Draft Grande Ronde Subbasin Summary

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Northwest Power Planning Council

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DRAFT: This document has not yet been reviewed or approved by the Northwest Power Planning Council

Grande Ronde Subbasin Summary

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Grande Ronde Subbasin Summary

Subbasin Description

General Description

Subbasin Location

Located in the southwest portion of the Blue Mountains Ecological province, the Grande Ronde subbasin encompasses an area of about 4,000 mi^2 in northeastern Oregon and southeastern Washington (Figure 1). The subbasin is characterized by rugged mountains and two major river valleys, and is defined by the Blue Mountains to the west and northwest, and the Wallowa Mountains to the southeast. It is in these mountain ranges, with peaks as high as 7,700 feet in the Blues and nearly 10,000 feet in the Wallowas, where the headwater streams of the Grande Ronde begin. Subbasin corners are approximated by the following Townships and Ranges; NW corner (T7N/R39E), NE corner (T7N/R46E), SW corner (T4S/R42E), SE corner (T6S/R35E).

The Grande Ronde River flows generally northeast 212 miles from its origin to join the Snake River at river mile (RM) 169, about 20 miles upstream of Asotin, Washington and 493 miles from the mouth of the Columbia River. The Grande Ronde River begins in the Blue Mountains near the Anthony Lakes recreation area, flows north, then northeast and through the cities of La Grande and Island City (RM 157). Here, in the valley, the river slows and meanders the valley floor before continuing north-northeast through the towns of Imbler, Elgin and Troy, Oregon (RM 46), then it crosses into Washington at RM 38.7 before joining the Snake River. There are 8 dams on the Columbia and Snake rivers between the Grande Ronde River and the Pacific Ocean.

Major streams flowing into the Grande Ronde are Catherine and Joseph creeks and the Wallowa and Wenaha rivers. Catherine Creek originates in the Eagle Cap Wilderness Area of the Wallowa Mountains and flows northwest, passing through the town of Union, then turns northeast to join the Grande Ronde at RM 140. The Wallowa River originates in the Lakes Basin area of the Eagle Cap Wilderness Area at elevations over 8,000 feet. The Wallowa River flows north into Wallowa Lake, the only large lake in the subbasin, then through the towns of Joseph, Enterprise and Wallowa before joining the Grande Ronde at RM 82. The Wenaha River begins in the Wenaha-Tucannon Wilderness Area and flows east to its confluence with the Grande Ronde River at the town of Troy (RM 46).

The subbasin includes large portions of Union and Wallowa Counties and a small portion of Umatilla County in Oregon as well as about a third of Asotin County and small portions of Columbia, and Garfield counties in Washington.

Drainage Area

The Grande Ronde and its tributaries are snowmelt runoff streams. Peak runoff occurs in spring, generally from April through June, from melting snowpack and spring rains. Runoff recedes to low flows by late summer, usually August and September. Flow again increases in late fall in response to autumn rains.

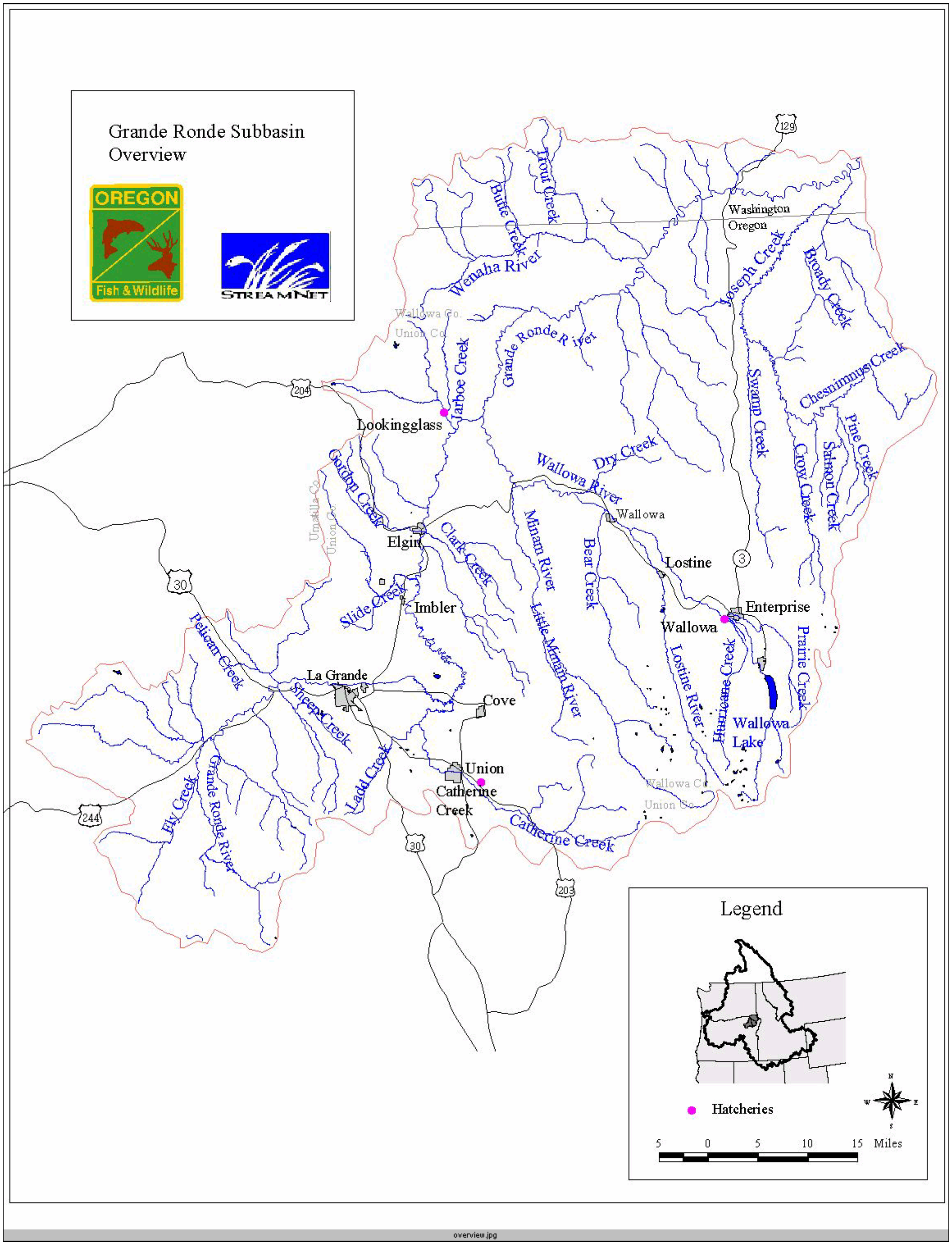

Figure 1. The Grande Ronde River Subbasin

The Grande Ronde subbasin drains much of the extreme northeast corner of Oregon as well as 341 mi^2 of southeast Washington. The subbasin is divided into three watershed areas – the Upper Grande Ronde, Lower Grande Ronde and Wallowa watersheds.

Upper Grande Ronde Watershed: The Upper Grande Ronde watershed drains approximately 1,650 mi^2, with a perimeter of 264 mi. and contains 917 mi of streams (221 miles of salmon habitat). The upper Grande Ronde watershed includes the Grande Ronde River and its tributaries from the headwaters to the confluence with the Wallowa River. Notable streams located in the Upper Grande Ronde watershed are listed in Table 1. Elevations in the watershed range from 2,312 ft. at the confluence of the Grande Ronde and Wallowa Rivers to over 7,000 ft. in the headwater areas.

Table 1. Notable Streams in the Upper Grande Ronde Watershed and their Points of Confluence with Larger Streams (RM). These streams are listed in order from downstream toward the headwaters.

Main Stream	Tributary (RM)	Tributary (RM)
Grande Ronde River		
	Lookingglass Creek – (85.1)	
		Jarboe Creek – (2.3)
		Little Lookingglass Creek – (4.0)
	Gordon Creek – (95.5)	
	Clark Creek – (98.7)	
	Phillips Creek – (99.7)	
	Indian Creek – (101.5)	
	Willow Creek – (105.7)	
	Catherine Creek – (143.9)	
		Mill Creek – (1.8)
		Ladd Creek – (10.3)
		Little Creek – (14.6)
		Little Catherine Creek – (28.4)
		N.F. Catherine Creek – (32.6)
	Fivepoint Creek – (169.3)	
	Rock Creek – (169.7)	
		Little Rock Creek
	Spring Creek – (169.9)	
	Whiskey Creek – (172.3)	
	Jordan Creek – (174.7)	
	Beaver Creek – (181.7)	
	Meadow Creek – (183.2)	
		McCoy Creek – (2.1)
		Waucup Creek – (18.4)
	Fly Creek – (184.5)	
	Sheep Creek – (194.0)	
		Chicken Creek – (2.3)
	Limber Jim Creek – (197.5)	

Source: EPA Watershed Profile and Hydrology Subcommittee 1965

Lower Grande Ronde Watershed: The Lower Grande Ronde watershed, exclusive of the Wallowa River drainage, drains approximately 1530 mi^2 and contains 773 miles of streams (140 miles of salmon habitat). This watershed includes The Grande Ronde River and tributaries, excluding the Wallowa River, from the Wallowa River to the confluence with the Snake River; 72 percent of this watershed is in the state of Washington. Notable streams located in the Lower Grande Ronde watershed are listed in Table 2. The Washington portion of the watershed contains 188 miles of perennial streams in the Wenaha drainage and 265 miles of streams in the Grande Ronde drainage (M. Kuttle, Washington Conservation Commission, personal communication, 2001). Elevations in the watershed range from about 1,000 ft. at the confluence of the Grande Ronde and Snake Rivers to over 5,800 ft. at the headwaters of the Wenaha River.

Table 2. Notable Streams in the Lower Grande Ronde Watershed (excluding the Wallowa River drainage) and their Points of Confluence with Larger Streams (RM). These streams are listed in order from downstream toward the headwaters.

Main Stream	**Tributary (RM)**	**Tributary (RM)**
Grande Ronde River		
	Joseph Creek – (4.3)	
		Cottonwood Creek – (4.4)
		Tamarack Creek – (12.6)
		Swamp Creek – (31.5)
		Elk Creek – (49.7)
		Chesnimnus Creek – (49.8)
	Rattlesnake Creek – (26.2)	
	Cottonwood Creek – (28.7)	
	Cougar Creek – (30.7)	
	Menatchee Creek – (35.9)	
	Grouse Creek – (40.0)	
	Wenaha River – (45.3)	
		Crooked Creek – (6.7)
		Butte Creek – (14.8)
		Beaver Creek – (21.7)
	Courtney Creek – (46.4)	
	Mud Creek – (52.0)	
		Buck Creek
		Tope Creek
	Wildcat Creek – (53.3)	
		Wallupa Creek
	Sickfoot Creek – (58.2)	
	Grossman Creek – (62.9)	
	Bear Creek – (66.2)	

Wallowa Watershed: The Wallowa watershed is the smallest of the three watersheds and drains about 950 mi^2, with a perimeter of 139 mi. and 494 mi. of streams (212 miles of salmon habitat). It includes the Wallowa River and its tributaries from the headwaters to the mouth. Notable streams in the watershed are listed in Table 3. Elevations in the watershed range from 2,288 ft. at the confluence of the Wallowa and Grande Ronde Rivers to over 8,000 ft. at the headwaters in the Lakes Basin of the Eagle Cap Wilderness Area.

Table 3. Notable Streams in the Wallowa Watershed and their Points of Confluence (RM) with Larger Streams. These streams are listed in order from downstream toward the headwaters.

Main Stream	Tributary (RM)	Tributary (RM)
Wallowa River		
	Howard Creek – (3.4)	
	Minam River – (10.1)	
		Squaw Creek – (2.5)
		Murphy Creek – (12.8)
		Little Minam River – (17.5)
		North Minam River – (28.9)
	Deer Creek – (11.5)	
	Rock Creek – (18.4)	
		Dry Creek – (0.5)
	Bear Creek – (22.7)	
		Little Bear Creek – (7.5)
		Doc's Creek – (9.1)
		Goat Creek – (13.1)
	Whiskey Creek – (24.8)	
	Lostine River – (26.0)	
		Silver Creek – (14.0)
		Lake Creek – (19.4)
	Parsnip Creek – (29.0)	
	Trout Creek – (38.9)	
	Hurricane Creek – (39.8)	
	Prairie Creek – (40.1)	
	West Fork Wallowa River (54.8)	
	East Fork Wallowa River (54.8)	

Climate

The relief of the Blue and Wallowa Mountains creates several localized climatic effects. The diversity of landscapes between mountain ranges, rolling topography and deep, dissected canyons influences local climatic patterns. However, the major influence to the regional climate comes from the Cascade Mountains lying nearly 200 miles to the west. These mountains form a barrier against the modifying effects of moist winds from the Pacific Ocean resulting in a modified Continental climate in the Grande Ronde River subbasin.

Winters are cold and moist. January is the coldest month, with an average daily minimum temperature of 24°F. Summers in the subbasin are warm and dry. July is the warmest month with an average daily maximum of 84°F. Temperature and precipitation vary considerably with elevation. In winter, valleys tend to be colder than lower slopes of adjacent mountains due to cold air drainage. Average annual precipitation increases from 14 inches on the valley floor to more than 60 inches in some mountain areas. On average, precipitation increases approximately 5 inches with each 1,000-foot rise in elevation (USDA 1979). Precipitation occurs in the mountains throughout the year but falls primarily as winter snow. The average annual frost-free period in the Grande Ronde Valley is 160 days. The cooler Wallowa Valley may experience frost at any time of the year but the average frost-free period is 130 days.

Topography

Rugged mountains in the headwater areas have an important influence on the character of the Grande Ronde subbasin. Peaks in the Wallowa Mountains approach 10,000 ft and serve as the source of many of the Grande Ronde's tributary streams. The Blue Mountains reach elevations of 7,700 ft and are the source of the Grande Ronde River and other, tributary streams. The relatively low elevation of the Blue Mountains can result in earlier melt off than in the Wallowa Mountains. This, in turn, can result in low flows in the Grande Ronde River in late summer (July, August, & September).

The Grande Ronde Valley, between the Blue and Wallowa Mountains, lies at a relatively high elevation (2,600-2,800 ft). The valley floor is virtually flat; over one stretch of 4.5 river miles, there is an elevation change of just 7 feet (USDA 1997).

The other major valley in the subbasin is the Wallowa Valley. Wallowa Valley lies between the Wallowa Mountains to the south and west and high plateau country to the north and east and is oriented generally southeast to northwest. The valley is approximately 32 miles long, as measured from two miles south of Wallowa Lake to one mile west of Water Canyon (approximately six miles northwest of the town of Wallowa) where the Wallowa River enters a narrow canyon. Elevations range from 4,680 feet at the south end of the valley (Wallowa Lake) to 2,760 feet at the north end.

Geology

The Grande Ronde subbasin has a complex geologic history. Rocks of the Columbia River Basalt Group dominate the surface geology of the area. Rocks older than the Columbia River Basalts occur only in the headwaters areas of the Grande Ronde River, the Wallowa River and Catherine Creek. These rocks consist of granitic intrusives and older volcanics with associated sedimentary deposits. Some of these older rocks are visible in the Wallowa Mountains where the andesitic core was exposed during uplift of the Wallowas (Baldwin 1964). Some older rocks may be visible near the mouth of the Grande Ronde River where the channel cuts into basement rock below the basalt layers.

The structural geology of the area is also complex. Regional deformation has included easterly and southeasterly tilting and uplift and northwesterly compression. Because of these forces, many faults cut the bedrock formations. These faults follow a general northwest-southeast trend. Some structural deformation continues in the area as evidenced by offsets in modern alluvial and colluvial deposits. The southern portion of the subbasin is subsiding faster than the northern portion as demonstrated by the large bend in the Grande Ronde River to the south. The presence of hot springs and regional, deep ground water flow systems also indicate ongoing tectonic activity

Hydrology

Due to the varying physiography in the Grande Ronde River subbasin, the timing of spring runoff and peak discharge is also variable. The upper Grande Ronde River, flowing out of the relatively low elevation Blue Mountains, generally experiences seasonal peak flows in March or April while peak flows in Catherine Creek, originating in the Wallowa Mountains, usually occur in May or June. Flows in the Wallowa River, which originates from mostly north-facing slopes of the higher elevation Wallowa Mountains, generally do not peak until late May or June (S. Hattan, Union/Wallowa County Water Master, personal communication, 2001; Figure 2, Figure 3, Figure 4, and Figure 5).

Gaging stations operated by the U.S. Geological Survey (USGS), the Oregon Water Resources Department (OWRD), Oregon Watershed Enhancement Board (OWEB) and the Wallowa Soil and Water Conservation District (WSWCD), measure and record stream flows throughout the subbasin. Average annual discharge of the Grande Ronde River at Troy, Oregon, the lowest gaging station presently in use, is approximately 2.25 million acre feet [3101 cubic feet per second (cfs)]. The only major tributary adding to the Grande Ronde River below this station is Joseph Creek, which is ungaged. Daily flows at gaging stations throughout the basin can vary 100-fold in as little as one month and differences between the annual minimum and maximum flows can be even greater. The gaging station on Catherine Creek near Union, Oregon recorded a minimum flow in 1998 of 1.4 cfs and a maximum the same year of 2,160 cfs. The average annual discharge of Catherine Creek at this gaging station is approximately 85,500-acre feet.

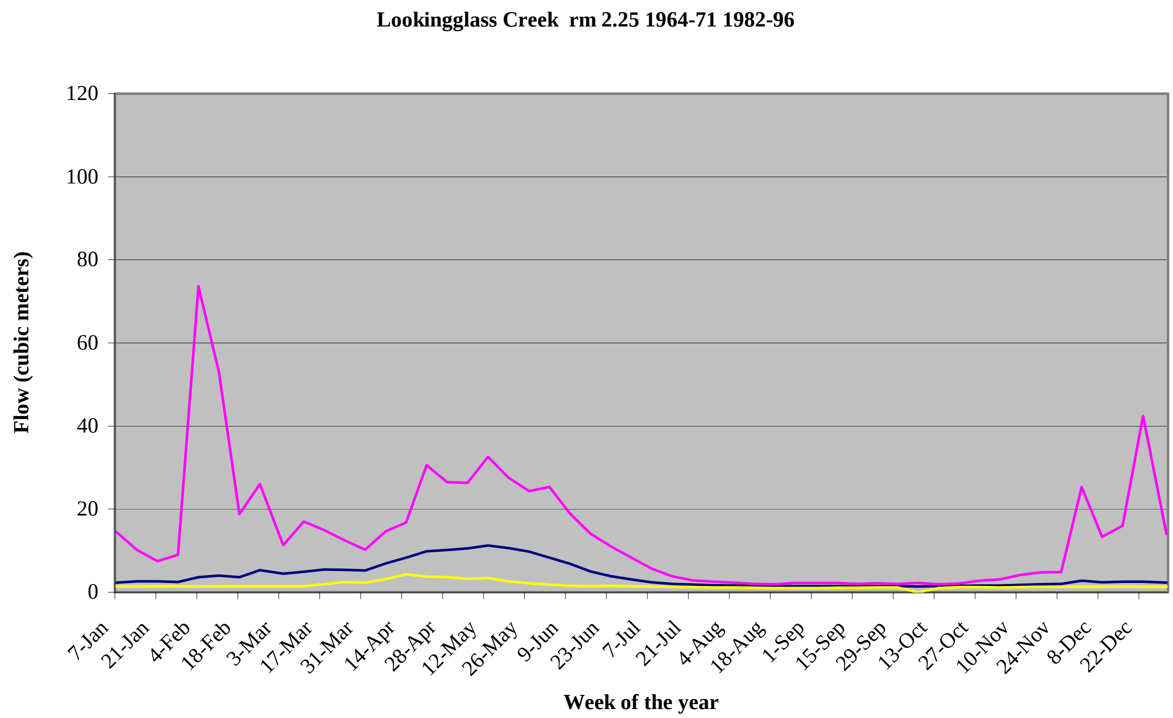

Figure 2. Hydrograph of Mean Flows in Lookingglass Creek 1964-1971 and 1982-1996. The bottom line (yellow) represents minimum; the middle line (blue) mean; and the upper line (purple), maximum flows.

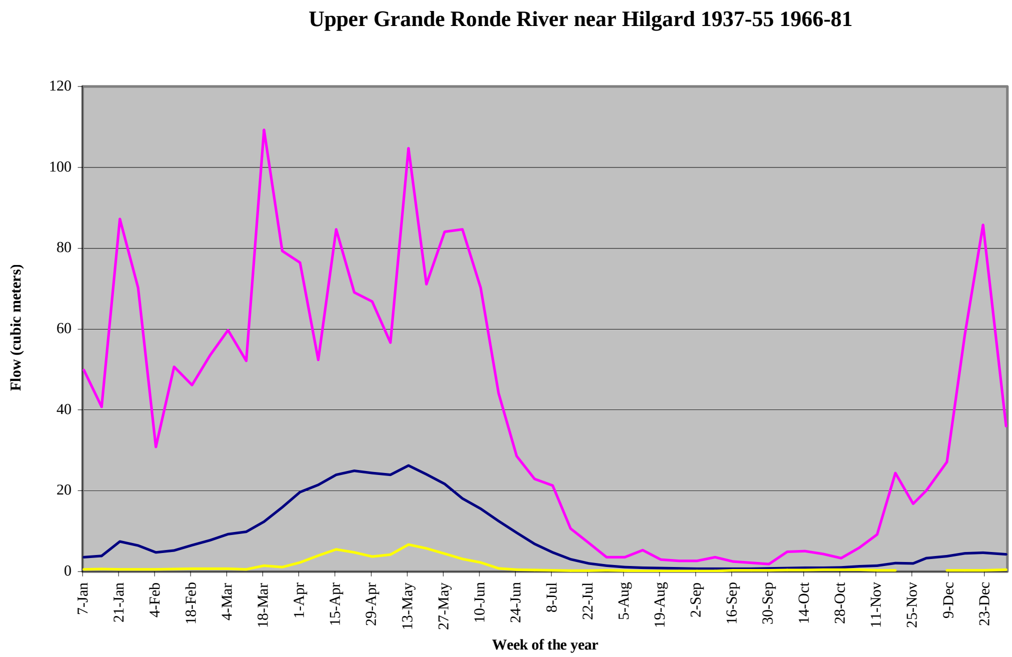

Figure 3. Hydrograph of Mean Flows in the Grande Ronde River near Hilgard 1937-1955 and 1966-1981. The bottom line (yellow) represents minimum; the middle line (blue) mean; and the upper line (purple), maximum flows.

