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).

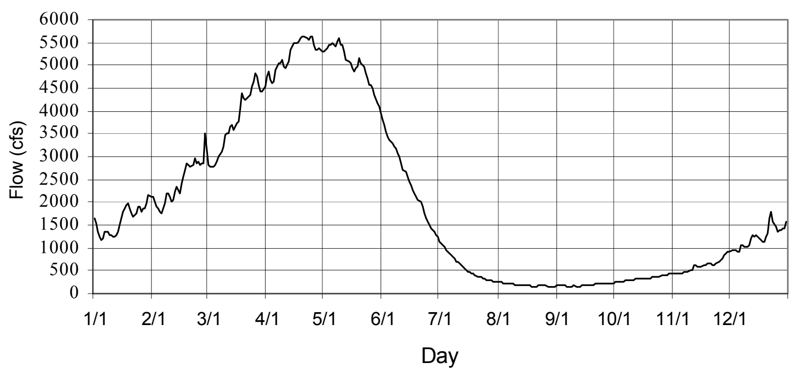

Figure 14. Average streamflow in the lower John Day River at Service Creek (RM 156.7, below the confluence with the North Fork), 1929 to 1998.

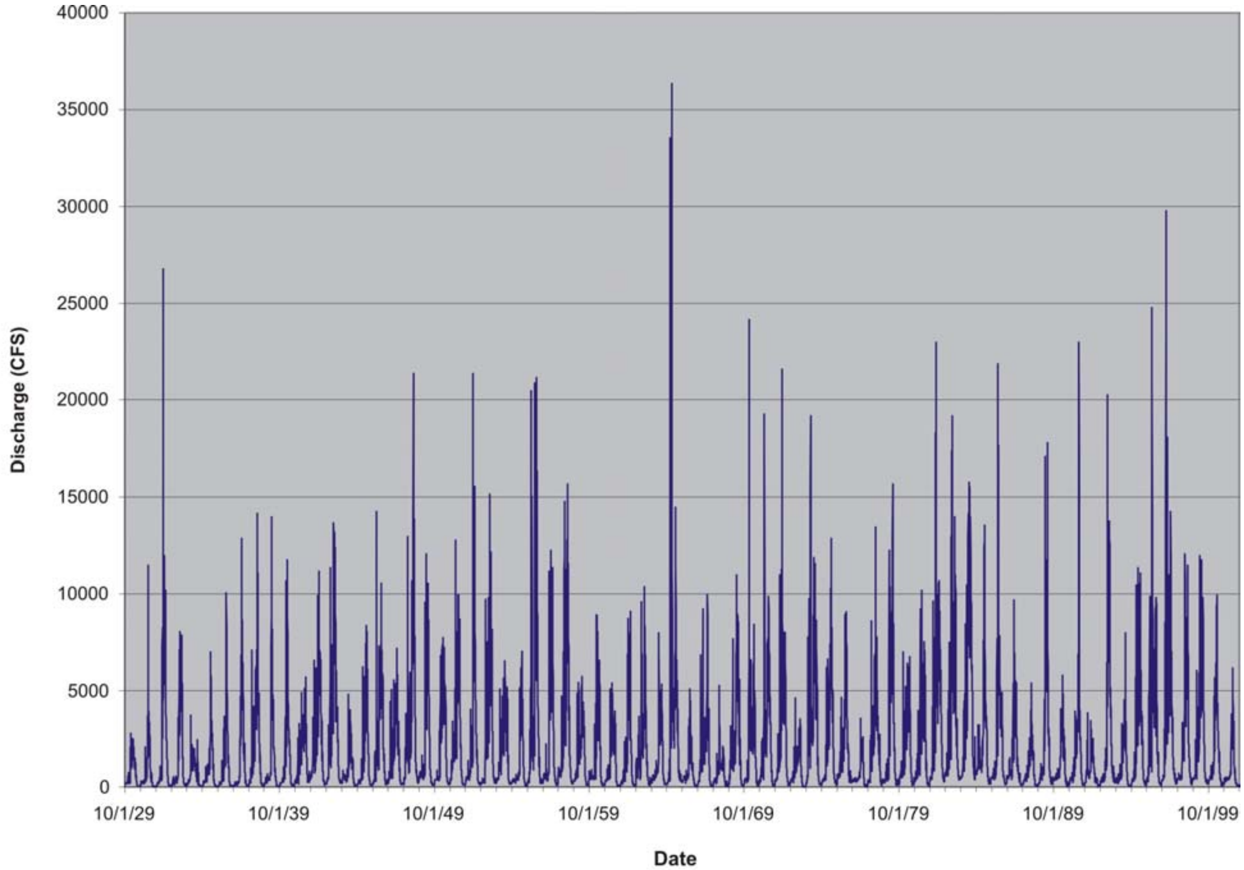

Figure 15. Hydrograph of lower John Day River at Service Creek (RM 156.7, below the confluence with the North Fork), with the dates of major flow events.

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.

