion, and the North Fork Watershed Council's vision of a John Day Basin in which healthy runs of native fish coexist with vibrant local communities.

Sincerely,

Alexander Conley
Coordinator
North Fork John Day Watershed Council

United States Department of the Interior

BUREAU OF RECLAMATION
Pacific Northwest Region
Lower Columbia Area Office
825 NE Multnomah Street, Suite 1110
Portland, Oregon 97232-2135

IN REPLY REFER TO:
PN-3420
ENV-1.10

MAR 12 2003

Mr. Alexander Conley, Coordinator
North Fork John Day Watershed Council
P.O. Box 95
Monument, OR 97864

Dear Mr. Conley:

Thank you for your response to the Draft Programmatic Environmental Assessment for Implementation of Action 149 Fish Habitat Improvement Measures for the December 2000 National Marine Fisheries Services Biological Opinion of the Federal Columbia River Power System in Three John Day Subbasins in the Mid-Columbia River Steelhead Evolutionarily Significant Unit in Central Oregon. We sincerely appreciate you and the Watershed Council taking the time to review the document and provide us feedback.

We understand the concerns of the North Fork John Day Watershed Council regarding the narrow interpretation of RPA Action 149 which was used for this Programmatic EA. We recognize there are other projects which may be warranted which do not fit the scope of this Programmatic EA. Such projects, if later considered, will require a supplemental or separate Environmental Assessment to deal with the site specific issues of these projects.

We applaud the North Fork Watershed Council for their vision of a John Day Basin in which healthy runs of native fish coexist with vibrant local communities. We trust that this Programmatic Environmental Assessment will assist in turning this vision into reality.

Again, thank you for commenting on the Draft Programmatic Environmental Assessment.

Sincerely,

Karen A. Blakley

for Ronald J. Eggers
Area Manager

cc: PN-3400, PN-3420, PN-1720

Comments received from John Morris 1/24/03 (hand carried)

Comments concerning Programmatic Environmental Assessment for Implementation of Action 149 Fish Habitat Measures

The assessment is well thought out and analyzed. The comments are not directly related to the analysis but are more geared to fully identifying environmental conditions and facts.

Item 1. 1.4.2 paragraph 2. I feel that environmental litigation has heavily influenced the availability of forest products that would help the economy. Although the Malheur NF, in all likelihood, could not sustain the near 200 MBF harvested in the late 1980s to 1992, the threat of litigation reduced the volume sold from a high 94.4 MBF in 1998 to a low of 2.6 MBF in 2002. Factors such as "Pacfish" and roadless areas withdrawn from Management Area 1-2 reduced potential harvest acres. These were in direct response to litigation threats.

Item 2. 1.5 paragraph 1. Recent redd counts are the highest since redd counts began in 1959. I would agree that historically there were considerably more fish but it must be recognized activities that caused degradation of aquatic habitat are being considered and discontinued along with restoration efforts and improved management. Lets not keep beating ourselves up over things our ancestors did and take credit for recognizing problem area and making improvements that have helped increase runs.

One thing that is absent in this overview is the invasion of juniper and the subsequent reduction of capture, storage and safe release of precipitation. The effects of fire suppression and juniper encroachment and the effects on water yield are well documented in case studies throughout the John Day and other basins.

Item 3. 1.5 paragraph 5. Typically diversion dams are not required prior to July 1 because of adequate snow melt. By the time diversion dams are needed in the mainstem, smolt migration has diminished, water temperatures have increased and rearing is primarily in the tributaries. Although spawning does occur in the mainstem, the majority of spawning occurs in tributaries and alevins have emerged from the gravel by July. Oregon Dept. of Fish and Wildlife instream work period begins July 15 with the assumption all alevins will be out of the gravel.

Item 4. 2.1 paragraph 2. "resolve streamflow issues" What are these issues? Antidotal information from a mid 1860s sheepherders diary at Calarno indicates "the river has enough water to provide water for the bands a few more days", indicating flows have periodically been low. (Contact Arleigh Isley, Canyon County, Or. For reference). Is the goal to increase flows? If so, should not all aspects that affect flows be addressed, i.e. juniper encroachment, rural development, wells, etc.? Year to year there is only so much water in the basin. Purchasing water for instream purposes does not increase the overall water in the basin, it only changes the use of the existing water. The necessary flow needs to be quantified rather than an unidentified quantity.

Item 5. 2.2.3.1 #2 The "reach served" needs to be identified prior to purchase or lease so interested stakeholders are informed of potential impacts.

Item 6. 2.2.3 #4 The cancellation process needs to be more clearly defined. If a water right is

cancelled does it need to be applied for with the effective date the same as the application date or is the priority date the dame as the cancelled right?

United States Department of the Interior

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IN REPLY REFER TO:

PN-3420
ENV-1.10

MAR 12 2003

Mr. John Morris
P.O. Box 669
John Day, OR 97845

Dear Mr. Morris:

Thank you for your response to the Draft Programmatic Environmental Assessment for Implementation of Action 149 Fish Habitat Improvement Measures for the December 2000 National Marine Fisheries Services Biological Opinion of the Federal Columbia River Power System in Three John Day Subbasins in the Mid-Columbia River Steelhead Evolutionarily Significant Unit in Central Oregon. We sincerely appreciate you taking the time to review the document and provide us feedback.

The final document will incorporate many of your suggested changes. Following is a recap of your comments and how we will address them in the Programmatic Environmental Assessment.

Item 1 (Section 1.4.2 paragraph 2): We agree that the environmental litigation has greatly decreased the availability of forest products and has had substantial negative impacts on the local economy. To address this issue we are adding environmental litigation as a factor that has had an impact on the local economy.

Item 2 (Section 1.5 paragraph 1): We agree with your comments that there has been a recognition of many activities that degrade aquatic habitat and many of these practices are being discontinued, and a great deal of restoration effort is taking place. To address this issue we are revising this paragraph to emphasize the efforts that have been made to date to address the degradation of aquatic habitat.

We acknowledge your concerns regarding the invasion of juniper and the subsequent reduction of capture, storage and release of water. This issue was raised in the scoping process and was determined to be outside the scope of this Programmatic Environmental Assessment. See page 1-4.

Item 3 (Section 1.5 paragraph 5): Your comments to this paragraph point out that push-up dams are often put in during periods when smolt migration has diminished, water temperatures have increased and rearing is primarily in tributaries. We have modified this paragraph to clarify the timing and the impacts from construction and maintenance of push up dams.

Item 4 (Section 2.1 paragraph 2): We are making a number of changes to this paragraph to address the issues you have raised. We are also noting that Reclamation is initiating Instream Flow Incremental Methodology to help identify habitat flow relationships.

Item 5 (Section 2.2.3.1 #2): In this item you comment that the "reach served" needs to be identified prior to purchase or lease so interested stakeholders are informed of potential impacts. We are addressing this by noting the Oregon Water Resource Department process shall be followed which includes notifying interested stakeholders and informing them of potential impacts.

Item 6 (Section 2.2.3 #4): You point out the need to clearly define the cancellation process. We will revise the report to make it clear that when a water right is cancelled, any new water right filed will also be assigned a current date.

Again, thank you for commenting on the Draft Programmatic Environmental Assessment. Your comments will result in an improved final document. A copy of the final document will be delivered to you when it is completed.

Sincerely,

Karen A Blakney

for Ronald J. Eggers
Area Manager

cc: PN-3400, PN-3420, PN-1720