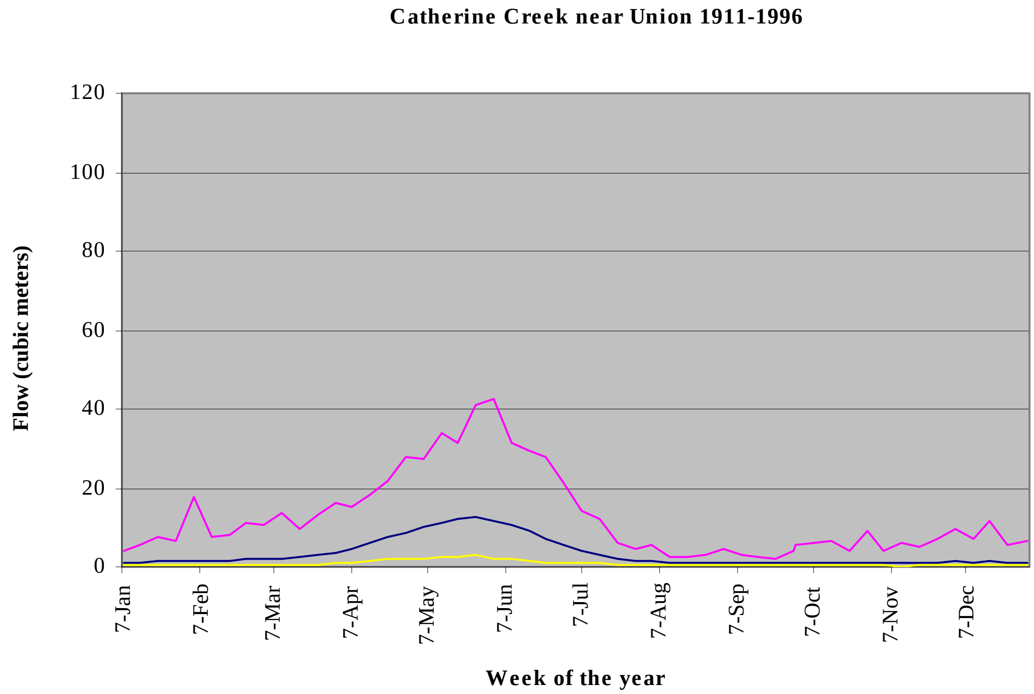

Figure 4. Hydrograph of Mean Flows in Catherine Creek near Union 1911-1996. The bottom line (yellow) represents minimum; the middle line (blue) mean; and the upper line (purple), maximum flows.

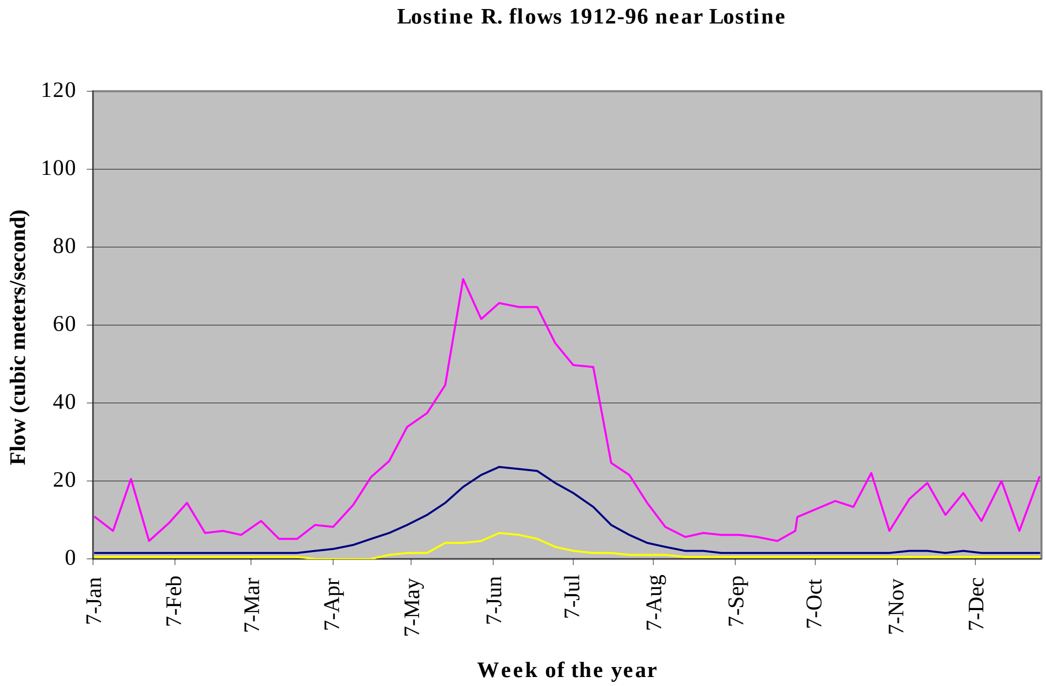

Figure 5. Hydrograph of mean flows in the Lostine River near Lostine 1912-1996. The bottom line (yellow) represents minimum; the middle line (blue) mean; and the upper line (purple), maximum flows.

Three aquifers are found in the Grande Ronde subbasin (Table 4). The Columbia Plateau aquifer system is predominant in all three watersheds. Approximately 8 percent of the subbasin have no principal aquifer.

Table 4. Principle Aquifers in Grande Ronde Subbasin Watersheds.

Aquifer Type	Total Miles^2	Percent Subbasin	Rock Type	Percent by watershed*		
				UGR	LGR	W
Columbia Plateau aquifer system	3079	75.1	Basalt, Volcanic	72.2	89.8	56.4
Pacific Northwest basin-fill aquifers	604	14.7	Unconsolidated sand & gravel	18.7	10.2	15.1
Volcanic and sedimentary rock aquifers	99	2.4	Basalt, Volcanic	6.1	0.0	0.0
No Principal Aquifer	320	7.8	N/A	3.0	0.0	28.5

*UGR = Upper Grande Ronde, LGR = Lower Grande Ronde, W= Wallowa

Most surface- and ground-water use is for irrigation. Information regarding the number of water diversions for irrigation is unavailable, as is the number of water rights holders in the subbasin. Sales and subdivision of water rights over the years has created a situation where there are too many small water rights holders for accurate records to be kept. Despite the lack of details regarding water rights and diversions, it is known that the water in the Grande Ronde River subbasin is fully appropriated (S. Hattan, personal communication, 2001); during the summer, there is no remaining unappropriated water. Efforts are underway to improve the available data regarding water rights in the subbasin, especially in streams used by anadromous fish, through stream surveys and diversion inventories (S. Hattan, personal communication, 2001).

Water Quality

The Oregon Department of Environmental Quality (ODEQ) has identified many stream segements within the Grande Ronde subbasin as water quality limited (Figure 6). Many of these streams are habitat areas for chinook salmon, summer steelhead and bull trout. Water quality limited means instream water quality fails to meet established standards for certain parameters for all for a portion of the year. Oregon’s 1998 303(d) List of Water Quality Limited Waterbodies identifies nine parameters of concern in the upper Grande Ronde subbasin. These are algae, bacteria, dissolved oxygen, flow modification, habitat modification, nutrients, pH, sedimentation and temperature. All of these concerns exist within the Grande Ronde Valley portion of the subbasin. Three of these nine concerns – temperature, sediment and habitat modification – are widespread throughout the rest of the subbasin outside the Grande Ronde Valley.

While not the only issue, riparian habitat degradation is the most serious problem in the subbasin and improving these riparian areas will improve temperature, stability, sediment, other water quality factors and habitat (Clearwater BioStudies,1993, Bureau of Land Management 1993, Chen 1996, all cited in ODEQ 2000). Elevated water temperatures occur throughout the Upper Grande Ronde Subbasin (Bach 1995, cited in ODEQ 2000). Maximum water temperatures in the mainstem river are often observed upstream of the valley floor. It has been demonstrated that weather cycles alone cannot explain the persistent warm water temperatures in the subbasin (Chen 1996, cited in ODEQ 2000). Temperature studies specific to this subbasin have shown there are management strategies that will slow the rate of stream warming (Chen 1996, NRCS/USFS/ Union SWCD 1997, cited in ODEQ 2000). Slowing the rate of water warming will push the point at which maximum temperatures occur further downstream, adding many miles of fish habitat. These strategies would include the use of streamside vegetation to shield the water from solar radiation and provide thermal insulation particularly on smaller streams. Improved riparian vegetation along smaller order streams will dramatically reduce the daily maximum stream temperature. Significant, but not as dramatic, reductions could also be expected on the wider mainstem river (Chen 1996, NRCS/Union SWCD 1997, cited in ODEQ 2000).

Water quality parameters (and standards) of temperature (64°F/55°F, rearing/spawning), dissolved oxygen (98% sat), habitat modification (pool frequency), and flow modification (flows) relate to the beneficial use for fish life. Table 5 describes how temperature affects cold water fish mortality. Standards for bacteria (fecal coliform) relate to the beneficial use for recreation. Most water quality problems in the Grande Ronde subbasin stem from legacy forestry, grazing and mining activities as well as current improperly managed livestock grazing, cumulative effects of timber harvest and road building, water withdrawals for irrigation, agricultural activities, industrial discharge and urban and rural development.

Table 5. Modes of Thermally Induced Cold Water Fish Mortality.

Modes of Thermally Induced Fish Mortality	**Temperature Range**	**Time to Death**
***Instantaneous Lethal Limit* –** Denaturing of bodily enzyme systems	> 90^{o}F > 32^{o}C	Instantaneous
***Incipient Lethal Limit* –** Breakdown of physiological regulation of vital bodily processes, namely: respiration and circulation	70^{o}F to 77^{o}F 21^{o}C to 25^{o}C	Hours to Days
***Sub-Lethal Limit* –** Conditions that cause decreased or lack of metabolic energy for feeding, growth or reproductive behavior, encourage increased exposure to pathogens, decreased food supply and increased competition from warm water tolerant species	64^{o}F to 74^{o}F 20^{o}C to 23^{o}C	Weeks to Months

Reproduced from ODEQ 2000.

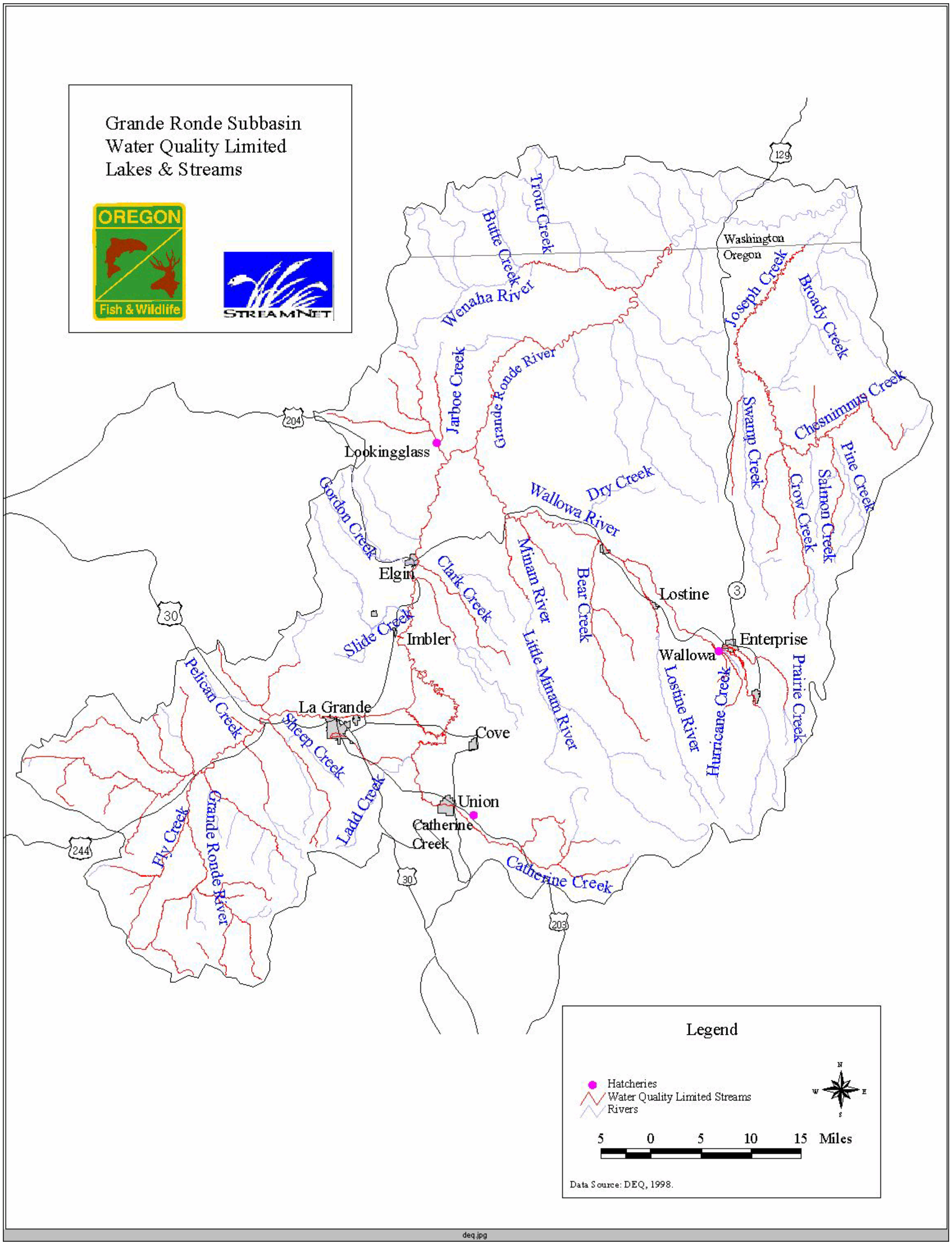

Figure 6. ODEQ Water Quality Limited, 303(d), Streams in the Grande Ronde River Subbasin.

Upper Grande Ronde River. There are 45 stream segments in the upper Grande Ronde watershed identified as water quality limited (Table 6), including most of the larger tributaries to the upper Grande Ronde River above La Grande.

Table 6. Upper Grande Ronde River Watershed 303(d) Listed Stream Segments and Parameters of Concern.

Stream	Parameters of Concern	Stream	Parameters of Concern
Grande Ronde River	Temp., Sedimentation, Habitat Mod.	Indian Creek	Temperature
Grande Ronde River	Temp., Sedimentation, pH, Nutrients, Habitat Mod., Dissolved Oxygen, Bacteria, Aquatic weeds/algae	Jarboe Creek	Temperature
Grande Ronde River	Temp., Sedimentation, pH, Habitat Mod.	Jordan Creek	Sedimentation, Habitat Modification
Grande Ronde River	Sedimentation, Habitat Mod.	Lick Creek	Temperature
Grande Ronde R.	Temperature	Limber Jim Creek	Temp., Sedimentation, Habitat Modification
Bear Creek	Temperature	Limber Jim Creek	Temperature
Beaver Creek	Temp., Sedimentation	Limber Jim Cr., SF	Temperature
Burnt Corral Creek	Temperature	Lookout Creek	Temp., Sedimentation
Catherine Cr., MF	Temperature	Little Lookingglass Creek	Temperature, Habitat Modification
Catherine Cr., NF	Temp., Sedimentation	McCoy Creek	Temp., Sedimentation, Habitat Modification
Catherine Cr., SF	Temp., Sedimentation	McIntyre Creek	Sedimentation, Habitat Modification
Catherine Creek	Temp., pH, Nutrients, Habitat Mod., Flow Mod., Dissolved Oxygen, Aquatic Weeds/Algae	Meadow Creek	Temperature, Sedimentation, pH, Habitat Modification
Catherine Creek	Temperature	Mill Creek	Temperature
Little Catherine Cr.	Sedimentation	Mottet Creek	Sedimentation
Chicken Creek	Temp., Sedimentation, Habitat Mod.	Pelican Creek	Temperature
Chicken Cr., WF	Temperature	Rock Creek	Temp., Habitat Mod.
Clark Creek	Temperature	Sheep Creek	Temp., Sedimentation, Habitat Modification
Clear Creek	Sedimentation	Sheep Creek	Sedimentation, Habitat Modification
Dark Canyon Cr.	Temp., Sedimentaion, Habitat Modification	Sheep Creek, EF	Temperature
Fivepoint Creek	Temperature	Spring Creek	Temperature
Little Fly Creek	Temp., Sedimentation, Habitat Modification	State Ditch	Temp., pH, Nutrients, Habitat Mod., Flow Mod., Aquatic Weeds/Algae
Fly Creek	Temp., Sedimentation, Habitat Modification	Waucup Creek	Temperature
Indiana Creek	Temperature	Wallowa River	Temp., Sedimentation, pH, Habitat Mod., Flow Mod., Bacteria

Source: U.S. EPA

Lower Grande Ronde River Watershed: There are 10 stream segments listed as water quality limited in the lower Grande Ronde River watershed, none of which are in Washington (Table 7).

Table 7. Lower Grande Ronde River Watershed 303(d) Listed Streams and Parameters of Concern.

Stream	Parameters of Concern	Stream	Parameters of Concern
Grande Ronde River	Temperature Sedimentation, Habitat Mod.	Elk Creek	Temperature, Sedimentation, Habitat Mod.
Chesnimnus Creek	Temperature, Sedimentation, Habitat Mod.	Davis Creek	Temperature
Crow Creek	Temperature	Peavine Creek	Temperature, Habitat Mod.
Joseph Creek	Temperature	Wenaha River	Temperature
Salmon Creek	Temperature		

Wallowa River Watershed: Nine stream segments in the Wallowa watershed are listed as water quality limited (Table 8)

Table 8. Wallowa River Watershed 303(d) Listed Streams and Parameters of Concern.

Stream	Parameters of Concern	Stream	Parameters of Concern
Bear Creek	Sedimentation, Habitat Mod., Flow Modification	Hurricane Creek	Sedimentation, Habitat Mod., Flow Modification
Little Bear Creek	Temperature	Deer Creek	Temperature
Lostine River	Sedimentation, Habitat Mod., Flow Modification	Minam River	Temperature, Sedimentation
Prairie Creek	Sedimentation, Habitat Mod., Dissolved Oxygen, Bacteria	Spring Creek	Dissolved Oxygen, Bacteria
Wallowa River	Temperature, Sedimentation, pH, Habitat Mod., Flow Mod., Bacteria		

A Total Maximum Daily Load (TMDL) and Water Quality Management Plan (WQMP) and Agricultural Water Quality Management Area Plan (AWQMAP) have been developed for the Upper Grande Ronde River watershed (ODEQ 2000) and are in development for the lower Grande Ronde (in Oregon) and Wallowa watersheds. A TMDL is established to ensure that water quality standards are met and maintained. The total allowable pollutant load is allocated to point, non-point, and background sources of pollution.

Oregon Administrative Rules (OAR Chapter 340, Division 41) lists the designated beneficial uses for which water is to be protected in the Upper Grande Ronde subbasin. Designated beneficial uses are presented in Table 9. Numeric and narrative water quality standards are designed to protect the most sensitive beneficial uses. In the Upper Grande Ronde sub-basin, resident fish and aquatic life, salmonid spawning, rearing and migration (i.e., anadromous fish passage) are designated the most sensitive beneficial uses.

Table 9. Designated Beneficial Water Uses in the Upper Grande Ronde Subbasin.

Designated Beneficial Uses Occurring in the Upper Grande Ronde Sub-Basin

(OAR 340-41-722)

Temperature, dissolved oxygen and pH sensitive beneficial uses are marked in gray

Beneficial Use	***Occurring***	***Beneficial Use***	***Occurring***
Public Domestic Water Supply	✓	Anadromous Fish Passage	✓
Private Domestic Water Supply	✓	Salmonid Fish Spawning	✓
Industrial Water Supply	✓	Salmonid Fish Rearing	✓
Irrigation	✓	Resident Fish and Aquatic Life	✓
Livestock Watering	✓	Wildlife and Hunting	✓
Boating	✓	Fishing	✓
Aesthetic Quality	✓	Water Contact Recreation	✓
Commercial Navigation & Trans.		Hydro Power	

Reproduced from ODEQ 2000.

The Upper Grande Ronde River Water Quality Management Area Plan (ODA 1999) was developed by the ODA and a public ad hoc committee and addresses the following water quality issues and conditions related to lands in agricultural use:

- Erosion and surface water management
- Nutrient management
- Animal enterprises including confined animal feeding operations
- Near-stream management areas
- Livestock management

The Grande Ronde Water Quality Committee, a coalition of people from all affected interest groups, developed the Upper Grande Ronde Subbasin Water Quality Management plan (WQMP). The plan provides a framework for achieving the load allocations set out in the TMDL. The Committee prioritized areas within the subbasin for restoration and treatment (Table 10).