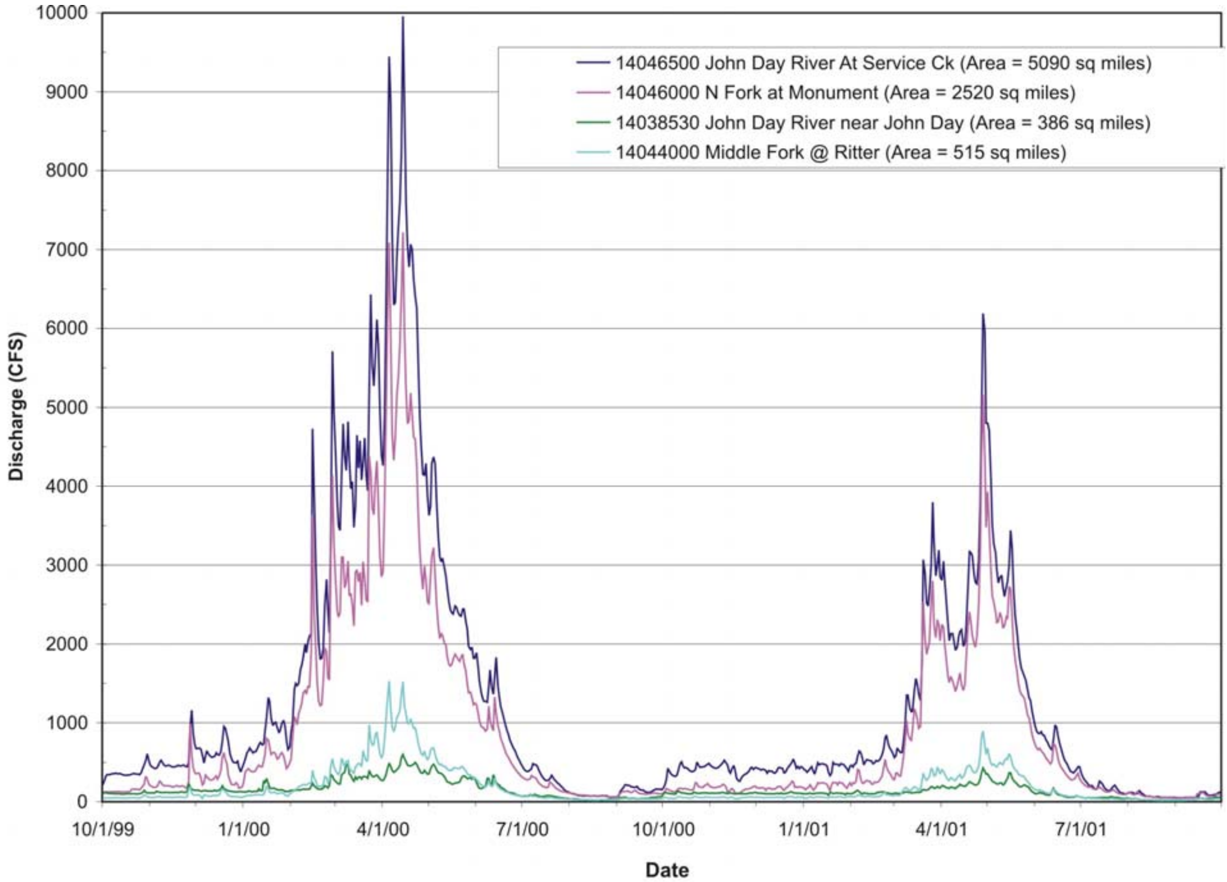

Figure 16. Hydrograph of streamflows at selected gages in and near the project area, October 1999 to September 2001.

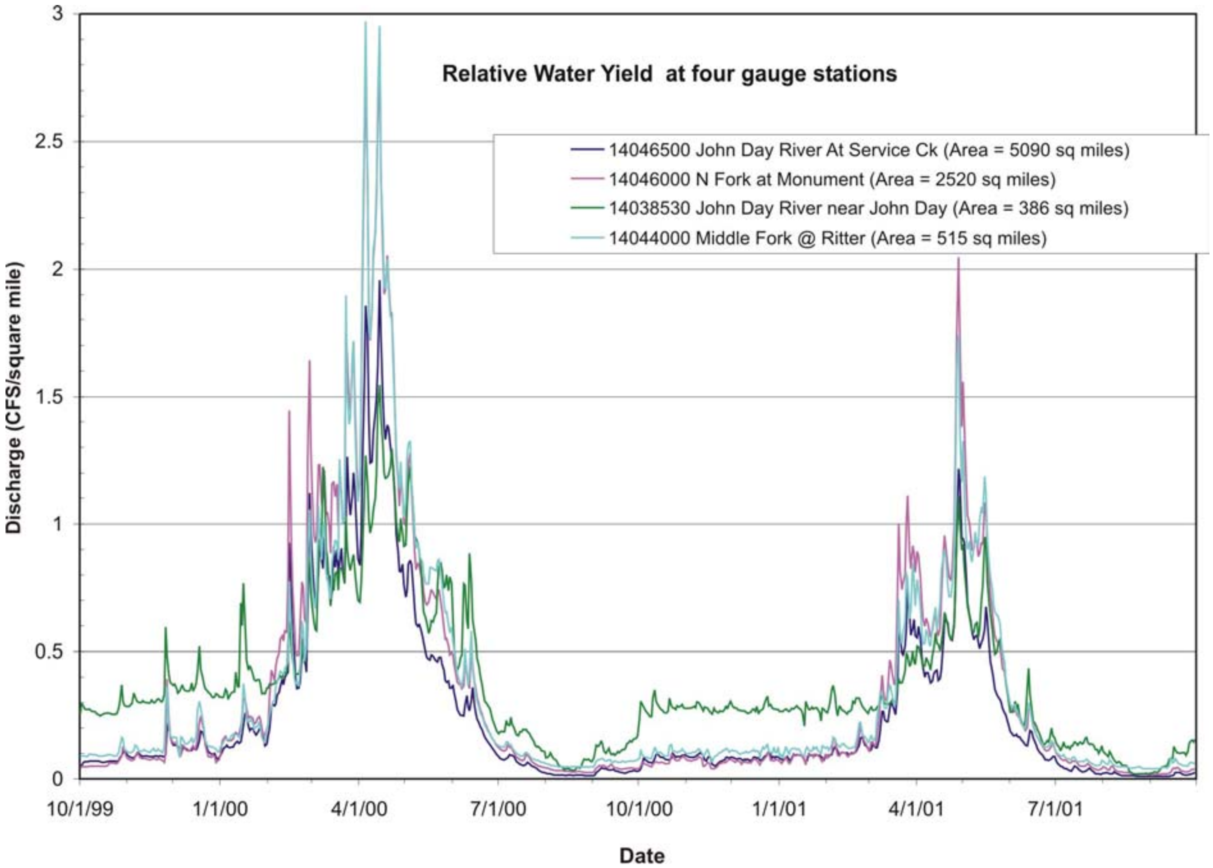

Figure 17. Water yields for selected gages in and near the project area, October 1999 to September 2001.

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).

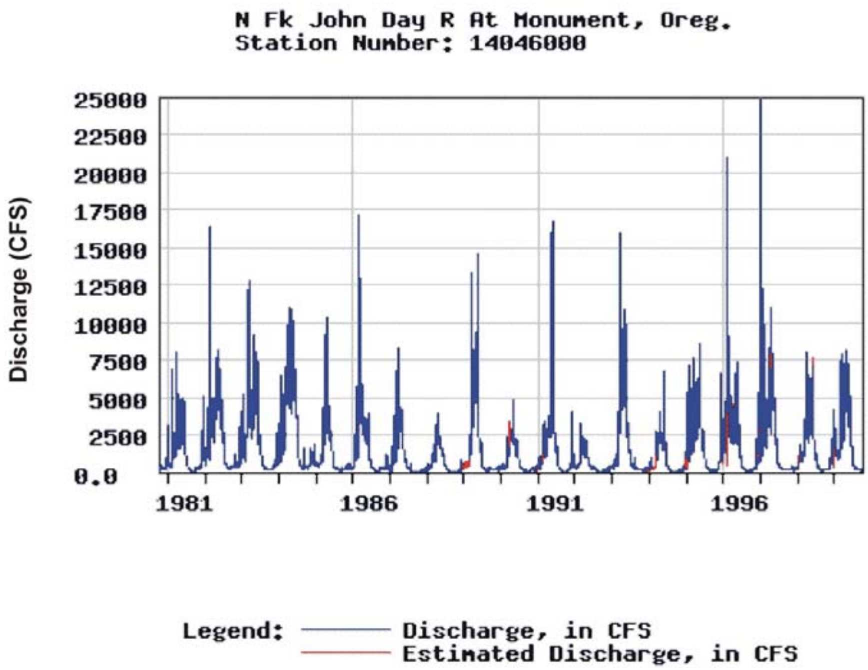

Figure 18. Hydrograph of streamflows at the Monument gaging station on the North Fork John Day River, October 1980 to September 1999.

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.

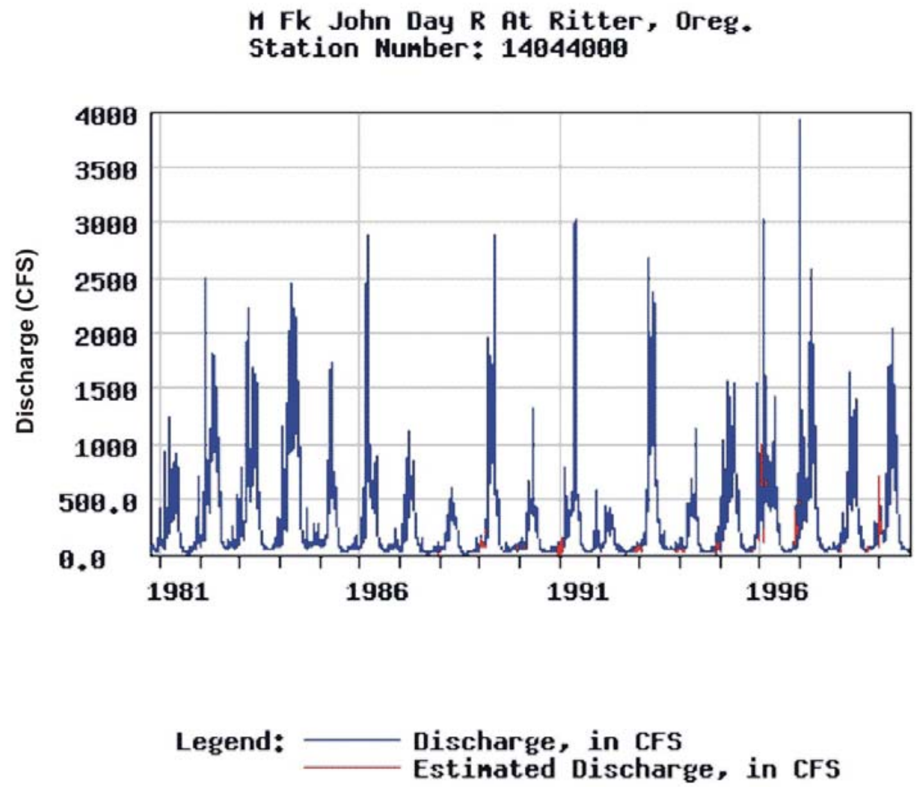

Figure 19. Hydrograph of streamflows at the Ritter gaging station (RM 15) on the Middle Fork John Day River, October 1980 to September 1999.