Table 10. Geographic Priority Areas for Water Quality Treatment in the Upper Grande Ronde Watershed. (H=high, M=medium, L=low)

Watershed	Temperature	Sediment	Flow
Lookingglass	L[1]	L	L
Lower Grande Ronde	L	L	L
Willow/Philips	H	H	H
Indian/Clark	M	M[2]	M
Catherine Crk	H	H	H
Beaver	M	M	L[3]
GRR Valley	H	H	H
Ladd Crk	H	H	H
Upper Grande Ronde	H	H	H[4]
Meadow Crk	H	H	H[4]
Spring/Five Pts.	H	M	M

[1]Lookingglass is listed for temperature because of Bull trout (50 degree criterion).
[2]Clark Crk. probably should be "high" for sediment but the watershed as a whole is medium.
[3]There is potential for flow being important because of the reservoir.
[4]Lost wet meadow/ground water storage & possible shift in spring runoff.

Soils

Soils in the Grande Ronde River subbasin are highly variable and may range from those on thin, rocky, low-productivity ridgetop scablands to those in deep ash accumulations on very productive sites (Johnson and Simon 1987). Soils in the area can be divided into 4 main groups (USDA SCS 1985).

Soils that formed in alluvial and lacustrine deposits are found on the floodplain, terraces and fans of the Grande Ronde and tributary valleys. These soils form on gentle slopes and are well suited for cultivated crops and pasture.

Soils that formed in a combination of alluvium, eolian and lacustrine deposits mixed with residuum and colluvium from basalt and volcanic tuff are found in higher terraces and alluvial fans of the Grande Ronde subbasin. Slopes vary considerably, ranging from less than 5 percent up to 45 percent. These soils are also used for irrigated crops and pasture, as well as rangeland.

Soils derived exclusively from colluvium and residuum from basalt and volcanic tuff are found on the dry foothills above the valleys and below the timbered areas. Slopes vary from less than 5 percent to as much as 70 percent. Areas with steeper slopes tend to have a high erosion hazard. These soils are mainly used for rangeland and wildlife habitat.

Soils that formed in colluvium and residuum from basalt and volcanic tuff and recent volcanic ash are found in the forested uplands of the subbasin. Slopes vary from less than 5 percent to greater than 70 percent, and have variable erosion hazard. Predominant land uses in this soil type are timber production, wildlife habitat and woodland grazing.

Vegetation

At one time grasslands occupied an extensive area in eastern Oregon. The major dominants included bunch grasses such as bluebunch wheatgrass, sheep fescue and giant wild rye (Shelford and Hanson 1947). The native grasses offered high quality grazing for livestock. During the droughts of the 1930's one cattleman remarked, "…when the first settlers came to the country there was an abundance of fine grass. The valleys were covered with tall meadow grass that was cut and stored for winter feed. The open hillsides all had a heavy stand of bunchgrass and scarcely any sagebrush" (Ewing, 1938). He later stated that it was now all cheatgrass and scablands. Remnant strips of the grassland steppe vegetation still exist throughout farmed areas, but are generally confined to areas inappropriate for farming. According to Houle (1995), roots of indigenous bunchgrasses in the Palouse Region of southeastern Washington and northeastern Oregon, can extend 25 feet or deeper into the earth, and some of the deep root stalks live over 100 years. Such characteristics make native grasses instrumental in developing soils, controlling soil erosion, conserving water and providing wildlife habitat. Native bunchgrasses produce from seed, not by runners or rootstalks. Many native grass communities in the Grande Ronde subbasin have been lost because the plants were unable to mature and spread seed (they were burned, over-grazed, mowed, plowed or irrigated). Grassland plant communities in the subbasin include Idaho fescue-bluebunch wheatgrass (*Festuca idahoensis-Agropyron spicatum)* and bluebuch wheatgrass-Sandberg's bluegrass (*Agropyron spicatum-Poa sandbergii*). The Grande Ronde subbasin includes a portion of Zumwalt Prairie, the largest palouse prairie remaining in North America. This 146,000-acre prairie is located northeast of Joseph and Enterprise, Oregon in the Grande Ronde and Imnaha subbasins.

As elevation increases in the subbasin, grasslands intermingle with shrub/scrub plants, eventually grading into coniferous forests in the Blue and Wallowa mountains. Forest associations also exhibit an elevational gradient with low elevation Ponderosa pine (*Pinus ponderosa*) associations grading into Douglas-fir (*Pseudotsuga menziesii*), grand fir (*Abies grandis*), subalpine fir (*Abies lasiocarpa*), and mountain hemlock (*Tsuga mertensiana*) associations where conditions are appropriate.

Diverse wetland communities are found in various locations throughout the subbasin. These communities range from low elevation emergent wetlands to high elevation grass and sedge meadows, and riverine deciduous riparian communities dominated by black cottonwood (*Populus trichocarpa*) and willow (*Salix spp*). Black hawthorn (*Crataegus douglasii*), mountain alder (*Alnus incana*), and mountain maple (*Acer glabrum*) are also common in riparian areas and seeps.

The vegetation of the Grande Ronde River subbasin is described in detail in Johnson and Simon (1987) and Johnson and Clausnitzer (1992). The Oregon Natural Heritage Program has identified 14 state or federally listed plant species and species of concern in the Oregon portion of the subbasin (Table 11).

Table 11. State and Federal Listed Plant Species and Species of Concern in the Grande Ronde Subbasin in Oregon.

Common Name	Scientific Name	County
Hells Canyon rock cress	*Arabis hastatula*	Wallowa
crenulate moonwort	*Botrychium crenulatum*	Union, Wallowa
skinny moonwort	*Botrychium lineare*	Wallowa
twin-spike moonwort	*Botrychium paradoxum*	Union, Wallowa
stalked moonwort	*Botrychium pedunculosum*	Union, Wallowa
fraternal paintbrush	*Castilleja fraternal*	Union, Wallowa
purple alpine paintbrush	*Castilleja rubida*	Wallowa
Hazel's prickly-phlox	*Leptodactylon pungens*	Wallowa
Greenman's lomatium	*Lomatium greenmanii*	Wallowa
membrane-leaved monkeyflower	*Mimulus hymenophyllus*	Wallowa
stalk-leaved monkeyflower	*Mimulus patulus*	Wallowa
Macfarlane's four-o'clock	*Mirabilis macfarlanei*	Wallowa
Howell's spectacular thelypody	*Thelypodium howellii*	Union
Douglas clover	*Trifolium douglasii*	Union
Spalding's campion (catchfly)	*Silene spaldingii*	Wallowa

Source: ONHP 2001

Noxious Weeds

The spread of noxious weeds has been described as a "biological emergency" (ODA 2001). Alien species in general are second only to habitat loss and degradation among threats to biodiverstiy (Wilcove et al. 2000). In Oregon, noxious weeds pose a serious economic and environmental threat. Oregon loses $83 million annually to 21 of the 99 state-listed noxious weeds (ODA 2001). These invasive, mostly non-native, plants choke out crops, destroy range and pasture lands, clog waterways, affect human and animal health and threaten native plant communities.

During the last 10 years, the number of state-listed noxious weeds in Oregon has increased by 40 percent. The recent detection of two aggressive invasive weeds, kudzu and smooth cordgrass, has sounded a serious alarm about new invasions. The increasing spread of established weeds is equally alarming; infestations of some invasives have expanded up to 42 fold in Oregon since 1989 (ODA 2001).

The Asotin County, Washington Noxious Weed Board visually surveys approximately 130 out of 627 square miles in Asotin County yearly, including private and public lands. Approximately 40 percent of the riparian areas are infested with yellow starthistle (*Centaurea solstitialis*) and knapweeds (*Centaurea diffusa, Centaurea biebesteinii, Acroptilon repens*). Seventy percent of rangelands are infested with yellow starthistle. The Weed Board found limited amounts of rush skeletonweed (*Chondrilla juncea*) and is attempting to contain leafy spurge (*Euphorbia esula*).

A total of 42 noxious weeds have been listed by the weed boards of Union and Wallowa counties in Oregon and Asotin County in Washington (Table 12). Some of these species present an ever-increasing threat to crop and wildlands in northeast Oregon (Mark Porter, Wallowa Resources, personal communication, 2001). In the lower Grande Ronde

River corridor, some noxious species are spreading quickly along the stream banks, utilizing recreational stream users and the stream itself as vectors (Mark Porter, personal communication, 2001).

Table 12. Union and Wallowa County, Oregon and Asotin County, Washington Noxious Weeds.

Common Name	Scientific Name	Common Name	Scientific Name
rush skeletonweed	*Chodrilla juncea*	hoary cress (white top)	*Cardaria draba*
common bugloss	*Anchusa officianalis*	Dalmatian toadflax	*Linaria dalmatica*
yellow toadflax	*Linaria vulgaris*	purple loosestrife	*Lythrum salicaria*
yellow hawkweed	*Hieraceum floribundum*	Scotch thistle	*Onopordum acanthium*
meadow knapweed	*Centaurea pratensis*	diffuse knapweed	*Centaurea diffusa*
spotted knapweed	*Centaurea maculosa*	sulfur sinquefoil	*Potetilla recta*
yellow starthistle	*Centaurea soltitalis*	tansy ragwort	*Senecio jacobaea*
medusahead rye	*Teaniatherum caput-medusa*	jointed goatgrass	*Aegilops cylindrica*
Mediterranean sage	*Salvia aethiopis*	musk thistle	*Carduus nutans*
perennial pepperweed	*Lepidium latifolium*	leafy spurge	*Euphorbia esula*
Canada thistle	*Cirsium arvense*	common teasle	*Dipsacus fullonum*
field dodder	*Custuca campestris*	hounds tongue	*Cynglossum officinale*
poison hemlock	*Conium maculatum*	puncture vine	*Tribulus terrestris*
St. Johnswort	*Hypericum perforatum*	common burdock	*Arctium minus*
western waterhemlock	*Cicuta douglasii*	velvetleaf	*Abutilon theophrasti*
Russian knapweed	*Cantaurea repens*	Scotch broom	*Cytisus scoparius*
Dyer's woad	*Isatis tinctoria*	buffalo burr	*Solanum rostratum*
catchweed bedstraw	*Galium aparline*	kochia	*Kochia scoparia*
quackgrass	*Agropyron repens*	wild oat	*Avena fatua*
morning glory	*Convolvulus sepium*	horsetail rush	*Equisetum arvense*
Russian thistle	*Salsola tenuifolia*	cereal rye	*Secale cereale*

Source: Weed Boards of Union and Wallowa counties, OR.

Yellow starthistle is a member of the Asteraceae family. It is a winter annual with yellow flowers. About 60 percent of the seeds produced by yellow starthistle survive dispersal (Sheley and Larson 1994). Birds, wildlife, humans, domestic animals, whirlwinds, and vehicles may transport the seeds. A single plant may produce up to 150,000 seeds. Studies show that 90 percent of the seed falls within 2 feet of the parent plant (Roche 1991). Of these seeds, 95 percent are viable, and 10 percent can remain viable for 10 years (Callihan et al. 1993). Yellow starthistle can grow more rapidly than most perennial grasses. It is deep-rooted and will grow twice as fast as annual grasses (Sheley and Larson 1995). Yellow starthistle displaces native plant communities and reduces plant diversity. It can accelerate soil erosion and surface runoff (Lacey et al. 1989). Yellow starthistle forms solid stands that drastically reduce forage production for wildlife.

Knapweeds are also members of the Asteraceae family. Spotted knapweed is a deep tap rooted perennial that lives up to nine years (Boggs and Story 1987). Seed production ranges from 5,000 to 40,000/m2 (Shirman 1981). Seeds can germinate in the spring and fall when moisture and temperature are suitable (Watson and Renney 1974). Spotted knapweed is able to extend lateral shoots below the soil surface that can form rosettes next to the parent plant (Watson and Renney 1974). Diffuse knapweed is a biennial that grows from a deep taproot. Seed production ranges from 11,200 to 48,000/m2 (Shirman 1981). Wind, animals, and vehicles spread knapweeds. Diffuse knapweed reduces the biodiversity of plant population, increases soil erosion (Sheley et al. 1997), threatens Natural Area Preserves (Schuller 1992) and replaces wildlife forage on range and pasture. Spotted knapweed also reduces wildlife forage. Watson and Renney (1974) found that spotted knapweed infestations decreased bluebunch wheatgrass by 88 percent. Elk use was reduced by 98 percent on range dominated with spotted knapweed compared to bluebunch-dominated sites (Hakim 1979). Spotted knapweed also increases surface runoff and stream sediment (Lacey et al. 1989).

Rush skeletonweed is in the Asteraceae family. It can be a perennial, a biennial, or a short-lived perennial, depending on its location. Seed production ranges from 15,000 to 20,000 seeds. The seeds are adapted to wind dispersal but are also spread by water and animals. Rush skeletonweed can also spread by its roots. Rush skeletonweed reduces forage for wildlife. Its extensive root system enables it to compete for the moisture and nutrients that grasses need to flourish.

Leafy spurge is a perennial belonging to the Spurge family. The root system can penetrate the soil 8 to 10 feet. The plants will also produce horizontal roots that enable colonies to enlarge. The seeds are in a capsule and, when dry, the plant can project the seeds as far as 15 feet. Seeds may be viable in the soil up to 8 years. Vehicles, mammals, and birds spread leafy spurge. Leafy spurge root sap gives off a substance that inhibits the growth of grasses and reduces forage for wildlife. It also spreads by seed and root, which crowd out desirable forage species.

Land Uses

Until the mid-1800's, the Grande Ronde subbasin was utilized solely by the Cayuse, Umatilla, Walla Walla and Nez Perce Tribes (James 1984). The Confederated Tribes of the Umatilla Indian Reservation ceded all of their lands in northeast Oregon and southeast Washington to the federal government under the Treaty of 1855 (CTUIR 1996). The Nez Perce Tribe retained claim to its lands in the subbasin until the Treaty of 1863, when all of the Oregon territory was removed from the Nez Perce Reservation. The Tribes maintain reserved rights for these lands that include harvesting salmon, wildlife and vegetative resources (USACE 1997). As European settlers moved into the area, significant timber harvest, livestock grazing and agricultural production began (McIntosh 1992).

The US Forest Service and the BLM manage about 46 percent (1,901 mi^2) of the land in the Grande Ronde subbasin (Figure 7), with a small amount of additional public land managed by the states of Oregon and Washington. The percentage of public land is higher in Wallowa County than in Union County with 65 percent of the county in public ownership (USFS, BLM, state). The Grande Ronde River, Catherine Creek, Wallowa River and its tributaries, and Joseph Creek originate in the Wallowa-Whitman National Forest. The Wenaha River originates in the Umatilla National Forest. With the exception of those areas that lie within the Eagle Cap and Wenaha-Tucannon Wilderness Areas, the National Forests are managed for multiple use including, primarily, timber production, livestock grazing, and recreation. Seasonal recreation use of the forest, including big game hunting and mushroom harvest is economically significant to communities in the subbasin.

Privately owned land is generally at lower elevations along streams and on the valley floors. Nearly all of the agricultural lands of the Grande Ronde and Wallowa valleys are privately owned, as are portions of the Joseph Creek headwaters and high elevation meadows of the upper Grande Ronde River. Primary uses of private land are forest, range and cropland.

Impoundments and Irrigation Projects

Wallowa Lake is the only major water impoundment in the Grande Ronde River subbasin. Although it is a natural lake, a dam was constructed at the outlet in 1918 and enlarged between 1928 and 1929 to its present height. Located upstream of Joseph, Oregon, at RM 50.2 on the Wallowa River, Wallowa Lake has a storage capacity of 57,200 acre feet but is presently held at 44,000 acre feet and irrigates approximately 15,000 acres. The principal use for water stored in Wallowa Lake is irrigation, although a small proportion is diverted for municipal use in Joseph.

There are a number of minor impoundments in the subbasin (Table 13) as well as numerous small ponds that serve as water storage for irrigation and livestock. While power may have been generated in several locations historically, there remain only two working hydro-power generation facility in the subbasin: The City of Cove, Oregon operates a generator powered by Mill Creek, a tributary of Catherine Creek, and PacificCorp operates a hydroelectric facility on the East Fork Wallowa River above Wallowa Lake. A third facility, on Indian Creek, has not been operational since 1985 but is being reviewed for relicensing by the Federal Energy Regulatory Commission (FERC).

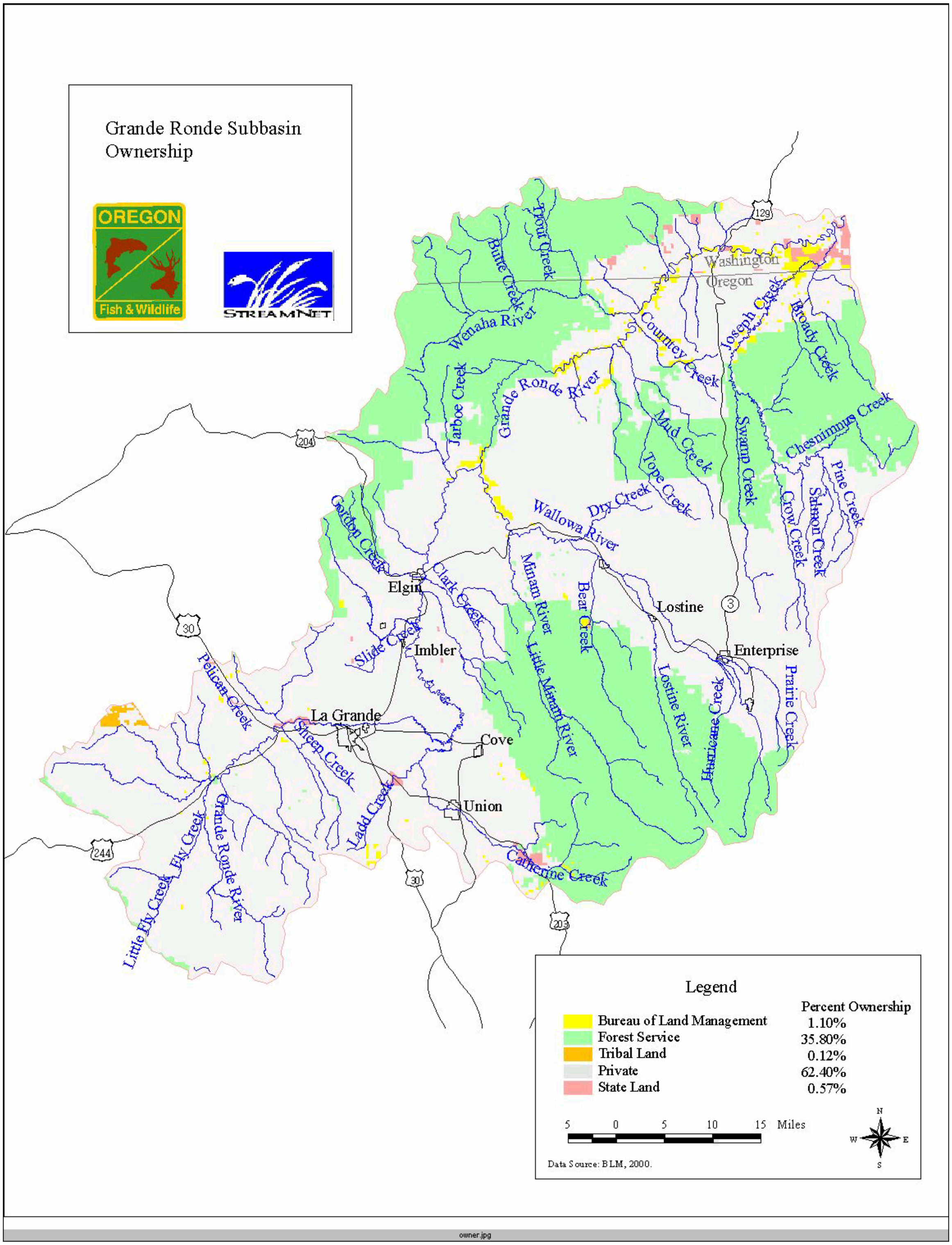

Figure 7. Land Ownership in the Grande Ronde River Subbasin.

Table 13. Minor Impoundments in the Grande Ronde Subbasin with Primary Use.

Impoundment Name	County	Primary Use
La Grande Reservoir	Union	municipal
Jubilee Lake	Union	recreation
Langdon Lake	Umatilla	recreation
Kinney Lake	Wallowa	irrigation
Minam Lake	Wallowa	irrigation
Lostine River Ranch Pond	Wallowa	recreation
Morgan Lake	Union	recreation

Source: OWRD, Union/Wallowa County Water Master.

Diversions for irrigation are primarily in and around La Grande, Enterprise, Joseph and Wallowa, Oregon. A trans-basin diversion transfers water from Big Sheep Creek tributaries in the Imnaha subbasin to the Wallowa Valley for irrigation. A similar diversion transfers water from the Catherine Creek drainage into the Powder River drainage for irrigation.

Protected Areas

U.S. Forest Service

- *Eagle Cap Wilderness Area.* The Eagle Cap Wilderness Area lies in the heart of the Wallowa Mountains on the Wallowa-Whitman National Forest and encompasses 361,446 acres. First established as a primitive area in 1930, the Eagle Cap Wilderness became a part of the National Wilderness Preservation System with the passage of the Wilderness Act of 1964. The Eagle Cap Wilderness Area includes most of the Minam, upper Wallowa and upper Lostine river drainages as well as Bear Creek and Hurricane Creek and a small portion of Catherine Creek.
- *Wenaha-Tucannon Wilderness Area.* The Wenaha-Tucannon Wilderness Area was created by the Endangered American Wilderness Act of 1978. Located in the northern Blue Mountains of southeastern Washington and northeastern Oregon, it encompasses 177,465 acres and includes most of the Wenaha River drainage.

Oregon Department of Fish and Wildlife

- *Ladd Marsh Wildlife Area:* Ladd Marsh Wildlife Area is located about 5 miles southeast of La Grande, Oregon. It presently includes 4,051 acres of streams, ponds, wetlands and associated uplands, although negotiations to purchase neighboring tracts are ongoing. The Nature Conservancy and the Rocky Mountain Elk Foundation have purchased adjacent properties. These properties will be managed by ODFW as part of the Ladd Marsh Wildlife Area. Ladd Marsh is home to over 200 species of birds, 40 species of mammals and 10 species of reptiles and amphibians. Snake River spring chinook salmon, Snake River summer steelhead and bull trout may all be found in Ladd Creek within the Wildlife Area at some times of the year.