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).

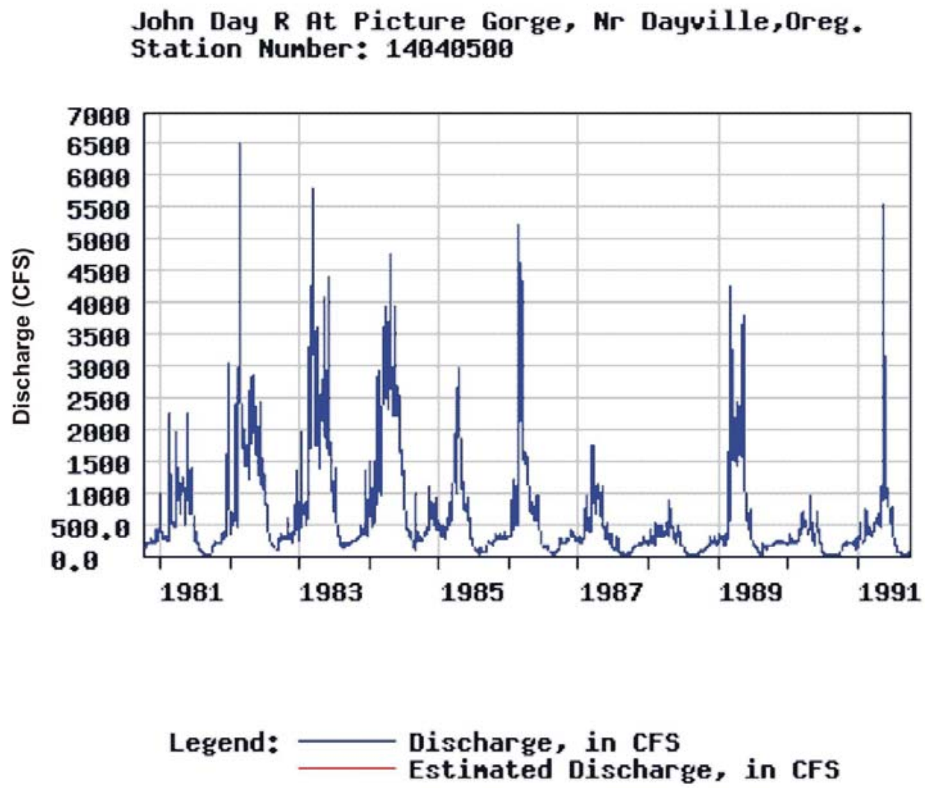

Figure 20. Hydrograph of streamflows at the Picture Gorge gaging station (RM 205) on the Upper John Day River, October 1980 to September 1991 (end of record for this site).