- *Wenaha Wildlife Area:* The Wenaha Wildlife Area is located approximately 50 miles north of Enterprise, Oregon. The Wildlife Area encompasses 10,966 acres with an additional 1,370 acres currently managed as part of the Wildlife Area. The Wenaha Wildlife Area was established in 1953 to provide natural and subsistence food for mule deer, elk and bighorn sheep, to enhance habitat for native fish and wildlife species, and to provide wildlife-oriented recreational opportunities for the public. The Wenaha Wildlife Area is home to a variety of wildlife, both resident and migratory, including 29 species of mammals, 131 species of birds, and 7 species of reptiles and amphibians. Spring chinook salmon, fall chinook salmon, and summer steelhead may all be found in reaches of the Grande Ronde and Wenaha Rivers where they pass through the Wildlife Area.
- *Enterprise Wildlife Area:* Located in Wallowa County near Enterprise, Oregon, the Enterprise Wildlife Area consists of 32 acres of riparian and juniper habitat managed for a variety of wildlife species.
- *Lostine Wildlife Area:* The Lostine Wildlife Area is located in the Lostine River drainage of Wallowa County, Oregon about 6 mi. south of Lostine. The wildlife area encompasses 969 acres of grassland habitat managed primarily for Rocky Mountain bighorn sheep.
- *Rhinehart Wildlife Area:* This 1-acre tract adjacent to the Grande Ronde River near Elgin, Oregon is managed for its value as riparian habitat for passerine birds and other wildlife.
- *Saw-whet Wildlife Area:* This 7-acre wildlife area, in Union County, Oregon consists of pond and riparian habitat and is managed for a variety of wildlife associated with these habitats.
- *Wallowa Wildlife Area:* The Wallowa Wildlife Area is 22 acres of wetland and riparian areas. This area is managed to benefit wintering birds and a variety of other wildlife.
- *Minam River Public Access:* Located near the confluence of the Minam and Wallowa rivers, this public access area consists of 338 acres of mostly riparian habitat. The area is managed primarily for large mammals and other wildlife while offering an access point for recreation in the Minam River drainage.
- *Morgan Lake Public Access:* Morgan Lake is a 65-acre lake located southwest of La Grande, Oregon. The area serves as habitat for waterfowl and other wildlife as well as offering recreational opportunities for anglers, paddlers, birdwatchers, and others.

Washington Department of Fish and Wildlife

- *Chief Joseph Wildlife Area.* The Chief Joseph Wildlife Area complex consists of 3 parcels, with a total of 13,425 acres, located on the lower Grande Ronde River. The area is in Asotin County, Washington, approximately 30 miles south of the town of Asotin. The largest parcel in the complex, 9,735 acres, was purchased in 1974. The other two parcels, with a combined area of 3,680 acres, were added in the 1990's through Snake River dam mitigation for wildlife programs. The Chief Joseph Wildlife Area is managed for Rocky Mountain bighorn sheep, mule deer, upland birds and a variety of non-game wildlife. Over 115 species of birds have been identified in the Area. Peregrine falcons have been reared in the wildlife area and it is a popular wintering area for bald eagles. Through its management of the wildlife area, WDFW owns or manages 11.5 miles of anadromous fish streams in, or bordering the area.

Nez Perce Tribe

- *Precious Lands.* The Precious Lands area, purchased with Snake River dam wildlife mitigation funds, lies approximately 40 miles north of Enterprise, Oregon and encompasses parts of Cottonwood, Broady, Tamarack, Joseph, and Buford Creeks. The area, with a total of 15,325 acres, contains primarily grassland plant communities dominated by bluebunch wheatgrass. North facing slopes also support dense shrub fields and/or mixed conifer stands of Douglas-fir and ponderosa pine. Riparian areas largely consist of a black cottonwood or white alder overstory with multi-layered shrub understory, or dense black hawthorn thickets with an occasional conifer. The area supports a wide range of wildlife species and is a critical big game wintering area for the Chesnimnus Unit elk herd. Survey work has identified 87 bird species, 29 mammals, and 11 reptiles and amphibians that inhabit the project area. Joseph and Cottonwood Creeks also support steelhead populations that benefit from the current management of the property.

Wild and Scenic Rivers

The lower Grande Ronde River in Oregon and all or portions of four tributaries are designated as federal Wild and Scenic under the Omnibus Oregon Wild and Scenic Rivers Act and are sub-classified as wild, scenic or recreational. These river segments are the Grande Ronde from its confluence with the Wallowa River (RM 82) to the Washington border, a distance of about 44 miles (wild, scenic, recreational); Joseph Creek from 6.5 miles below the Crow Creek/Chesnimnus Creek confluence to the Forest Service Boundary, about 9 miles (wild); The Lostine River from the headwaters to the Forest Service boundary, about 16 miles (wild, recreational); the Minam river from the headwaters to the Wilderness boundary, about 39 miles (wild); and the Wenaha River from the confluence of the North and South Forks (Wenaha Forks, RM 22) to the mouth, about 21 miles (wild, scenic, recreational). Outstandingly Remarkable Values (ORV) of the Wild and Scenic River designation include scenery, recreational opportunities and fisheries. Wild and Scenic rivers within the National Forests in the subbasin are managed by the Forest Service; those outside the National Forests are managed by the Bureau of Land Management.

Three river segments in the subbasin are also designated as Scenic Waterways under the Oregon State Scenic Waterways System. These are the entire Minam River; the Wallowa River from Minam to the confluence with the Grande Ronde; and the Grande Ronde from the Wallowa River to the Washington border. The criteria for state Scenic Waterways are similar to those for federal designation.

Fish and Wildlife Status

Fish

The Grande Ronde River subbasin once supported fisheries that were an important part of tribal cultures and economies (James 1984, Wallowa County and Nez Perce Tribe 1999, Ashe et al. 2000). These fisheries included both anadromous and resident populations and a variety of species. As European settlement came to the area, the fisheries were woven into the culture of these new inhabitants, as well. During the intervening years, some species have been lost from the subbasin and other, non-native species have been introduced.

An estimated 38 species of fish, including 15 introduced species, are found in the Grande Ronde River subbasin (Table 14). Once abundant (Thompson and Haas 1960), coho salmon (*Oncorhynchus kisutch*) were extirpated from the subbasin in the 1980's. Historic abundance of sockeye salmon (*O. nerka*) in the Wallowa River system is unknown, but it is assumed to have been high given the presence of sockeye canneries at Wallowa Lake in the 1890's (ODFW et al. 1990). Although anadromous sockeye salmon were extirpated from the area by 1905, their genetic component may still be present in wild kokanee in Wallowa Lake. Golden trout (*O. aguabonita*) are suspected to persist in a few high mountain lakes from introductions prior to 1958 but their present abundance and distribution are unknown.

Table 14. Fish Species Known to Occur in the Grande Ronde River Subbasin.

Species	Origin	Distribution
Spring Chinook (*Oncorhynchus tshawytscha*)	N	GRR & major tributaries
Fall Chinook (*Oncorhynchus tshawytscha*)	N	Lower GRR
Summer steelhead (*Oncorhynchus mykiss*)	N	GRR & major tributaries
Sturgeon (*Acipenser transmontanus*)	N	Lower GRR
Kokanee (*Oncorhynchus nerka*)	N	Wallowa Lake
Redband trout (*Oncorhynchus mykiss gibbsi*)	N	Basin wide
Bull trout (*Salvelinus confluentus*)	N	GRR & major tributaries
Mountain whitefish (*Prosopium williamsoni*)	N	GRR, WR.
Brook trout (*Salvelinus fontinalis*)	I	UGRR, WR, WMHL
Lake trout (*Salvelinus namaycush*)	I	Wallowa Lake
Westslope cutthroat (*Oncorhynchus clarki lewisi*)	I	Frances lake
Pacific lamprey (*Lampetra tridentata*)	N	unknown
Brook Lamprey (*Limper richardsoni*)	N	unknown
Mottled sculpin (*Cottus bairdi*)	N	mainstems and tributaries
Slimy sculpin (*Cottus cognatus*)	N	mainstems and tributaries
Torrent sculpin (*Cottus rhotheus*)	N	mainstems and tributaries
Shorthead sculpin (*Cottus confuses*)	N	mainstems and tributaries
Piaiute sculpin (*Cottus beldingi*)	N	mainstems and tributaries
Carp (*Cyprinus carpio*)	I	LGS
Northern pikeminnow (*Ptychocheilus oregonensis*)	N	lower reaches GRR, tribs
Chiselmouth (*Acrocheilus alutaceus*)	N	WSH
Peamouth (*Mylocheilus caurinus*)	N	WSH
Longnose dace (*Rhinichthys cataractae dulcis*)	N	WSH
Speckled dace (*Rhinichthys osculus*)	N	WSH
Redside shiner (*Richardsonius balteatus balteatus*)	N	WSH
Largescale sucker (*Catostomus macrocheilus*)	N	WSH
Mountain sucker (*Catostomus platyrhynchus*)	N	WSH
Bridgelip sucker (*Catostomus columbianus*)	N	WSH
Black crappie (*Poxomis nigromaculatus*)	I	LPS, LGS
White crappie (*Poxomis annularis*)	I	LPS, LGS
Largemouth bass (*Micropterus salmoides*)	I	LPS, LGS
Smallmouth bass (*Micropterus dolomieui*)	I	LPS, LGS
Bluegill (*Lepomis macrochirus*)	I	LPS, LGS
Pumpkinseed (*Lepomis gibbosus*)	I	LPS, LGS
Warmouth (*Lepomis gulosis*)	I	LPS, LGS
Yellow perch (*Perca flavescens*)	I	LPS, LGS
Channel catfish (*Ictalurus punctatus*)	I	LPS, LGS
Flathead catfish (*Pylodictis olivaris*)	I	LPS, LGS
Brown bullhead (*Ameiurus nebulosus*)	I	LPS, LGS

I=Introduced, N=Native, GRR=Grande Ronde River, UGRR= Upper Grande Ronde River, WR= Wallowa River, WMHL=Wallowa Mountain High Lakes, WSH= Widespread in Suitable Habitats, LPS= Lakes, Ponds & Sloughs, LGS= Low Gradient Streams.

In 1993 the Oregon Chapter of the American Fisheries Society compiled a database of "critical watersheds" throughout Oregon (Henjum et al. 1994). These watersheds known as Aquatic Diversity Areas (ADAs) were delineated in an effort to: 1) help conserve the diversity of watersheds, habitats and indigenous aquatic fauna of Oregon; 2) establish refugia of native aquatic assemblages and corridors of migration; and 3) designate "reference watersheds" that could serve as a benchmark for evaluating effects of human disturbance. Ecological criteria for selection of ADAs were categorized as follows:

- Connecting Corridor (CC),
- Ecological Function (EF; e.g., cool water source).
- Genetic Reserve (GR)
- Highly Sensitive (HS; e.g., unstable soils or cumulative vulnerability).
- Reference Watershed (RW; relatively intact example of ecosystem type).
- Scientific Value (SV; e.g., long term data set).

There are 27 ADAs in the Grande Ronde River subbasin representing all 6 ecological criteria. Most were selected for more than one criterion. These ADAs represent important areas for protection and restoration in the Grande Ronde subbasin.

The Grande Ronde subbasin hosts 6 fish species that are federally listed as Threatened or Species of Concern (Table 15).

Table 15. Federal Special Status Fish Species in the Grande Ronde River Subbasin.

Species	Status	Species	Status
Snake River Spring Chinook	Threatened	Bull Trout	Threatened
Snake River Fall Chinook	Threatened	Redband Trout	Species of Concern
Snake R. Summer Steelhead	Threatened	Pacific lamprey	Species of Concern

Spring Chinook Salmon (*Oncorhynchus tschawytscha*)

Spring chinook salmon are indigenous to the Grande Ronde River subbasin and were historically distributed throughout the river system. Twenty-one tributaries supported spring chinook runs, contributing to large documented runs in the subbasin. Spring chinook spawning escapement in the subbasin was estimated at 12,200 fish in 1957 (USACE 1975). Recent escapement levels have numbered fewer than 1,000 fish (USDA Forest Service 1994) many of which were hatchery fish. Snake River spring chinook salmon were listed as threatened under the ESA in 1992.

An independent scientific panel found that populations of Grande Ronde River subbasin spring chinook salmon remained distinct from non-native hatchery fish and from each other (Currens et al. 1996). These differences were greater for Lostine River chinook than for the Minam, Wenaha, upper Grande Ronde and Catherine Creek populations. The latter populations were, nevertheless, found to be distinct and retain at least some of their native genetic component.

The decline in the Grande Ronde spring chinook salmon population has been primarily attributed to passage problems at Columbia and Snake River dams (ODFW et al. 1990). Grande Ronde River anadromous fish must pass a total of 8 dams, 4 on the Columbia River and 4 on the Snake River, during up- and downstream migrations. Out-of-subbasin harvest and both in-and out-of-subbasin habitat degradation have also contributed to the population decline (Ashe et al. 2000).

Within the Grande Ronde River subbasin, riparian and instream habitat degradation has severely affected spring chinook salmon production potential. Livestock overgrazing, mining, mountain pine beetle damage, limited quality rearing habitat, low stream flows, poor water quality, logging activity and road construction are major problems affecting salmon production. Many of these impacts have been reduced in recent years with management practices becoming more sensitive to fish and aquatic habitats. However, the effects of some past management activities will remain for years to come.

Reduction in quantity and quality of rearing habitat have reduced the capacity of some streams in the Grande Ronde River subbasin to support juvenile spring chinook salmon. ODFW has estimated reductions in juvenile production capacity of 30 percent in the upper Grande Ronde River and Sheep Creek, 20 percent in the Lostine River and Bear Creek, and 70 percent in the Wallowa River and Hurricane Creek (Carmichael and Boyce 1986).

The upper Grande Ronde, Wenaha, Minam, Wallowa, and Lostine Rivers along with Catherine and Lookingglass Creeks account for most of the spring chinook production in the Grande Ronde subbasin including both natural and hatchery populations (Carmichael and Boyce 1986). Spring chinook salmon utilize at least some portion of 50 streams in the subbasin (Table 16, Figure 8).

Table 16. Spring Chinook Salmon Use of Streams in the Grande Ronde Subbasin.

Primary Use Type	**Miles of Stream Used**	**% of total available stream miles used**
Spawning and rearing	227.8	4%
Rearing and Migration	280.0	5%
Migration	6.6	0%
Total	514.4	10%

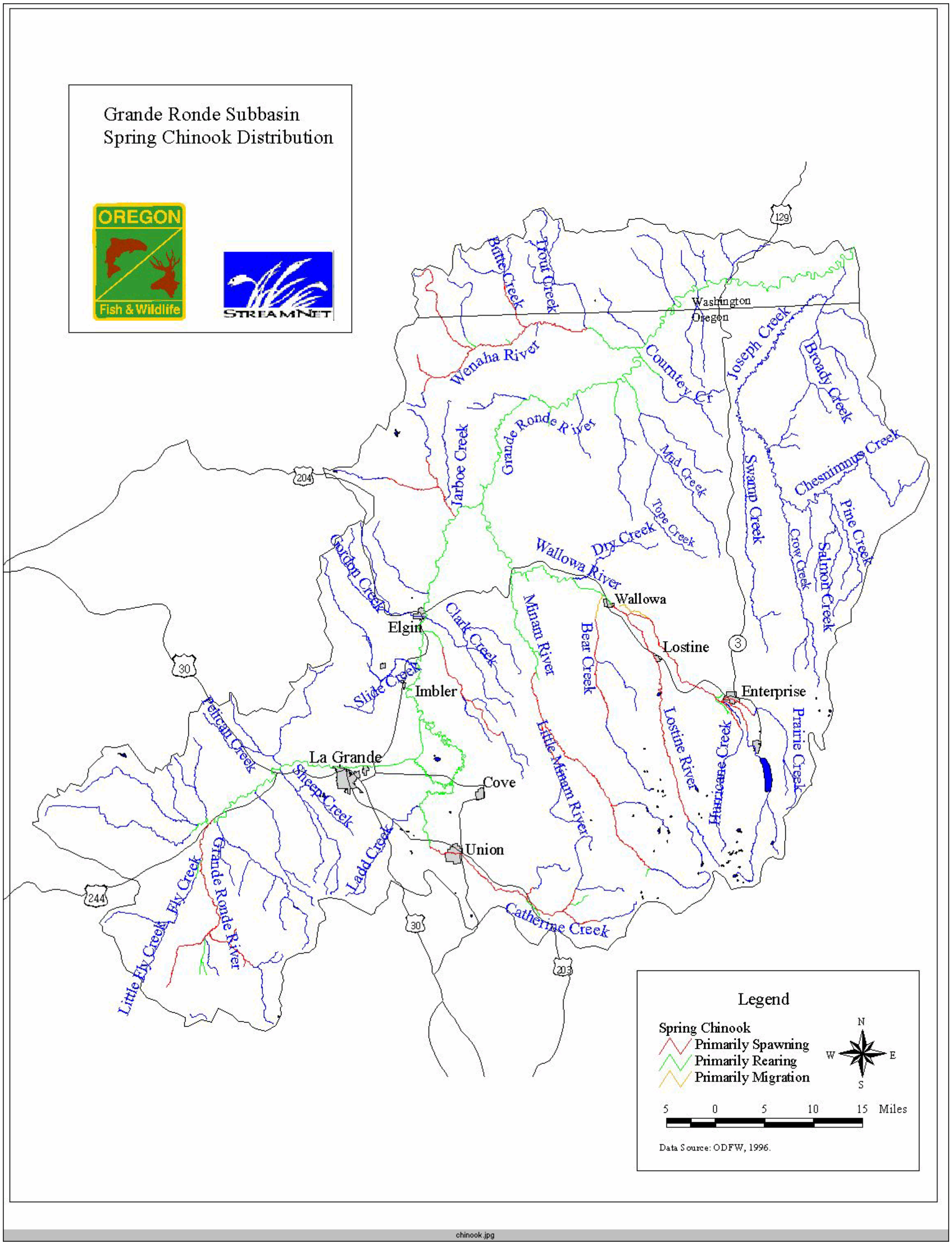

Figure 8. Spring Chinook Salmon Distribution in the Grande Ronde River Subbasin.

The ODFW has conducted spawning ground surveys throughout the Grande Ronde subbasin since the late 1940's to assess trends in abundance of spawning fish. Since 1964, sections of most spawning streams have been surveyed annually as index areas. In 1986, spawning ground surveys were expanded to include more surveys per stream and extended areas with the help of the Nez Perce Tribe, the Confederated Tribes of the Umatilla Indian Reservation and, more recently, the US Forest Service. These surveys document declining trends in escapement through time (Table 17). Sport harvest has been closed since 1974 in Oregon and 1977 in Washington. Sport and tribal spring chinook fisheries will occur in Lookingglass Creek, a tributary to the Grande Ronde, in 2001 utilizing the last remaining production of Lookingglass Hatchery Rapid River stock.

Table 17. Number of Spring Chinook Salmon Redds Observed in the Grande Ronde River and Tributaries, 1988-2000 (P. Kinery, ODFW, personal communication).

Year	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**
Redds observed	969	227	296	198	558	688	149	80	306	298	253	180	502

To document and compare current escapement levels with previous levels, fisheries managers estimated escapement for 1977 through 2000. Estimates were developed from redd counts and an estimated percentage of spawning that occurs in the index areas. The estimates ranged from a low of 189 fish to a high of 1,757 fish. Escapement levels are down substantially from those estimated in the late 1960's and early 1970's. Figure 9 documents the dramatic decline in redd counts over the last 37 years. Wilderness area streams (e.g. the Wenaha River) show the same declines as streams that have been more heavily managed (Figure 10). This comparison offers support to the assertion that out-of-basin issues (e.g., eight mainstem dams, a changed estuary, ocean harvest) have had, and continue to have, a more profound negative impact on Grande Ronde anadromous fish populations than in-basin issues.

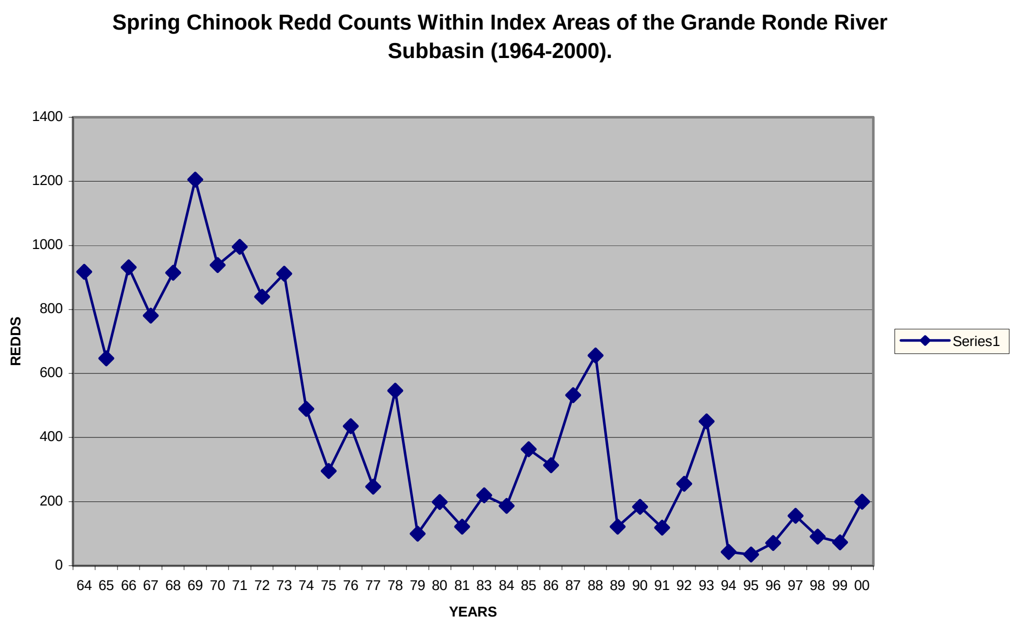

Figure 9. Spring Chinook Salmon Redd Counts Within Index Areas of the Grande Ronde River Subbasin, 1964-2000 (D. Bryson, NPT, personal communication, 2001).