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

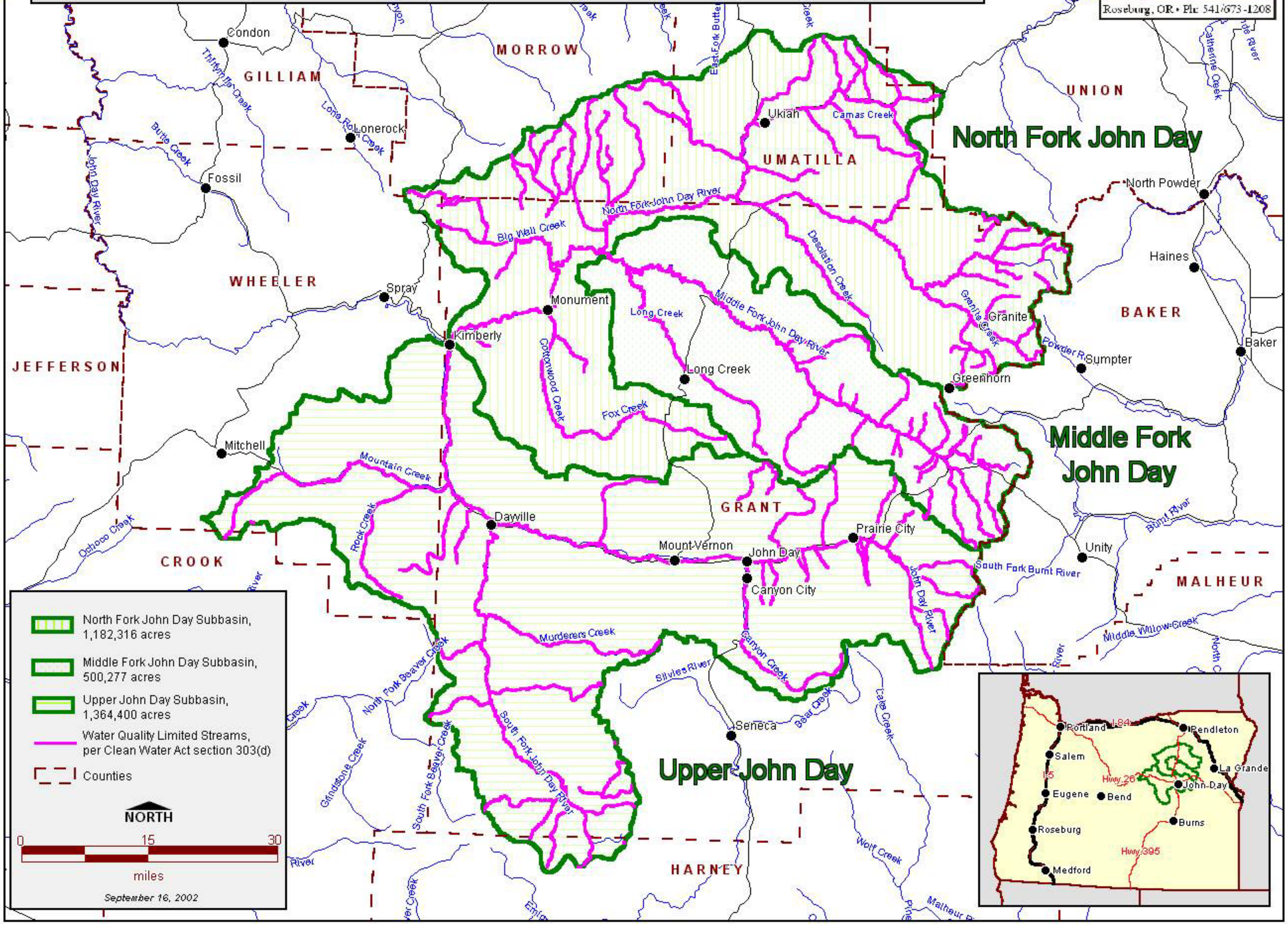

Table 7. North Fork John Day River Subbasin 303(d) Listed Stream Segments and Water Quality Parameters of Concern. (Source: ODEQ)

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 <u>No Action</u>

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 *<u>No Action</u>*
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 *<u>Proposed Action</u>*
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%