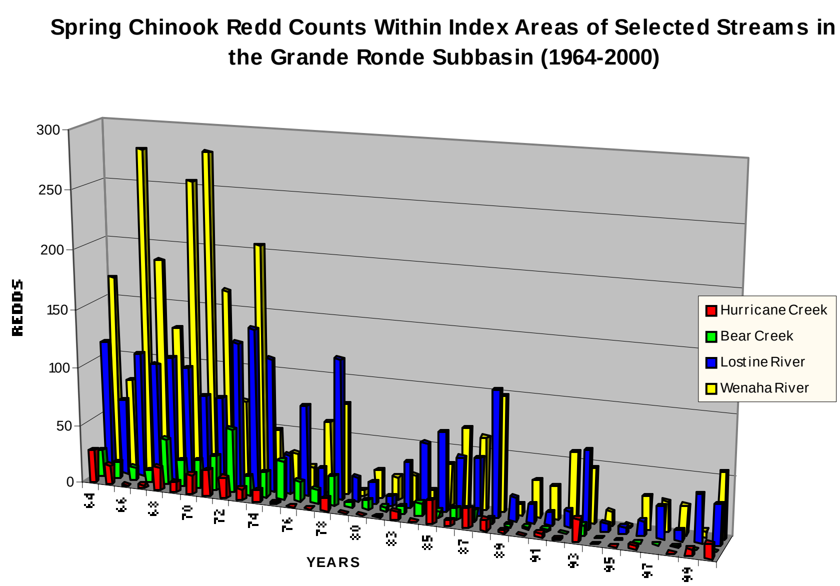

Figure 10. Spring Chinook Salmon Redd Counts Within Index Areas of Selected Streams in the Grande Ronde Subbasin, 1964-2000 (D. Bryson, NPT, personal communication, 2001).

Most adult spring chinook salmon destined for the Grande Ronde River subbasin pass Bonneville Dam and enter the Columbia Basin in April and May (ODFW et al. 1990). By June or July, the adults are holding in the Grande Ronde River subbasin near spawning tributaries. Spawning usually occurs in August and September. Eggs incubate in the gravel over the winter and fry emerge between March and May.

Most spring chinook salmon juveniles rear in the Grande Ronde River subbasin for one year before migrating to the ocean as smolts from March through May. Juveniles that out-migrate during their first year leave the subbasin from June through October. Chinook salmon continue to rear in fresh water prior to smolting the following spring. Adult spring chinook salmon return to spawn at ages 3 to 6 (after 1-4 years in the ocean), although age 4 is the dominant age class among spawners. Known spawning areas by river mile are listed in Table 18.

Table 18. Known Spring Chinook Salmon Spawning Areas by River Mile in the Grande Ronde River Subbasin.

River Reach	**River Mile**	**River Reach**	**River Mile**
Upper Grande Ronde River	180-203	Little Minam River	0-5
Sheep Creek	0-9	Bear Creek	6.5-13
N.F. Catherine Creek	0-3	Hurricane Creek	0-3
S.F. Catherine Creek	0-2.7	Lostine River	0-5.4
Mainstem Catherine Creek	18-32.5	Lostine River	7.9-14.5
Little Lookingglass Creek	0-4	Lostine River	18-23
Lookingglass Creek	0-10	Wallowa River	42-46.5
Indian Creek	6-9	Prairie Creek	0-4
Lower Minam River	19-25	Hays Fork	0-1
Upper Minam-splash dam	30	Wenaha River	6.5-22
Upper Minam-Little Pot Cr.	31	Milk Creek	0-0.3
Upper Minam-N. Minam	32	Butte Creek	0-1.5
Upper Minam-Roc Creek	35.5	N.F. Wenaha River	0-4
Upper Minam-Camp One	40.5	S.F. Wenaha River	0-6.3
Upper Minam-Elk Creek	41		

Hatchery production and acclimation of spring chinook salmon in the Grande Ronde River occurs at Lookingglass Hatchery and acclimation facilities on the Lostine River, Catherine Creek, and the upper Grande Ronde River (see *Artificial Production*) as part of the Lower Snake River Compensation Plan (LSRCP) program and the Columbia Basin Fish and Wildlife Program. The Minam and Wenaha River drainages are designated as wild fish management areas (USFWS 1998); there are no releases of hatchery fish in those streams.

Fall Chinook Salmon (*Oncorhynchus tshawytscha*)

Fall chinook salmon are indigenous to the Grande Ronde River subbasin. Historic distribution included all of the lower portion of the river system. Now, only remnant populations occur in the lower Grande Ronde River from the mouth to just above the Wenaha River, primarily in Washington (Figure 11). One pair was documented spawning in lower Joseph Creek in the late 1990s by WDFW (D. Bryson, NPT, personal communication, 2001). Grande Ronde fall chinook salmon are part of the Snake River ecologically significant unit (ESU) and were federally listed as threatened under the ESA in 1992.

Historical runs of Snake River fall chinook averaged 72,000 fish during the period 1938-1949 and 29,000 during the 1950's (Irving and Bjornn 1981). Construction of the Hells Canyon Complex (1958-1967) and the Lower Snake River Dams (1961-1975) eliminated or severely degraded 530 miles of spawning habitat. Currently, fall chinook spawn from Asotin to Hells Canyon Dam and in the tail races below the four Snake River dams, and in the lower Clearwater, Grande Ronde, Imnaha, Salmon and Tucannon Rivers. Fall chinook were particularly susceptible to the effects of hydroelectric development because of inundation of its preferred spawning and rearing habitats in mainstem rivers and because juveniles migrate to the ocean in late summer during low summer flows and high water temperatures (Mendel 1998). This species was harvested up to a 70-80% exploitation rate in the lower Columbia River and the ocean. Harvest on the Snake River stock was especially high during the years when they were mixed with particularly large returns of fall chinook salmon destined for the Hanford Reach of the mid Columbia River. The listing of fall chinook under the ESA and renegotiation under the Columbia River Fishery Management Plan has substantially reduced the exploitation rate on the Snake River stock of fall chinook salmon.

Searches for fall chinook salmon redds in the Grande Ronde River were reported annually by the Washington Department of Fish and Wildlife from 1986 to 1992 (Bugert et al. 1989-1991; Mendel 1992; Seidel et al. 1987-1988), and by the U.S. Fish and Wildlife Service from 1992 to 2000 (Connor et al. 1994; Garcia et al. 1994, 1996-1998a; Garcia 1998b, 1999, 2000). The Idaho Power Company, Nez Perce Tribe, U.S. Forest Service, U.S. Fish and Wildlife Service and Washington Department of Fish and Wildlife have contributed to the redd search effort in the Grande Ronde River at various times.

All searches were conducted from a helicopter, although the type of helicopter, crew route, data recording methods and number of flights conducted, varied in some years. As a result, the data collected in the Grande Ronde River can be divided into two groups (1986-1991 and 1992-2000). From 1986 to 1991, one to three searches were conducted and flights (starting at the mouth) ranged from Joseph Creek (4.5 river miles) to Wenaha Canyon (45.5 river miles)(Table 19). Redd counts ranged from zero to seven. No record of redd locations were noted. From 1992 to 2000, three to eight searches were conducted and flights typically extended to RM 53 near Wildcat Creek (Table 20). In addition to information on visibility and flight route, redd locations were recorded. Redd counts ranged from five to 55, and redds were observed at 41 "spawning sites" from RM 2.1 to RM 51.5 (Figure 12).

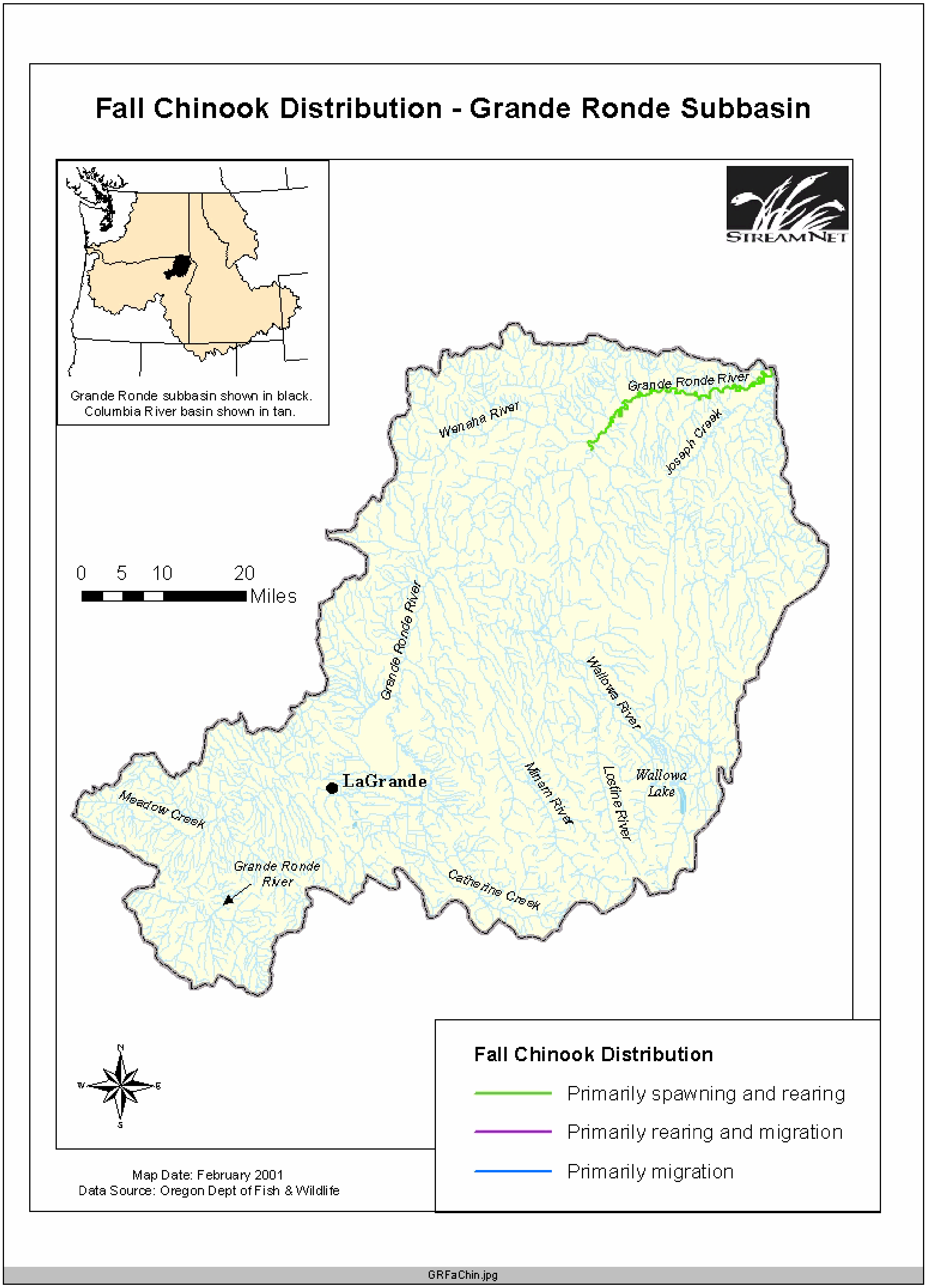

Figure 11. Fall Chinook Salmon Distribution in the Grande Ronde River Subbasin.

Table 19. Fall Chinook Redd Searches Conducted in the Grande Ronde River, 1986-1991. (Bugert et al. 1989-1991; Mendel 1992; Seidel et al. 1987-1988).

Year	New Redds Per Flight	Comments on Viewing Conditions
1986	0	Notes not compiled
1987	0, 1, 6	Different observer third flight than first 2 flights
1988	0, 1	Excellent visibility, fair visibility
1989	0	Poor conditions precluded second flight
1990	1	Poor visibility
1991	0, 0, 0	Visibility fair to good on all 3 flights

Table 20. Fall Chinook Redd Searches Conducted in the Grande Ronde River , 1992-2000. (A.P. Garcia, USFWS, Ahsahka, Idaho; unpublished data).

Year	New Redds Per Flight	Comments on Viewing Conditions
1992	0, 2, 1, 2, 0, 0, 0	E, F, P, P, P, NR, F
1993	11, 11, 1, 7, 12, 4, 2, 1	P, G, G, G, G, G, G, G
1994	1, 8, 0, 1, 5, 0, 0	F, F, F, G, G, P, P
1995	10, 3, 5	NR, F, G
1996	3, 3, 10, 4, 0	G, G, G, G, P
1997	0, 12, 11, 1, 13, 10, 6, 2	G, G, G, P, F, E, G, F
1998	0, 0, 11, 7, 6, 0	G, G, G, G, G, G, G
1999	6, 1, 4, 0, 0, 2, 0	G, G, G, G, G, G, G
2000	0, 3, 1, 2, 0, 2, 0	G, G, G, G, G, G, G

E=Excellent, G=Good, F=Fair, P=Poor, NR=No Record

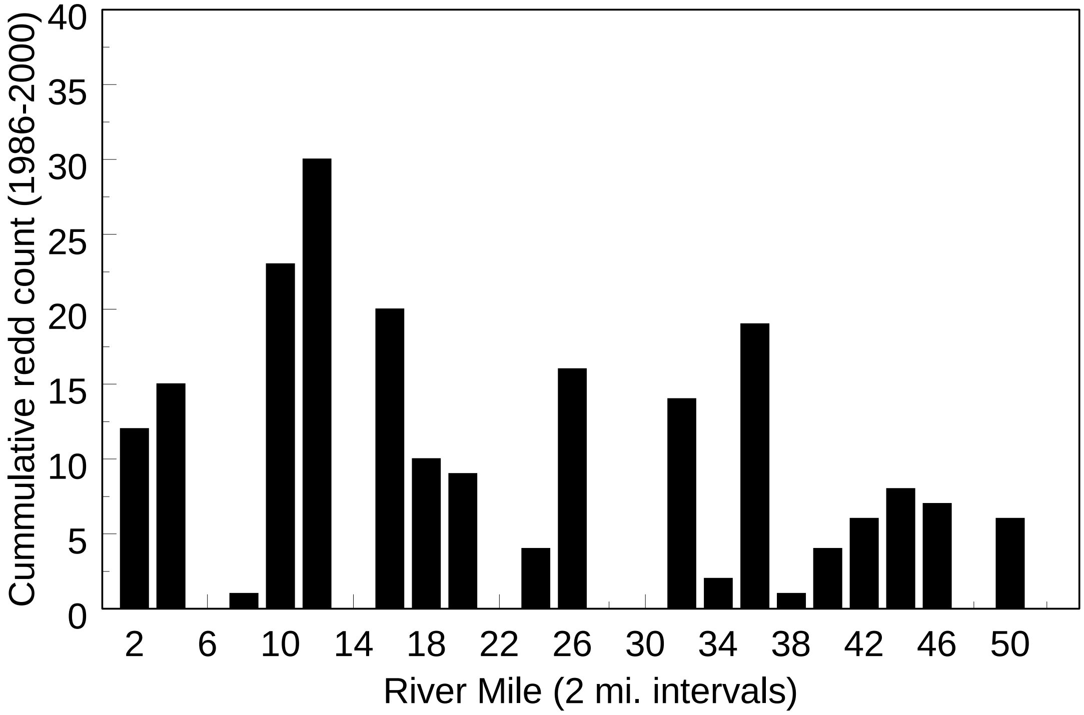

Figure 12. River Mile and Number of Fall Chinook Salmon Redds Counted in the Grande Ronde River by Helicopter, 1992-2000. (A.P. Garcia, USFWS, Ahsahka, Idaho; unpublished data).

Table 21. Summary of Fall Chinook Salmon Redds Counted in the Grande Ronde River by Year, 1992-2000. (A.P. Garcia, USFWS, Ahsahka, Idaho; unpublished data).

Year	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**
# Redds	5	49	15	18	20	55	24	13	8

In comparison with the Snake and Clearwater rivers (rivers that are routinely searched and where fall chinook salmon are commonly found), the Grande Ronde River is more difficult to search and redds are more difficult to see, due to comparatively more frequent periods of high turbidity and ice cover, and numerous areas where glare and shade limit visibility. Also, redds in the Grande Ronde appear dark, similar to the background materials which makes them difficult to see (redds in the Snake and Clearwater rivers appear light in contrast with the dark background which makes them easier to see, especially in areas that are shaded). Factors that affect visibility need to be considered when interpreting redd-search information (Welsh 1983). For searches conducted in the Grande Ronde River, visibility-limiting factors make it very likely that more spawning occurred than was indicated by redd counts in some years. However, in the last three years (1998-2000) the crew and pilot were experienced, the observation conditions were good on all flights, search effort (number of flights) was high, the number of adult fall chinook salmon in the basin (i.e., passing Lower Granite Dam) was high and redd counts were up in other Snake River tributaries, yet redd counts in the Grande Ronde River were relatively low (Table 21, and Table 22, Figure 13). Although part of the increase in returns to the Snake and Clearwater rivers in 1998, 1999, and 2000 might be attributable to supplemental releases of juvenile fish in previous years (no supplemental releases of fall chinook salmon were made in the Grande Ronde River), the redd-search data indicates use by spawners was markedly different in the Grande Ronde River compared to that of the nearby Snake and Clearwater rivers.

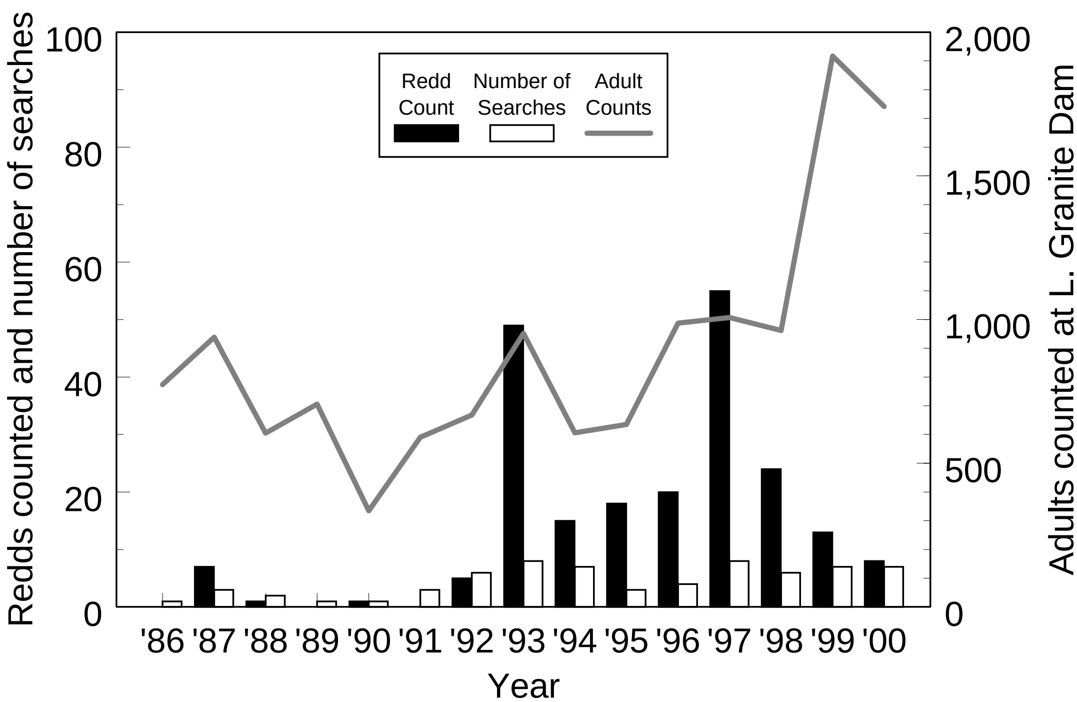

Figure 13. Number of Redds Counted, Number of Searches Conducted in the Grande Ronde River, and the Number of Adult Fall Chinook Salmon Counted in the Fish Ladder at Lower Granite Dam, 1986-2000 (A.P. Garcia, USFWS, Ahsahka, Idaho; unpublished data).

Table 22. Number of Fall Chinook Salmon Redds Counted Upstream of Lower Granite Dam, 1986-2000. An empty cell indicates no searches were conducted in the corresponding river or method and year (A.P. Garcia, USFWS, Ahsahka, Idaho; unpublished data. data from the Clearwater basin and the Salmon River provided by the Nez Perce Tribe).

	Year														
River (method or reach)	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Snake (aerial searches)	7	66	64	58	37	41	47	60	53	41	71	49	135	273	255
Snake (camera)						5	0	67	14	30	42	9	50	100	91
Clearwater (RM 0-41)			21	10	4	4	25	36	30	20	66	58	78	179	164
Clearwater (RM 41-74)							1	0	0	0	0	0	0	2	7
Clearwater (RM 74-98)									0	0	0	0	0	0	0
Selway									0	0	0	0	0	0	0
N.F. Clearwater			0	0	0	0	0	0	7	0	2	14	0	1	0
S. F. Clearwater							0	0	0	0	1	0	0	2	1
Grande Ronde	0	7	1	0	1	0	5	49	15	18	20	55	24	13	8
Imnaha		0	1	1	3	4	3	4	0	4	3	3	13	9	9
Salmon							1	3	1	2	1	1	3	0	0
Totals	7	73	87	69	45	54	82	219	120	115	206	189	303	579	535

Because of the low spawning escapement of fall chinook in the Grande Ronde, life history data are sparse. The life history of Snake River fall chinook salmon in general is better understood. Snake River fall chinook salmon mostly exhibit an “ocean-type” (Healy 1991) life history. Fry emerge in the spring, grow rapidly and migrate out of the Snake River primarily during July and August as subyearlings (Connor et al. in press). The timing of fall chinook salmon life history events and growth are regulated by water temperature (Connor et al. In review), thus the Snake River ESU of fall chinook salmon can be divided into four tributary races based on life history timing differences fostered by water temperature. The four races, in order of fry emergence timing are the upper reach Snake River, lower reach Snake River, lower Grande Ronde River and lower Clearwater River (W.P. Connor, US Fish and Wildlife Service, personal communication, April 2001).