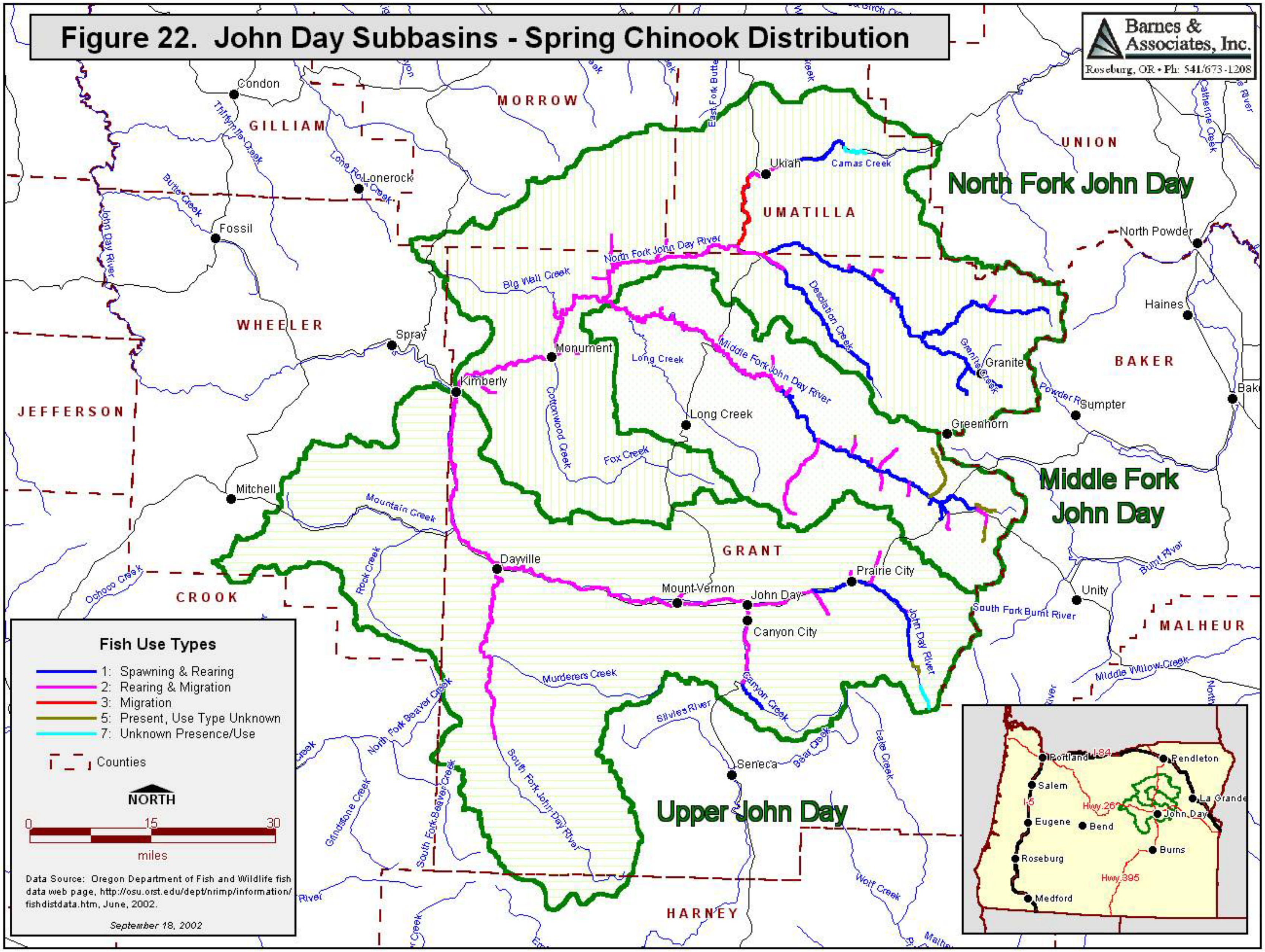

Figure 22. John Day Subbasins - Spring Chinook Distribution

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.

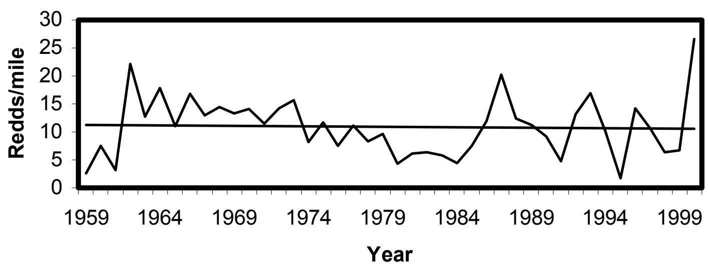

Figure 23. Results of spring chinook spawning surveys in the John Day River Basin, 1959-2000.

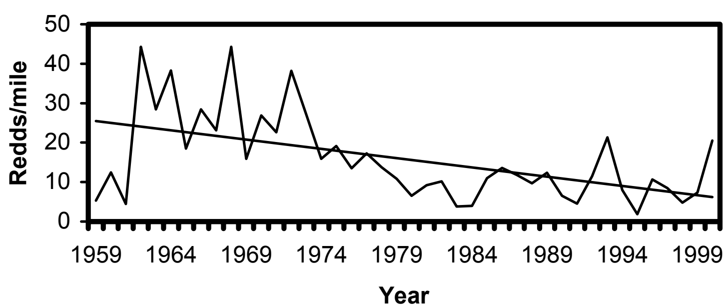

Figure 24. Results of spring chinook spawning surveys in the Granite Creek system, 1959-2000.

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.