Water temperatures were analyzed in the lower Grande Ronde from 1996-2000 to predict emergence and emigration timing for fall chinook (Bill Arnsberg, Nez Perce Tribe, unpublished data). Based on a thermal temperature unit accrual of 968^{o} C for the Snake River fall chinook stock (Arnsberg et al. 1992), a November 1 spawning fall chinook would emerge from April 30 to May 15. Emigration timing would be June 10 to June 25 based on an average emergence size 39 mm fork length, an average growth rate of 1 mm/d, and an average fork length of 80 mm at the start of emigration. For a November 15 spawning fall chinook, fry would emerge May 8 to May 22 with emigration timing between June 18 and July 2, based on the same size and growth criteria as above.

Limited life history data collected on fall chinook juveniles during 1998 supports the emigration timing predictions above. Subyearling chinook salmon were captured using beach seines from Troy to the mouth and PIT tagged (Bill Arnsberg, Nez Perce Tribe, unpublished data). Subyearling chinook were also subsampled for genetic analysis to determine race (spring vs fall chinook). During 1998, the year following a redd count of 55 in the Grande Ronde, a total of 166 fish were captured of which 40 were sacrificed for genetic analysis. Seining dates were 6/11, 6/18, 6/25, 6/28, 7/2, and 7/3. Subyearlings chinook were caught on all sample dates, except in July when no salmon juveniles were caught. The average chinook salmon fork length on 6/28 was 79.4 mm. Water temperatures during early July were approaching 20 degrees C during mid-day, and juvenile salmon seemed to have moved away from near shore areas to deep water or began emigrating out of the system. Genetic samples were sent to the Washington Department of Fish and Wildlife in Olympia, WA for electrophoretic analysis and to the USGS lab in Seattle for DNA analysis. Results were similar with the two techniques with differences in ranking on four fish. Three fish were ranked as fall chinook and one as a spring chinook by WDFW whereas the USGS ranked them otherwise. The WDFW ranked 24 fish (60%) of the samples as fall chinook. There was no significant difference in fish size based on the ranking i.e. the fish that were ranked as fall chinook were not smaller at the time of capture than those ranked as spring chinook.

The production potential of fall chinook salmon in the Grande Ronde River system is unclear. W. Connor (USFWS, personal communication, 2001) suggests the viability of the race is questionable because of limited spawning habitat quality, low red counts in recent years and a late time schedule for some life history events. However, Arnsberg (2001) assessed spawning habitat quality in the Grande Ronde River in 1996 with the freeze core technique and, from the results, predicted that egg survival would be comparable to other Snake River production areas. Further, by extrapolating from spawning habitat availability, area needed per spawner and estimated adults per redd, P. Kucera (NPT, personal communication, 2001) estimated the lower Grande Ronde could facilitate approximately 2,900 redds and approximately 8,700 adult fall chinook salmon.

There have been no releases of fall chinook for supplementation into the Grande Ronde River. However, prior to 1984, hatchery smolts were released into the Snake River near the mouth of the Grande Ronde. The WDFW proposed hatchery releases of fall chinook salmon from Lyons Ferry Hatchery into the lower Grande Ronde River in the 1980's (G. Mendel, WDFW, personal communication, 2001). The Nez Perce Tribe is presently conducting studies into the feasibility of initiating hatchery production and supplementation of fall chinook salmon through the Cottonwood Creek facility (B. Arnsberg, NPT, Personal Communication, April 2001).

Summer Steelhead (*Oncorhynchus mykiss*)

Summer steelhead are native to the Grande Ronde River subbasin. The Grande Ronde subbasin historically produced large runs of summer steelhead. The size of those runs is unknown but an estimate of 15,900 to the mouth of the Grande Ronde River was given for 1957, prior to construction of lower Snake River dams (USACE 1975). Grande Ronde summer steelhead are part of the Snake River ESU and were federally listed as threatened in 1997. Chilcote, in a draft ODFW document that has not been peer reviewed (2001) reported there are four distinct populations and twelve sub-populations of summer steelhead in the Grande Ronde River subbasin (Table 23). There is disagreement among co-managers regarding the validity of his findings.

Table 23. Summer Steelhead Populations and Sub-populations in the Grande Ronde River Subbasin.

Population	Sub-populations
Lower Grande Ronde	Wenaha, Lower Mainstem, Lookingglass
Joseph	none
Wallowa	North Wallowa, South Wallowa, Prairie, Minam
Upper Grande Ronde	Middle Mainstem, Willow, Catherine, Upper Mainstem, South Upper Mainstem

Summer steelhead are presently distributed throughout the accessible portions of the Grande Ronde subbasin (Figure 14). Summer steelhead are found in 238 streams in the subbasin, utilizing 33 percent of the total stream length available. Most of that is used for spawning and rearing (Table 24).

Table 24. Summer Steelhead Stream Use in the Grande Ronde River Subbasin.

Use Type	Miles of Stream Used	% of Stream Miles Used
Primarily spawning and rearing	1404.6	29%
Primarily rearing and migration	168.4	3%
Primarily migration	22.2	0%
Subbasin total	**1595.1**	**33%**

Spawning survey results suggest a decline in summer steelhead spawning in the subbasin between 1968 and 1979. Populations rebounded between 1980 and 1984, rose markedly in 1985 and remained relatively high through 1987. From 1988 to 2000, redd counts show a steady decline in summer steelhead spawning, although the Joseph population remains relatively productive compared with the others (Table 25).

Population data for Oregon summer steelhead presented in Chilcote (2001, an ODFW document that has not been peer reviewed) suggest a “long term cyclic phenomena” in population abundance and productivity. Grande Ronde populations appear to follow this type of population cycle. Chilcote (2001) also addressed extinction risk in populations of Oregon summer steelhead. He concluded that none of the Grande Ronde populations are presently at risk of extinction. His model further predicted that at adult mortality rates (from harvest) of less than 45 percent, the risk of extinction remains essentially zero. There is disagreement among co-managers regarding the validity of these conclusions.

Table 25. Steelhead Spawning Survey Data (spawners per mile) For Some Streams Within the Grande Ronde Subbasin, 1988-2000. Blank cells indicate no survey. (Data from Grande Ronde Watershed District files).

POP. UNIT	Prairie Cr.	S Wallowa	N Wallowa	Joseph Creek									M.Grande Ronde	U. Grande			S.Grande Ronde
Miles*	2	5	5	2.5	1	12	6	10	1	6	1	5	2.5	7	2	6	4
STREAM	Prairie Cr.	Wallowa R.	Whiskey Cr.	Butte Cr.	S. FK.Chesnimnus	Crow Cr.	Devils Run Cr.	Elk Cr.	McCarty Gu.	Peavine Cr.	Summit Cr.	Swamp Cr.	Phillips Cr	Meadow Cr.	McCoy Cr.	Five Points Cr.	Fly Cr.
Year																	
1988	23.0	2.7	22.3	0.5	24.3	8.7	23.4	12.2	0.0	22.7	67.5	8.4	2.7	7.9	3.4	2.5	13.8
1989	8.8	3.0	17.2	0.9	16.2	9.5	24.5	15.1	6.8	10.6	29.7	11.1	2.2	1.5	2.0	1.4	1.7
1990	14.9	3.2	11.8	2.2	5.4	10.4	5.6	10.7	1.4	11.9	12.2	14.0	2.7	2.9	2.0	2.5	1.0
1991	2.7	0.8	4.1	0.0	0.0	2.5	0.9	4.5	0.0	1.4	2.7	0.0					
1992	11.5	2.4	11.0	0.5	0.0	2.8	4.1	4.3	0.0	5.9	6.8	1.4	8.6	4.6	1.4	2.5	7.9
1993	9.5	0.0	3.7	0.5	2.7	5.1	15.3	12.2	0.0	5.6	9.5	14.9	2.2	1.7	4.7	1.4	1.4
1994	16.2	1.6	7.8	0.0	2.7	2.6	9.5	6.2	0.0	5.2	9.5	0.5	1.6	2.5	0.0	4.5	1.4
1995	5.4	1.4		0.0	5.4	0.5		1.8	0.0		1.4	2.2	2.7	1.7	2.0	2.7	1.7
1996	16.9	3.5	3.4	1.6	5.4	1.2	4.3	2.7	0.0	4.1	4.1	1.9	2.2	1.7	3.4	4.5	1.4
1997	17.6		4.6	4.9	6.8	2.5	4.1	3.9	0.0	2.7	4.1	1.9	1.1	3.7	6.8	5.2	2.3
1998	20.9		8.4	2.2		2.6		9.0	5.4	13.3		4.9	4.3	5.2	7.4	3.4	2.3
1999	31.1		5.7	5.4	8.1	4.1	10.8	4.7	0.0	3.6	8.1	8.1	2.2	1.4	0.7	3.6	
2000	37.1		6.8	2.2	13.5	2.5	5.9	5.9	1.4	6.1	17.6	9.2	1.1	0.8	0.0	4.1	2.7

Most summer steelhead rear for two years in the Grande Ronde River system before migrating to the ocean. Analysis of scales from 26 wild adult summer steelhead collected at Wallowa Hatchery during 1983-1984 showed all had smolted at age 2 (R. Carmichael, ODFW, unpublished data). Most smolt migration occurs from April through June (Smith 1975). There is a smaller pulse of fish in the fall, when juveniles are thought to migrate to lower stream reaches to avoid freezing conditions in the upper tributaries. Upstream areas may be repopulated the following spring. Juveniles may also move upstream to find cool water sanctuaries during the summer (ODFW 1993).

Adult summer steelhead spend one to three years in the ocean before returning to spawn. Returning Grande Ronde River adult summer steelhead pass Bonneville Dam during July and John Day Dam primarily during August-October. Like most Snake River populations, Grande Ronde River summer steelhead migrate through the lower Snake River during two periods: a fall movement that peaks in mid- to late-September and a spring movement that peaks during March and April. Some adult summer steelhead enter the lower Grande Ronde River as early as July but most adults enter from September through March (ODFW 1993).

Wild fish are generally 4 years old at maturity, having spent 2 years in fresh water, 1½ years in the ocean, and ½ year migrating to the subbasin and holding there until spawning. Spawning occurs from March through mid-June. Peak spawning takes place from late April through May. Fry emerge from May through July.

Hatchery production and acclimation for summer steelhead supplementation in the Grande Ronde River subbasin is accomplished at Wallowa Hatchery, Irrigon Hatchery and the Big Canyon acclimation facility in Oregon and at the Lyons Ferry Hatchery and Cottonwood acclimation facility in Washington (see *Artificial Production*). The Wenaha and Minam rivers and Joseph Creek are wild fish management areas for summer steelhead in the subbasin and, thus, receive no hatchery supplementation.

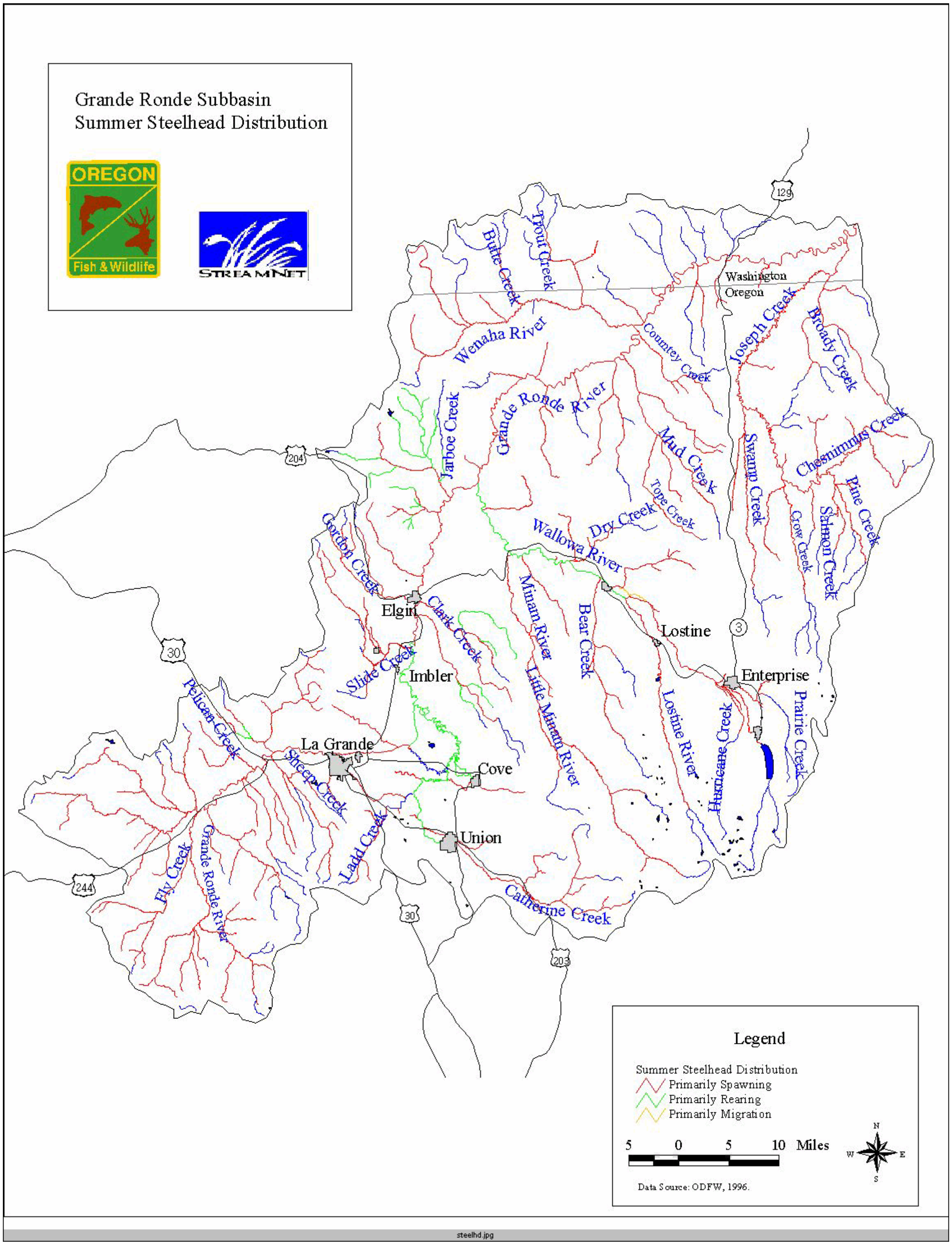

Figure 14. Summer Steelhead Distribution in the Grande Ronde River Subbasin.

Bull Trout (Salvelinus confluentus)

Bull trout occur throughout the Grande Ronde subbasin (Figure 15). While many Grande Ronde tributaries have not been surveyed, bull trout are generally found wherever water quality and habitat permits. Records of bull trout distribution in the upper Grande Ronde watershed are limited. Bull trout presence in the McCoy Creek drainage was verified by Oregon State University researchers in April, 2000 (A. Childs, CTUIR, personal communication, 2001). Limited information is available on historical distribution, but it is suspected that bull trout occurred in all major tributaries (West and Zakel 1993).

A systematic population estimate for the Grande Ronde subbasin bull trout is not available at this time. Although some relative healthy populations exist (i.e. Wenaha) most Grande Ronde bull trout populations are considered at "Moderate risk of extinction" (Buchanan et al 1997). Wenatchee Creek (also referred to on some maps as Menatchee Creek), a tributary in the lower Grande Ronde in Washington; and Wallowa Lake populations have been extirpated. Grande Ronde bull trout were listed as threatened under the ESA in 1998, as part of the larger Columbia River Basin Distinct Population Segment (DPS).

Most bull trout spawning and juvenile rearing takes place in the tributaries and headwaters areas of the subbasin (Figure 15). Bull trout are able to move throughout the Grande Ronde during fall, winter and spring. Summer water temperature in mainstem reaches may seasonally limit population connectivity to some degree.

Bull trout are often caught during the steelhead fishery in the Snake River from the mouth of the Grande Ronde to Asotin, Washington (G. Mendel, WDFW, personal communication, 2001). They are also documented to exist in the Snake River reservoirs downstream of Asotin.

In 1997, 400 bull trout were transferred into Wallowa Lake from a salvage operation associated with the decommissioning of an Imnaha basin hydroelectric project. At this point it is unclear whether this reintroduction has been successful.

Grande Ronde subbasin bull trout exhibit both resident and fluvial life histories. The population in the Little Minam is considered resident as it is isolated above a barrier waterfall. However, resident and fluvial fish can occur in the same population; their distinction being generally based on the larger size (greater than 13 inches in length) of fluvial fish and observed migratory behavior. Fluvial bull trout are components of the Catherine Creek, Lookingglass, Wenaha, Minam, and Lostine populations (Buchanan et al. 1997; Hemmingsen et al. 2001).

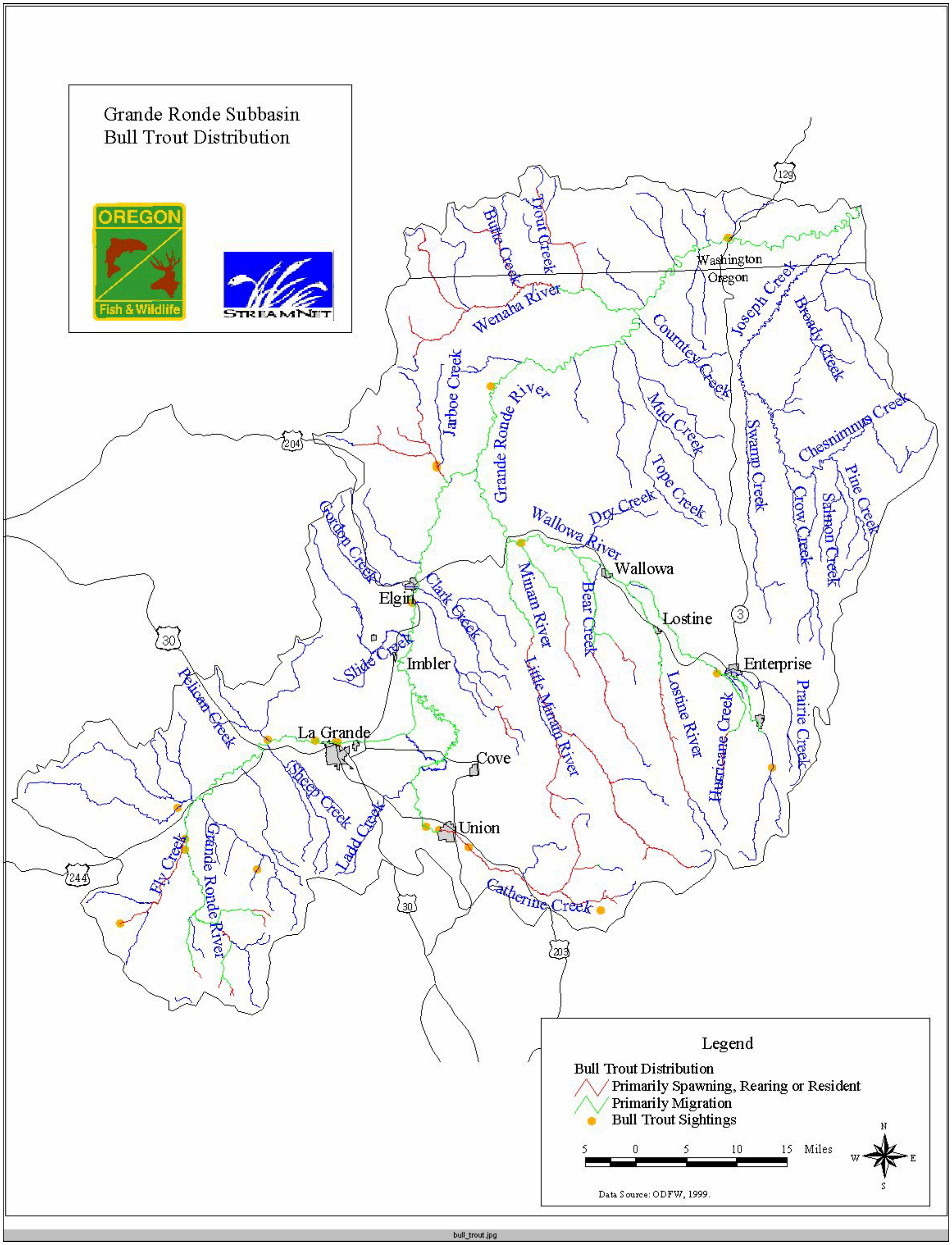

Figure 15. Bull Trout Distribution in the Grande Ronde River Subbasin.

Redband Trout (*Oncorhynchus mykiss*)

Many of the isolated rainbow trout populations in the Snake River Basin, including the Grande Ronde River subbasin, have been identified as inland "redband" type trout. Some taxonomists suggest that the resident form of *O. mykiss* in most of the Grande Ronde subbasin is part of the inland Columbia basin redband trout group. Distribution of redband trout is wide-spread throughout the Grande Ronde subbasin.

Resident redband trout tolerate water temperatures from 56° F to 70° F. Redband trout mature between 1 and 5 years of age with most maturing at age 3. They spawn mainly in the spring although studies of other inland populations as well as field investigations indicate that redband trout spawn throughout the year where water conditions allow (ODFW 1993a).

Rainbow Trout (*Oncorhynchus mykiss*)

Hatchery rainbow trout have been used to enhance fishery opportunities and harvest in the Grande Ronde River subbasin since 1925. This stocking effort supported popular trout fisheries on many subbasin streams, especially Catherine Creek and the Grande Ronde, Lostine and Wallowa rivers. Historically, releases have consisted of fry, fingerling, and legal-size (6-10 in.) fish. Some streams were stocked only once and many others were stocked annually until the mid-1950's.

When spring/summer chinook salmon were listed as threatened under the ESA in 1992, ODFW restricted the location of rainbow trout stocking, and reduced the number of fish stocked, to avoid primary chinook salmon spawning and rearing areas. When steelhead were listed as threatened in 1997, ODFW ceased stocking rainbow trout in anadromous streams in the Grande Ronde subbasin. Some stocking of rainbow trout still takes place in landlocked ponds and lakes.

Kokanee (*Oncorhynchus nerka*)

Wallowa Lake historically supported a large sockeye salmon population and continues to provide habitat for a naturally reproducing population of kokanee. From about 1955 to 1970, kokanee from Montana, Washington and British Columbia were planted in Wallowa Lake to supplement the existing population. The past introduction of lake trout and subsequently *mysis* shrimp to Wallowa Lake may have consequences for the native kokanee population and for potential reintroduction of sockeye. In a number of Northwest lakes the combination of lake trout and *mysis* shrimp introductions has led to ecological changes and severe reduction in kokanee population productivity. In some cases kokanee populations have been eliminated.

Although Wallowa Lake continues to support a significant recreational fishery on kokanee, recent changes in key population indicators suggest Wallowa Lake's kokanee population may be incurring similar impacts from those introductions. Over the past few years, average size of kokanee caught in the fishery increased while catch rate declined. These factors indicate fewer kokanee in the lake. If survival of juvenile kokanee in the lake is being affected by *mysis* shrimp or lake trout, similar impacts could be expected for naturally produced sockeye. A better understanding of the current ecology of the lake is needed in order to make informed decisions regarding the potential success of sockeye introduction to the system.

Brook Trout (*Salvelinus fontinalis)*

Brook trout are native to the eastern United States and were introduced into the Grande Ronde River subbasin in the late 1800's. This species of trout spawns in the fall and most mature at 3 years of age. They are usually short-lived; few wild fish live beyond 5 years of age. Brook trout are also slow growing and many populations are prone to stunting, especially in small headwater streams and lakes. Brook trout prefer cool, clear headwater streams and mountain lakes with water temperatures ranging from 55° F - 68° F. Brook trout conflict with management goals for bull trout due to competition, and the potential for hybridization which results in sterile offspring.

Brook trout are found in many Wallowa Mountain lakes and streams, spring-fed Wallowa Valley streams, the upper Minam River and tributaries and irrigation ditches (Table 26). There is currently no supplementation of brook trout in subbasin streams. Brook trout fingerlings are stocked into Morgan Lake southwest of La Grande, Oregon. Morgan Lake has no outlet.

Table 26. Stream Systems with Spawning and Rearing Populations of Bull Trout in the Upper Grande Ronde and Wallowa Watersheds and Whether Sympatric Brook Trout Populations Occur (ODFW, unpublished data).

Watershed	Stream	Sympatric Brook Trout Population?
Upper Grande Ronde	Limber Jim Creek	No
	Clear Creek	No
	Upper Grande Ronde River	No
	Chicken Creek	No
	Catherine Creek	No
	N.F. Catherine Creek	No
	M.F. Catherine Creek	No
	S.F. Catherine Creek	No
	Indian Creek	No
	E.F. Indian Creek	No
	Lookingglass Creek	No
	Little Lookingglass Creek	No
Wallowa River	Minam River	Yes
	N.F. Minam River	Yes
	Little Minam River	No
	Deer Creek	No
	Bear Creek	Yes
Wallowa River	Little Bear Creek	No
	Lostine River	Yes

Watershed	Stream	Sympatric Brook Trout Population?
	Hurricane Creek	Yes
	Upper Wallowa River	No

Lake Trout (*Salvelinus namaycush*)

Lake trout are native to the north central and eastern United States and Canada. They prefer water temperatures of 50° F and most mature at 5-7 years of age. Lake trout are broadcast spawners that spawn in the fall. In Oregon there are records of lake trout over 30 years of age. They prey on kokanee, mountain whitefish and rainbow trout in Wallowa Lake.

Within the Grande Ronde subbasin, lake trout are found only in Wallowa Lake. Information from angler harvest indicates a small, self-sustaining population. There is currently no supplementation of lake trout in the subbasin.

Golden Trout (*Oncorhynchus aguabonita*)

Golden trout are native to the Sierra Nevada in California and are suspected to exist in a few high lakes of the Grande Ronde subbasin from introductions prior to 1958. This species is most successful in water bodies at elevations over 7,000 ft and requires a stream system for successful spawning. In many cases, golden trout introduced into this area did not retain their unique coloration. Present abundance and distribution of golden trout in the Grande Ronde subbasin is unknown.

Lamprey (*Lampetra spp*)

Pacific lamprey (*L.* tridentata) occurred historically in the Grande Ronde River subbasin. Remnant populations may persist in the subbasin but their distribution and abundance are unknown. Western brook lamprey (*L.* richardsoni) are also native to the subbasin. A dead individual of this species was observed in the Wenaha River in the early 1990's (Don Bryson, NPT, personal communication). This observation suggests at least a few individuals may persist in the subbasin. However, their distribution and abundance are unknown.

Wildlife

A variety of wildlife species are found in the riverine, wetland and upland habitats of the Grande Ronde River subbasin. Nearly two-thirds of the wildlife species statewide are adaptable and thrive in both natural and human-impacted environments (e.g., coyote raccoon, red-tailed hawk, great horned owl, American robin, Brewer's blackbird, dark-eyed junco). One third of the state's wildlife species depend on natural or undisturbed environments. Over 20 federally listed species or species of concern can be found in the subbasin (Table 27).

Table 27. Federally Listed Wildlife Species and Species of Concern in the Grande Ronde Subbasin. * Denotes species extirpated from the area or whose population status is unknown.

Common Name	*Scientific Name*	Common Name	*Scientific Name*
tailed frog	*Ascaphus truei*	Columbian sharp-tailed grouse	*Tympanuchus phasianellus*
Columbia spotted frog	*Rana luteiventris*	pygmy rabbit	*Brachylagus idahoensis*
northern sagebrush lizard	*Sceloporus graciosus*	gray wolf*	*Canis lupus*
northern goshawk	*Accipiter gentilis*	pale western big-eared bat	*Corynorhinus townsendii*
western burrowing owl	*Athene cunicularia*	California wolverine*	*Gulo gulo*
upland sandpiper	*Bartramia longicauda*	silver-haired bat	*Lasionycteris noctivagans*
ferruginous hawk	*Buteo regalis*	Canada lynx*	*Lynx canadensis*
western greater sage-grouse	*Centrocercus urophasianus*	Pacific fisher*	*Martes pennanti*
black tern	*Childonias niger*	western small-footed myotis	*Myotis ciliolabrum*
yellow-billed cuckoo	*Coccyzus americanus*	long-eared myotis	*Myotis evotis*
eastern Oregon willow flycatcher	*Empidonax trailii*	fringed myotis	*Myotis thysanodes*
harlequin duck	*Histrionicus histrionicus*	long-legged myotis	*Myotis volans*
Lewis's woodpecker	*Melanerpes lewis*	Yuma myotis	*Myotis yumanensis*
mountain quail	*Oreortyx pictus*	Preble's shrew	*Sorex preblei*
white-headed woodpecker	*Picoides albolarvatus*	Columbia pebblesnail	*Fluminicola fuscus*

Certain populations of wildlife species are managed by federal, state and tribal wildlife managers throughout the subbasin including big game, furbearers, upland birds, and waterfowl. Many raptor species (e.g., golden eagle, American kestrel, northern goshawk) inhabit the subbasin including several seasonal migrants (e.g., bald eagle, Swainson's hawk).

Rocky Mountain Bighorn Sheep (*Ovis canadensis*)

Bighorn sheep were extirpated from Oregon by the mid-1940's. Historical information suggests that bighorns in the Grande Ronde subbasin were eliminated by a combination of disease, competition with livestock, and overhunting. However, disease, spread from domestic sheep and goats, was the factor most responsible for the decline of bighorn sheep in the area (V. Coggins, ODFW, personal communication, 2001). Reintroduction efforts have been ongoing since 1971, with sheep transplanted from Alberta, British Columbia, Idaho, Montana, Colorado, Washington and Wyoming. Within the Grande Ronde subbasin, bighorns have been released primarily in the Lostine, Minam and Wenaha drainages.

Additional efforts to restore bighorn sheep populations in the area were begun with the inception of the Hells Canyon Initiative in 1995. The Hells Canyon Initiative is a program to accelerate restoration of bighorn sheep in the Hells Canyon and Wallowa Mountain Areas of Idaho, Oregon and Washington and to focus research applicable to bighorn sheep restoration and management throughout the western United States and Canada.

Populations of bighorn sheep in the Grande Ronde subbasin provide limited opportunity for hunting in the Minam wildlife management unit. Current management of Oregon's bighorn sheep is described in the Bighorn Sheep Plan (ODFW 1992a).

Bighorn sheep were transplanted into the Washington portion of the lower Grande Ronde in 1977, when 10 bighorn sheep were released on the Chief Joseph Wildlife Area. A small number of California bighorn sheep moved into the Cottonwood Creek drainage from Asotin Creek in 1974, and established the Mt. View bighorn sheep herd. Bighorn sheep were re-introduced in the Wenaha-Tucannon Wilderness in 1983 and 1986 (29 bighorn sheep released).

These herds have suffered significant die-offs due to disease. In 1988, the Cottonwood herd suffered a major die-off when pneumonia, which may have been secondary to a severe scabies infection, resulted in 70% mortality. In November of 1995, a pasteurellosis epizootic inflicted major mortality on bighorn sheep populations on the lower Grande Ronde, resulting 75% mortality (approx. 245 sheep). Mortality of lambs and adults continues to be a significant problem, which hinders population recovery.

Rocky Mountain Goats (*Oreamnos americanus)*

Mountain goats were indigenous to northeast Oregon but were extirpated at, or prior to European settlement. Present populations occur in the Wallowa Mountains, Hells Canyon and the Elkhorn Mountains and are the result of reintroductions. The Wallowa Mountain goat herd originated from 4 separate releases. The 2000 population estimate for the Wallowa Mountains was 150 goats. Goats are beginning to pioneer vacant habitat adjacent to traditional core use areas, which will help to establish subpopulations throughout the Wallowas. Habitat is available for an estimated 600 mountain goats in the Wallowa Mountains (ODFW 2000b). Mountain goats offer extremely limited hunting opportunities in the subbasin; one tag was issued for the area in 2000 and Oregon law allows hunters to hold only one mountain goat tag in a lifetime. Mountain goat management in the subbasin is guided by Oregon's Interim Mountain Goat Management Plan (ODFW 2000b).

Rocky Mountain Elk (*Cervus elaphus nelsoni*)

Rocky Mountain elk are found throughout the subbasin wherever forage and cover can be found. Rocky Mountain elk are more abundant in the Blue and Wallowa mountains than elsewhere in Oregon. However, surveys in Wallowa County have shown a decline in calf recruitment over the past several years resulting more recently in a reduction in population numbers. Some areas of Union County have experienced reduced calf recruitment in 2000 and 2001 although this has not yet been coupled with a population decline (M. Henjum, ODFW, personal communication).

Quality, quantity and arrangement of several habitat components affect the distribution of elk. Availability and juxtaposition of food, water, shelter, space and harassment due to human activities ultimately determine the number of elk an area can produce and the amount of recreation that can be provided. Migratory herds need high quality forage on transitional winter and summer ranges. Resident herds must find sources of quality forage within their herd range.

During summer, elk use damp sites such as meadows and riparian areas, which offer nutritious forage and moist, cool places for escaping summer heat and insects. Winter survival is primarily dependent on fat stores. Thus, quality summer forage is at least as important as adequate winter food for over-winter survival. Elk require a mosaic of early forage-producing stages and later cover-forming stages of forest development; both in close proximity. In the Grande Ronde subbasin, most summer ranges for elk are on public land whereas winter ranges are largely on, or adjacent to, private lands. Elk breed in the fall, generally in September and October. Adult cows in good condition will typically produce a calf each year. Most young are born in June.

Management of elk in eastern Oregon is guided by the Rocky Mountain Elk Plan (ODFW 1992b). The plan was developed through a public review process and identifies acceptable population numbers and management options for each big game management unit. Big game management units in the Grande Ronde River subbasin include Wenaha, Sled Springs, Chesnimnus, Minam, Catherine Creek, Mount Emily and Starkey. With over 10,000 controlled hunt elk tags issued for the area in 2000, hunting opportunities remain good overall in the subbasin. However, elk hunting opportunities in Wallowa County have been reduced by over 5,000 tags in recent years. Hunting and other forms of outdoor recreation are important to the economies of Wallowa County communities. The loss of hunting opportunities may have a negative impact on businesses and communities throughout the area. Recent declines in recruitment in other portions of the subbasin may signal future reductions in populations in those areas, and the resultant loss of hunting opportunities.

Management of elk in Washington is guided by the Blue Mountains Elk Herd plan, which is an individual herd plan within the Washington State Elk Herd Plan (WDFW 2001). The plan was developed through the public review process, which included the general public, tribes, USFS, and various conservation organizations.

In Washington, elk exist in four Game Management units within the Grande Ronde subbasin; 169-Wenaha, 172-Mt. View, 181-Couse, and 186 Grande Ronde. The north Wenaha, Mt. View, and Grande Ronde populations are interstate herds containing approximately 1000-1100 elk. The north Wenaha sub-herd reached a peak, wintering population of 2500 elk during the mid-1980's, but has declined to approximately 600 by March of 2001. The Mt. View sub-herd has also declined from a wintering population of 700 elk in the 1980's, to approximately 450 in 2001. The Grande Ronde and Couse elk population is holding fairly stable at 50-100 elk (Pat Fowler, WDFW, personal communication)

Poor calf survival is the main factor impacting these elk populations. Between 1990-00, spring calf ratios within the sub-basin averaged 21 calves/100 cows. Calf ratios in the north Wenaha ranged from 6-26 calves/100 cows, and averaged 14 calves/100 cows. Calf ratios this low will not maintain elk populations under normal conditions. Calf mortality in Washington was monitored (Myers. et. al. 1999) between 1992 and 1997 in order to determine the annual mortality rate, and factors contributing to calf mortality. Annual calf mortality was measured at > 58%, with predation accounting for > 78% of the mortality. Cougar and bear were the primary predators, accounting for 81% of the predator related mortality.

Habitat conditions have also deteriorated in many areas due to noxious weeds, road building, silvicultural practices, and fire suppression. Long-term goals will be to improve habitat effectiveness through controlled burns, road closures, and efforts to control the expansion of noxious weeds.

Mule Deer (*Odocoileus hemionus*)

Rocky Mountain mule deer are native to eastern Oregon and Washington and are distributed throughout the Grande Ronde River subbasin. Mule deer populations in the subbasin have been in a steady decline for several years just as in much of eastern Oregon and western North America (ODFW 2000). Unmanaged livestock grazing, encroachment of human development, invasion of noxious weeds and loss of riparian vegetation have adversely affected habitat quality and quantity on winter ranges. Oregon management strategies regarding mule deer were developed through a public review process and are identified in the Mule Deer Plan (ODFW 1990).

Mule deer occupy a wide range of habitat types including desert shrub, woodland and conifer forest. In general, however, mule deer occupy more open, rugged areas. Although mule deer are commonly thought to be browsers, they consume a wide variety of plant material and in some seasons, graze extensively. Winter weather and deep snow drive mule deer to lower elevation wintering grounds. During this critical period for survival, mule deer browse the new growth of trees and shrubs.

In Washington, mule deer populations occur in game management units 169-Wenaha, 172-Mt. View, 181-Couse, 186-Grande Ronde. Mule deer populations have declined significantly over the last 12 years. The north Wenaha and Grande Ronde sub-herds have declined by approximately 70%. The Mt. View and Couse sub-herds appear to be recovering, and the mule deer populations are increasing slowly.

The factor(s) contributing to the decline of mule deer populations in Washington is unknown. However, during the same time period mule deer populations have declined, cougar populations have increased substantially. Mule deer populations in lowland areas where there are few, if any cougars, have increased significantly during the period deer populations in the mountains have declined.

White-tailed Deer (*Odocoileus virginianus ochrourus*)

Northeast Oregon, including the Grande Ronde subbasin, harbors the highest densities in the state of this subspecies, often called the Idaho white-tail. White-tailed deer utilize heavy shrub patches and thick riparian vegetation and are gradually extending their range as these features become more available. Because of their preference for heavy cover and their more limited distribution, white-tailed deer are seen less often than mule deer by both wildlife watchers and hunters.

In Washington, whitetail deer populations have remained fairly stable within the Grande Ronde subbasin. Whitetail populations occur in game management units 169-Wenaha, 172-Mt. View and 181-Couse. The Schumaker Grade area (30 sq. mi.) in unit 181-Couse provides winter range for approximately 300-400 resident and migratory whitetail deer. Deer that summer at higher elevations around Anatone and Big Butte migrate to the Schumaker Grade area when snow depths exceed 10+ inches at higher elevations.

Cougar (Puma concolor)

Cougars were classified in Oregon as an unprotected predator until 1978. Under that classification, and with the encouragement of bounties, the population reached an estimated low of 200 animals statewide. Following their classification as a game mammal in 1978, populations have increased steadily. The Wallowa Mountains harbor one of the highest density cougar populations in Oregon; cougars may be found in most habitats of the Grande Ronde subbasin.

Henjum (ODFW, unpublished data), estimated cougar density in the Catherine Creek game management unit to be approximately 1 animal per 20 mi^2 in 1991-1993. Cougar density is likely to be similar throughout the subbasin. In 1992, ODFW estimated the statewide population to be growing at a rate of 4-5% per year, a trend that likely continues today (ODFW 1993b) given their high reproductive potential. Oregon cougar populations are managed through the Cougar Plan (ODFW 1993b).

Cougars may breed at any time of the year and give birth to an average of 3 young. The young stay with the female for 12-18 months before becoming independent. Female young may remain close to their natal home range while males generally disperse relatively long distances. Adult females typically breed again shortly after their young disperse although they may breed prior to that time.

Cougars are a significant predator of deer and elk and may also prey on domestic animals. Cougar predation can impact small, isolated ungulate populations (Ross et al. 1997) and limit recruitment in larger populations. This may have an impact on achievement of management objectives for big game herds.

Canada Lynx (*Lynx canadensis*)

The Canada lynx was federally listed as threatened in 2000. Potentially suitable habitat in the Grande Ronde subbasin includes those plant communities above 4,500 feet in elevation that support vegetation capable of providing denning, foraging or travel habitat for lynx. Lower elevations are not considered potentially suitable for lynx denning and foraging because the primary prey species (snowshoe hare) does not inhabit those elevations in sufficient numbers. Lynx require stands with structural diversity and large woody debris in close proximity to foraging areas for denning. Hair-snag surveys for Canada lynx were conducted by the USFWS and the USFS in the subbasin in 1999 and 2000. These surveys failed to detect lynx in the area.

American Marten (*Martes americana*)

American martens are native to the mountainous regions of Oregon. They are closely associated with late-successional conifer forests and riparian habitats over a broad range of elevations (Buskirk and Ruggiero 1994, Csuti et al. 1997, Wisdom et al. 2000, Sallabanks et al. 2001). Marten populations may be declining due to loss of preferred late successional forest habitat (Csuti et al. 1997). Martens are sensitive to patch size and generally avoid clearcuts, preferring habitats with woody structural diversity including large diameter snags and logs (Wisdom et al. (2000). American marten are classified as a furbearer in Oregon and thus, can be legally harvested by trappers.

Black Bear (*Ursus americanus*)

The black bear is an important part of the ecosystem and has been considered an indicator of ecosystem health (ODFW 1993c). Black bear populations in the subbasin are steadily increasing and bears can be found in most forested habitats. Recent rules restricting the use of baiting and pursuit hounds have reduced hunting pressure; harvest is mostly opportunistic during other big game seasons. Bailey (1936) estimated Oregon's 1930-1933 bear population at approximately 9,000 animals. The 1993 population was estimated at 25,000 based on an estimated density of 0.3 bears per mi^2 of suitable habitat in eastern Oregon (1993c). Black bears are managed through the Black Bear Management Plan (ODFW 1993c).

Black bear diets are very diverse but, because of winter hibernation, forage availability in spring and fall is critical to survival. Bears can be a significant predator of deer fawns and elk calves. Black bear reproductive potential is relatively high with 2 cubs per litter most common. Young generally remain with the female for more than one year and disperse as yearlings in the spring when females breed again. Bears are long-lived animals; individuals older than 20 years have been documented in Oregon (ODFW 2000).

Furbearers

Wetland/Riparian furbearers: Several species of wetland/riparian dependant furbearers including beaver (*Castor canadensis*), river otter (*Lutra canadensis*), mink (*Mustela vison*), muskrat (*Ondatra zibethicus*), and raccoon (*Procyon lotor*) are found in the Grande Ronde subbasin.

Beavers were historically abundant throughout Oregon (Bailey 1936b) so that early trappers returned with a wealth of pelts. Beavers perform an important function in creating wetland habitat. Over time, their labors result in a mosaic of wetland successional stages from open-water ponds to seasonal wet meadows. Beavers' efficiency at aquatic engineering has resulted in conflicts with humans when irrigation projects are rerouted, fields are flooded, fences are damaged by falling trees or other damage is done to human developments. Beaver populations remain relatively high in areas undeveloped by humans.

River otters are relatively common along the mainstem rivers and tributaries of the Grande Ronde River subbasin. Otters consume many aquatic organisms including fish, frogs, and turtles as well as small mammals, birds and carrion.