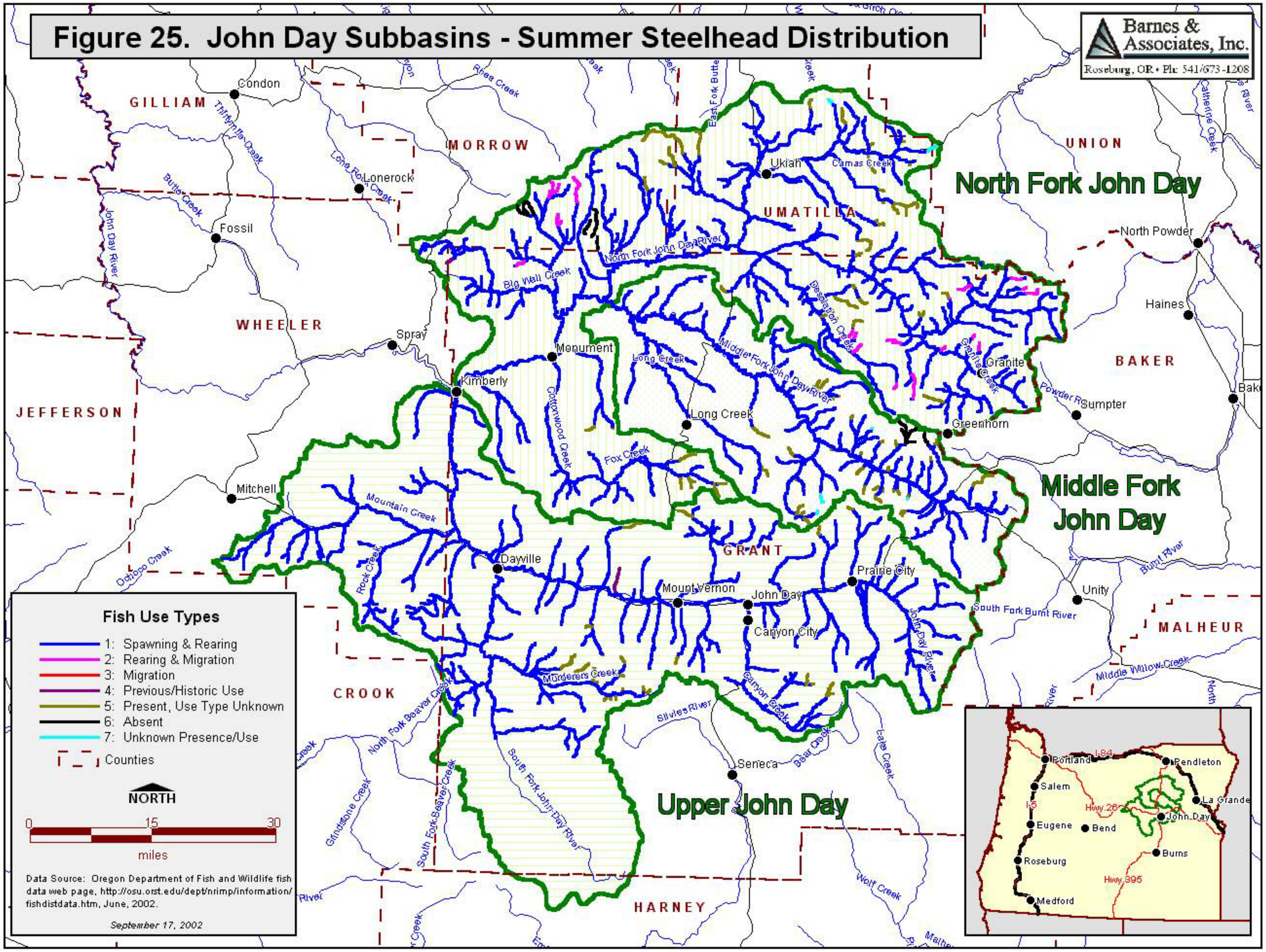

Figure 25. John Day Subbasins - Summer Steelhead Distribution

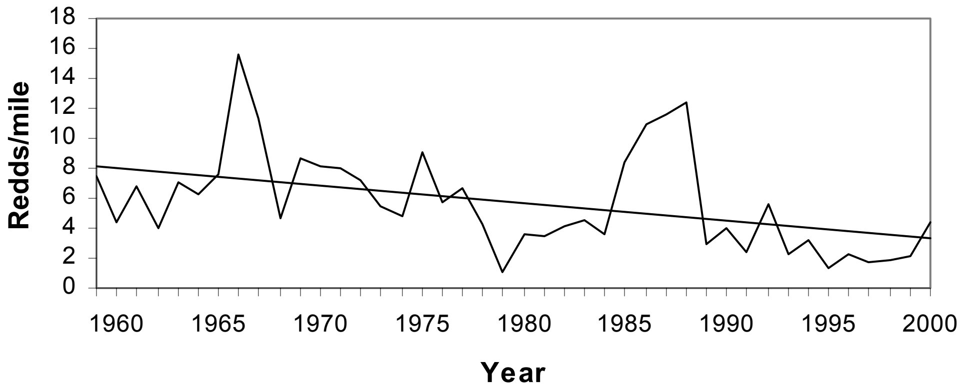

Figure 26. Spawning density (redds/mile) of summer steelhead in the John Day Basin, 1959 to 2000.

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.

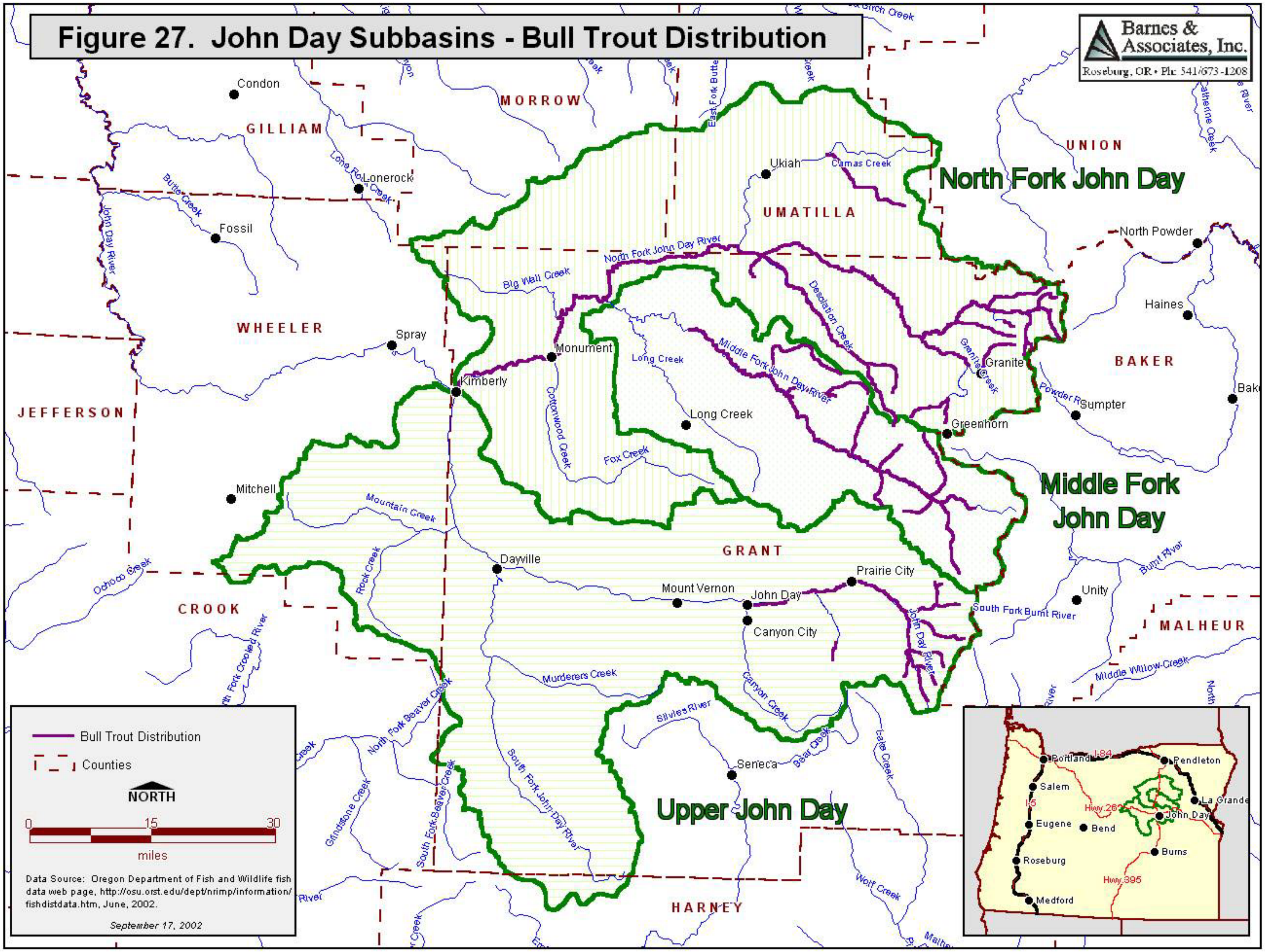

Figure 27. John Day Subbasins - Bull Trout Distribution

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

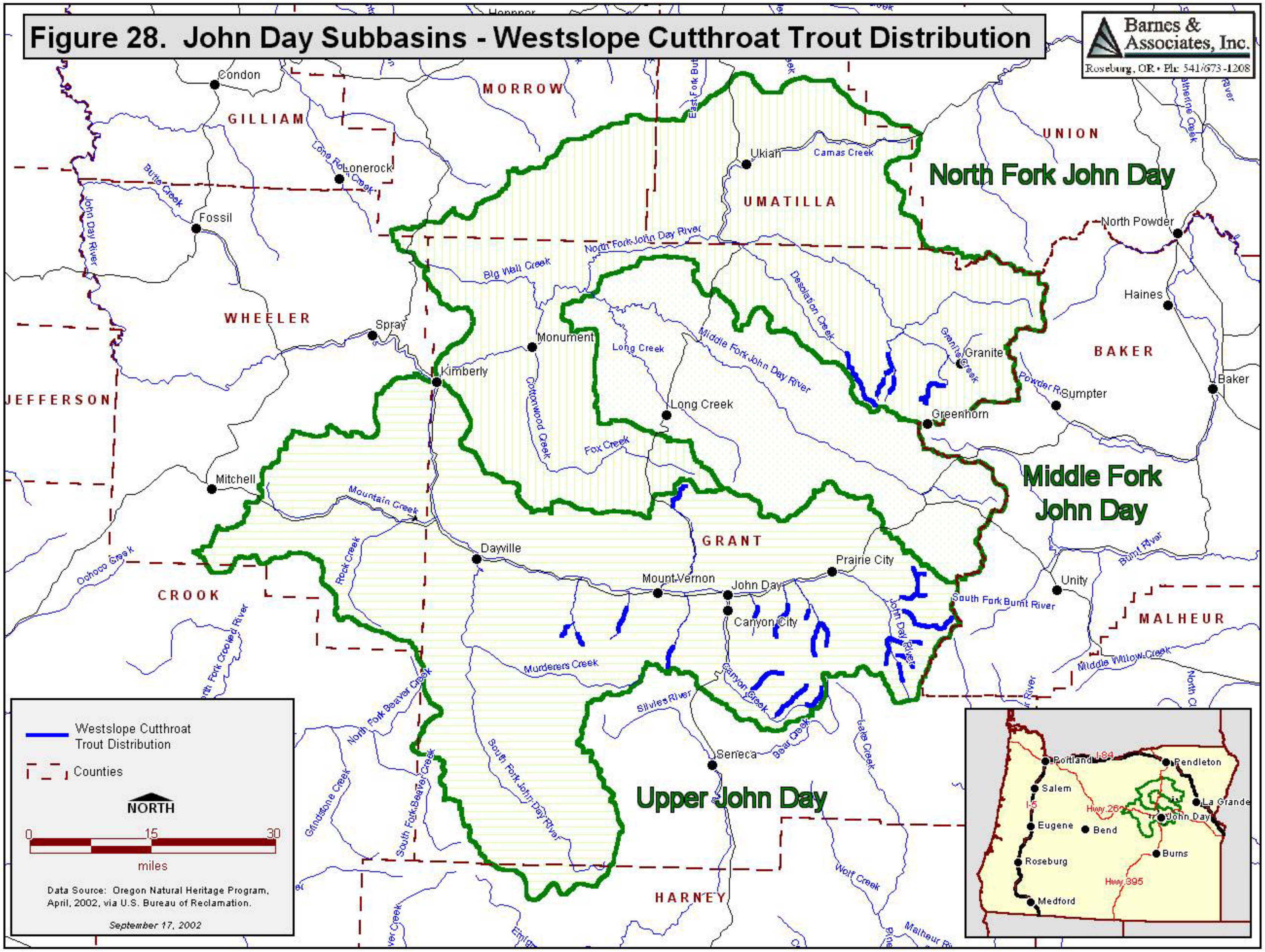

Figure 28. John Day Subbasins - Westslope Cutthroat Trout Distribution

(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 <u>No Action</u>

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 *<u>Flow increases</u>*

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 <u>No Action</u>
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 <u>Proposed Action</u>
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 15^{th}) 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 <u>No Action</u>
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 <u>Proposed Action</u>
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.