Mink are also common in the subbasin's wetland and riparian areas. They are semi-aquatic animals with partially webbed feet for swimming. Mink prey primarily on muskrats but will also consume fish, frogs, crawfish, small mammals and birds found near water.

Muskrats are found in or near water throughout the Grande Ronde subbasin. In appropriate habitats, population densities can reach 1-4 per acre of surface water (Csuti et al. 1997). Muskrats eat primarily aquatic and wetland vegetation but will also prey on small aquatic animals. Muskrats build large nests of vegetation and mud but generally do not create the kind of alterations that put beavers in conflict with humans.

Raccoons are versatile omnivores that occur in a wide variety of habitats. When food is abundant, raccoons are selective in their diet, but when food becomes scarce, they will eat almost anything (Csuti et al. 1997). Their adaptability and catholic diet often put raccoons in conflict with humans as they forage among domestic pets, fowl, and pet food. Raccoons are largely nocturnal and spend the daylight hours in trees.

Furbearers of Conservation Concern: The fisher (*Martes pennanti*) and wolverine (*Gulo gulo*) are furbearers classified by the Natural Heritage system as sensitive in Oregon and Washington (Bull and Wales in press).

Fishers are very rare in Oregon and Washington with most sightings in the Coast and Cascade Mountains. The species is being considered for listing by the U.S. Fish and Wildlife Service because populations are very low in both states. A few individuals may reside in the Grande Ronde River subbasin although their abundance and distribution is unknown. Fishers primarily use mature, closed-canopy forests with some deciduous component, frequently along riparian corridors. Although fishers will cross openings between forested areas (Arthur et al. 1989), a negative association with clearcuts has been documented.

Wolverines were historically found throughout Oregon and Washington in appropriate habitats. The species is very rare in both states and is considered a Species of Concern by the U.S. Fish and Wildlife Service. Wolverine sightings are occasionally reported in the Wallowa Mountains but their abundance and distribution in the area is unknown. Wolverines are typically found in open forests at higher elevations and in alpine areas. They avoid young, dense, regenerating forests and brushy areas (Csuti et al. 1997).

Wading and Shore Birds

A number of wading and shore birds are found in the Grande Ronde subbasin (e.g.: spotted sandpiper, killdeer, American avocet), but 2 species merit special note: the great blue heron (*Ardea herodias*) and the sandhill crane (*Grus canadensis*).

Great blue herons are colony-nesting birds that forage in shallow wetlands, irrigated fields or moving waters. They can be found throughout the subbasin along lower elevation streams and wetlands. Most heron rookeries are found in mature cottonwood galleries along riparian areas. Human induced changes to rivers and wetlands (dredging, diking, stream channelization) have substantially reduced riparian associated wetlands historically created by beaver dams and seasonal flooding. This loss of riparian wetland has resulted in the loss of some of the old cottonwood galleries and limited their replacement. Loss of roosting and foraging habitat likely has a negative effect on great blue heron populations.

Sandhill cranes are listed as “vulnerable” in Oregon. There are estimated to be about 1,000 nesting pairs in the state (Csuti et al. 1997), some of which may be found in the Grande Ronde subbasin. Approximately 9 pairs nest in the Ladd Marsh Wildlife Area and at least 3 pairs nest in the Wallowa watershed. Nesting in the area by sandhill cranes is increasing slowly (R. Anderson, USFS, personal communication April, 2001). Sandhill cranes typically nest in marshes and wet meadows such as are found in the Ladd Marsh Wildlife Area or in drier grasslands and pastures. The young of dry land nesters are vulnerable when hayfields and pastures are mowed early in the season. The loss of wetland and wet meadow habitats to agriculture and development has resulted in a decrease in safe nesting areas for sandhill cranes.

Waterfowl

Twenty one species of ducks, four species of geese, and two species of swans occur in the Grande Ronde subbasin during migration and nesting seasons (Table 28). Historically, beaver dams and seasonal flooding provided more ponds and open, slow moving waters for waterfowl resting, nesting, and feeding. Diking and channelization for flood control and intensive agriculture have eliminated many wetlands. Wetlands within the Ladd Marsh Wildlife Area have been, and continue to be, restored. This important area of habitat produces over 2,000 ducks and 400 Canada geese each year. As more land is acquired and restoration continues, this productivity can be expected to increase.

Table 28. List of Common Waterfowl Species in the Grande Ronde River Subbasin.

Common Name	Scientific Name	Common Name	Scientific Name
Tundra swan	*Cygnus columbianus*	Cinnamon teal	*Anas cyanptera*
Trumpeter swan	*Cygnus buccinator*	Northern shoveler	*Anas clypeata*
Greater white-fronted goose	*Anser albifrons*	Gadwall	*Anas strpera*
Snow goose	*Chen caerulescens*	Eurasian wigeon	*Anas Penelope*
Ross' goose	*Chen rossii*	American wigeon	*Anas americana*
Canada goose	*Branta canadensis*	Canvasback	*Aythya valisineria*
Wood duck	*Aix sponsa*	Redhead	*Aythya americana*
Green-winged teal	*Anas crecca*	Ring-necked duck	*Aythya collaris*
Mallard	*Anas platyrhynchos*	Lesser scaup	*Aythya affinis*
Northern pintail	*Anas acuta*	**Harlequin duck**	***Histrionicus histrionicus***
Blue-winged teal	*Anas doscors*	Common goldeneye	*Bucephala cllangula*
Hooded merganser	*Lophodytes cucullatus*	Barrow's goldeneye	*Bucephala islandica*
Common merganser	*Mergus merganser*	Bufflehead	*Bucephala albeola*
Ruddy duck	*Oxyura jamaicensis*		

bold= federal Species of Concern

Upland Game Birds

Chukar, pheasant, Hungarian partridge, and wild turkey are not native to the Grande Ronde subbasin but they are some of the most popular species among bird hunters (Table 29)

. In general, mountain quail have declined throughout most of their range and valley quail have increased in suitable habitats. Mountain quail in eastern Oregon are dependent on brushy and diverse riparian habitat and populations have disappeared as these habitats have deteriorated (ODFW 1998). Increased sightings in recent years suggest a slight recovery in response to moderate winters, riparian improvements and the end of an extensive drought cycle.

Table 29. Upland Birds in the Grande Ronde River Subbasin.

Common Name	Scientific Name	Common Name	Scientific Name
Chukar partridge	*Alectoris chukar*	Wild turkey	*Meleagris galopavo*
Mountain quail	***Oreortyx pictus***	Ruffed grouse	*Bonasa umbellus*
Blue grouse	*Dendragopus obscurus*	Ring-necked pheasant	*Phasianus colchius*
Hungarian partridge	*Perdix perdix*	**Sage grouse**	***Centrocercus urophasianus***
California valley quail	*Calipepla californica*	**Columbian sharp-tailed grouse**	***Tympanuchus phasianellus columbianus***

bold = federal species of concern

Columbian Sharp-Tailed Grouse

Prior to 1991, Columbian sharp-tailed grouse had been extirpated from Oregon. Reintroduction efforts began in 1991 in Wallowa County. Prior to 2001, 92 birds had been released in the Leap area, near Enterprise, Oregon. While successful reproduction has been documented, numbers had declined to an estimated population of 50 birds in 2000 (V. Coggins, personal communication). An additional supplementation of 33 sharp-tails were released in April 2001. It is unknown whether sharp-tailed grouse have moved from the release area to colonize other sites; sharp-tails have been reported outside the release area but these sightings have not been confirmed by biologists.

Columbian sharp-tailed grouse occupy semi-desert scrub and shrub grassland habitats. Grazing by livestock, agriculture, and successional transitions caused by fire exclusion have all contributed to the decline of these habitats. The federal CRP program is helping to reestablish these habitats where grain fields once stood but the stability of the program is dependent on congressional funding and thus, is uncertain.

Mountain Quail

Mountain quail are native to the Grande Ronde subbasin and prefer open forests and woodlands with a shrub understory (Csuti et al. 1997). They will also utilize riparian woodlands. The population in northeast Oregon has declined recently; they are now considered “very uncommon” in the subbasin (M. Henjum, ODFW, personal communication). The loss of low-elevation, open Ponderosa Pine forests and riparian habitats has likely contributed to the decline of this species.

Bald Eagle (*Haliaeetus leucocephalus*)

Bald eagles are generally winter visitors to the Grande Ronde subbasin although nests have been documented in both Union and Wallowa Counties. Roost trees are primarily cottonwoods in agricultural areas or large conifers in forested areas and near ponds and lakes. Loss and degradation of deciduous riparian habitats may severely limit opportunities for roosting and nesting by bald eagles. Bald eagles are federally listed as Threatened, but are proposed for de-listing. They are protected by the Migratory Bird Treaty Act.

Threatened, Endangered, and Sensitive Species

Although the status of wildlife species and populations varies throughout the subbasin, many wildlife species within the subbasin are listed as federal and/or state Threatened, Endangered, and Sensitive or Species of Concern (Table 27).

Some species have naturally low, localized populations such as the bobolink and upland sandpiper. Swainson's hawks have declined largely due to environmental problems in their southern hemisphere wintering grounds. Habitat alteration and conversion are believed responsible for the sensitive status of many species.

The ferruginous hawk, burrowing owl, white-tailed jackrabbit, and grasshopper sparrow are dependent on grassland and shrub communities, which have been extensively converted to agriculture and altered by grazing.

Many forest-dependent species can be affected by timber harvest and management practices (Bull and Wales, in press). Removal of standing and down dead trees may eliminate foraging and nesting sites for some woodpeckers. The loss of nest or roost trees could be detrimental to bald eagles, goshawks or ferruginous hawks, while the loss of canopy cover may be detrimental to harlequin ducks and goshawks or to the prey of some raptors (Bull and Wales, in press). The more open canopies created by thinning may benefit some species and harm others.

The Washington Department of Fish and Wildlife maintains a list of Priority Habitats and Species [(PHS) Table 30] with recommendations that address upland and riparian habitat and emphasize managing for the most critical species and their habitats. Waterfowl habitats and riparian areas are considered by WDFW to be priority habitats for protection.

Table 30. Washington Department of Fish and Wildlife Priority Habitats and Species.

Scientific Name	Common Name	State Status	Federal Status
Alectoris chukar	Chukar	Game-PHS	--
Cervus elaphus	Elk	Game-PHS	--
Cervus elaphus nelsoni	Rocky Mountain elk	Game-PHS	--
Haliaeetus leucocephalus	Bald eagle	Threatened	Threatened
Odocoileus hemionus hemionus	Mule deer	Game-PHS	--
Odocoileus virginianus	White-tailed deer	Game-PHS	--
Odocoileus virginianus ochrourus	NW White-tailed deer	Game-PHS	--
Ovis canadensis	Bighorn sheep	Game-PHS	--

Source: J. Azerrad, WDFW, personal communication, 2001.

Several target species have been selected for use in Habitat Evaluation Procedures (HEP) through the loss assessment and mitigation crediting process [(Rasmussen and Wright 1990a, b, c, d) Table 31]. These target species and their habitats are considered for habitat mitigation throughout the Columbia Basin, including the Grande Ronde subbasin.

Table 31. Target Species Selected for the John Day and McNary Projects and Used in Habitat Evaluation Procedures in the Grande Ronde Subbasin.

Target Species Selected for the John Day and McNary HEP, and the Rationale for Their Selection (Rasmussen and Wright 1990 a, b, c, d)	
EVALUATION SPECIES	**RATIONALE FOR SELECTION**
Spotted Sandpiper (**Actitis macularia**) *John Day and McNary Target Species	A representative of migratory shorebirds which utilize the sparsely vegetated islands, mudflats, shorelines, and sand and gravel bars associated with the John Day and McNary Project areas. This habitat comprised the third largest loss of terrestrial acreage resulting from hydropower development in the John Day and McNary project areas.
Lesser Scaup (**Aytha affinis**) *John Day Target Species	A migratory waterfowl species commonly observed utilizing open water habitat of John Day Reservoir during the winter. Representative of other diving waterfowl which may use the area. Existing HEP model available.
Canada Goose (**Branta canadensis**) *John Day and McNary Target Species	A migratory bird of national significance. Sensitive to island nesting habitat and associated shoreline brooding areas. Cultural significance.
Great Blue Heron (**Ardea herodias**) *John Day Target Species	Carnivore which forages on a variety of vertebrates in shallow water. The sand/gravel/cobble/mud shorelines of the reservoirs are commonly used as foraging areas. Existing HEP model available which is sensitive to changes in these habitats. Cultural significance.
Yellow Warbler **(Dendraica petechia)** *****John Day and McNary Target Species	Represents species which reproduce in riparian shrub habitat and make extensive use of adjacent wetlands. Existing HEP model which is sensitive to the targeted habitats - riparian shrub and adjacent wetlands.
Black-Capped Chickadee **(Parus atricopillus)** *****John Day Target Species	Representative of species utilizing mature forest canopies. Forest cavity nesters. HEP model available.
Mink (**Mustela vison**) *John Day and McNary Target Species	Carnivorous furbearer, feeds on wide variety of vertebrates. Utilizes shoreline and adjacent shallow water habitats. HEP model available. Cultural significance.
Western Meadowlark (**Sturnella neglecta**) *John Day and McNary Target Species	A species common to shrub-steppe/grassland habitat, the largest terrestrial habitat type flooded by the hydroelectric projects. This bird is well known for its melodious song, feeds primarily on insects and seeds.
California Quail (**Lophortyx californicus**) *John Day and McNary Target Species	A species commonly associated with the shrub-steppe/grassland habitat. This game bird feeds on seeds and greens in brushy and grassland areas.
Mallard (**Anas platyrhynchgos**) *John Day and McNary Target Species	The mallard utilizes a broad range of cover types including riparian herb, emergent wetlands, and islands for nesting, brood rearing, and wintering habitat. Recreational significance.
Downy Woodpecker (**Picoides pubescens**) *McNary Target Species	This woodpecker represents a species which feeds and reproduces in a tree environment. The downy woodpecker HEP model was selected to measure the riparian tree cover type. Its diet is primarily insects with some seeds and fruits.

Habitat Areas and Quality

Habitat degradation and destruction are ranked as the most pervasive threat to biodiversity in the United States (Wilcove et al. 2000). Biodiversity in the Grande Ronde subbasin is similarly threatened by loss and alteration of habitats. Riparian habitat degradation was considered “the most serious problem” in the subbasin by the Grande Ronde Water Quality Committee (1999 p. 16) although Wisdom et al. (2000) concluded that low-elevation old-forest habitats had suffered the greatest decline over time. Low-elevation late seral forests serve as the interface between forested and non-forested habitats. Riparian habitats serve as the interface between aquatic and terrestrial species and have a direct effect on in-stream habitat features such as temperature, stability, and sediment. Riparian areas also serve as a source of woody debris in streams and other water bodies as well as food and nutrient input (e.g., insect and leaf litter drop). Thus, the condition of terrestrial habitats is tied to the health of aquatic ecosystems. Likewise, the condition of aquatic habitats is tied to the health of terrestrial ecosystems through the “food web that knits the water and land together” (Cederholm et al. 2001).

Extensive vegetation removal and disturbance associated with urban development, forestry, transportation corridors, flood control and agriculture has occurred and continues in the Grande Ronde subbasin (Oregon Progress Board 2000). This has resulted in habitats that are very different in both quantity and quality from those present before European settlement.

Fish

The available historical information for the Grande Ronde subbasin indicates that the watersheds have been significantly degraded (see *Limiting Factors*). Due to various land uses, the valley bottoms, riparian areas, and streams are in moderately to severely degraded condition (McIntosh 1992; ODEQ 1988, cited in USDA Forest Service et al. 1992). McIntosh (1992) found that aquatic habitats were degraded through a variety of land use activities between 1941 and 1990.

Aquatic and riparian habitats in the Grande Ronde subbasin were evaluated by Clearwater Biostudies (1993), under contract to the Grande Ronde Model Watershed Program, through a review of existing survey data from state and federal agencies. They found conditions to be generally of lower quality than reference conditions with respect to stream shading, bank stability, fine sediment, pool frequency and woody debris. In the upper Grande Ronde subbasin, pool habitat has been reduced by about 70%, although pool habitat was essentially unaltered in the Wilderness Areas (McIntosh 1992). Habitat conditions in specific stream reaches were also characterized in the Grande Ronde Model Watershed Operations-Action Plan (1994) and the Wallowa County/Nez Perce Tribe Salmon Habitat Recovery Plan (Wallowa County/ NPT 1993). Some of the listed habitat issues mirror conditions targeted in the water quality limited, 303(d) list. However, several additional habitat problems were noted such as low levels of complexity, poor bank stability, low pool frequency, lack of shading due to degraded riparian vegetation, stream channelization and inadequate woody debris.

Instream and riparian habitats are generally of greatest concern in the large river valleys where gradients are low and demands for water and land for human development are high (Grande Ronde Model Watershed Program 1994). Water diversions for irrigation, stream channelization, loss of riparian vegetation and runoff from fields and roads are some of the most serious challenges to habitats in the low elevation valleys. Extensive channelization of portions of the Grande Ronde River and other streams for flood control and irrigation has resulted in losses of both riverine and associated wetland habitats throughout the subbasin. Channelization of the Grande Ronde River into the State Ditch near La Grande, Oregon reduced the stream length, and thus, riverine and riparian habitat, by 29 miles (Thompson and Haas 1960).

Transportation corridors, including historic railroad development and past and present road construction, have had a significant negative impact on habitats throughout the subbasin, especially in the upper Grande Ronde and in headwaters areas (see *Limiting Factors*).

Mobrand and Lestelle (1997) offer a complete review of productivity by stream reach in the subbasin using the Ecosystem Diagnosis and Treatment method with spring chinook salmon as the focal species. In 1993 the Oregon Chapter of the American Fisheries Society compiled a database of “critical watersheds” throughout Oregon (Henjum et al. 1994). This document lists 27 aquatic diversity areas (ADAs) in the Grande Ronde subbasin. The Grande Ronde Model Watershed Board has prioritized watersheds in the Grande Ronde subbasin for habitat restoration efforts.

Wildlife

Although the introduction of livestock and other early activities of European settlers affected range and forest habitats, large-scale terrestrial habitat degradation came about primarily with the availability of quantities of inexpensive water and power. These commodities made possible the development of large agricultural and industrial operations as well as urban centers to support them. Major transportation corridors followed as a means to carry products and people to and from the area. Wetland and riparian areas have been converted for use in agriculture and often serve as transportation corridors. Upland and forested areas have been cleared and developed for agricultural and urban development and harvested for wood products.

Riparian areas, wetlands and low elevation old ponderosa pine forests are some of the habitats most affected by legacy railroad and road building, mining, agriculture and other development activities (see *Limiting Factors*). Although some areas within the subbasin support relatively intact habitats (e.g., wilderness areas), many areas have been seriously degraded (e.g., valleys with a high degree of development and agricultural conversion). In general, habitats in Wallowa County are in better condition than those in Union County due to a high percentage of wilderness area and less intensive agricultural development. Habitat loss and degradation may change the assemblage of species that occupy a given area and offer opportunities for invasion by exotic species. Habitat conditions in National Forests and watersheds east of the Cascade Crest, including the Grande Ronde subbasin are discussed in Henjum et al (1994).

Watershed Assessment

Some of the most extensive watershed assessments in the nation have been undertaken in Oregon, a number of which have been conducted in the Grande Ronde subbasin by various agencies and entities. The following list is not intended to be exhaustive but is representative of watershed assessments in the Grande Ronde subbasin.

- The US Forest Service has conducted a number of watershed analyses in various National Forests. Completed watershed analyses include:

  Upper Grande Ronde Watershed Analysis. Watersheds 85 and 86. LaGrande Ranger District, Wallowa-Whitman NF. This analysis provides a description of the dominant physical, biological, and human dimension features, characteristics and uses of the watershed that assess ecosystem function and condition in watersheds 85 and 86 in the Upper Grande Ronde River system. The assessment also provides a framework to manage upland and riparian landscapes, analyze cumulative effects, and guide planning, management, restoration, and monitoring activities.

  Catherine Creek – Ladd McAllister Watershed Analysis. Watersheds 12 and 19. LaGrande Ranger District, Wallowa-Whitman NF. This analysis provides a description of the dominant physical, biological, and human dimension features, characteristics and uses of the watershed that assess ecosystem function and condition in watersheds 12 and 19 in the Upper Grande Ronde River system. Recommendations are presented for appropriate projects, monitoring and research that would move degraded portions of the watershed closer toward reference conditions.

  Beaver Creek Watershed Analysis. Watershed 16. LaGrande Ranger District, Wallowa-Whitman NF. This analysis provides a description of the dominant physical, biological, and human dimension features, characteristics and uses of watershed 16 that assess ecosystem function and condition. Included are recommended management activities identified to move the ecosystem toward reference condition. Recommended activities include fish habitat restoration and road obliteration.

  Spring Creek/Five Points Watershed Analysis. Watershed 87. La Grande Ranger District, Wallowa-Whitman NF. Provides a background discussion of the physical and biological features of watershed 87 in the Upper Grande Ronde River system. The analysis results in recommendations for potential projects for managing the ecosystem toward a desired condition, monitoring and research recommendations, and a list of information gaps for the watershed.

  Upper Joseph Creek Watershed Analysis. Watershed 26. Wallowa Valley Ranger District, Wallowa-Whitman NF. See descriptions above.

  Lostine River Watershed Analysis. Watershed 05. Wallowa Valley Ranger District, Wallowa-Whitman NF. November 1997. See descriptions above.

  Minam River Watershed Analysis. Watershed 10. Wallowa Valley Ranger District, Wallowa-Whitman NF. See descriptions above.

  Lower Grande Ronde Subbasin Review. La Grande Ranger District, Wallowa-Whitman NF. See descriptions above.

- The U.S. Forest Service and Bureau of Reclamation have completed numerous Section 7 consultation documents for spring and fall chinook salmon, summer steelhead and bull trout.
- The Oregon Natural Heritage Program maintains a database on habitats and species occurrences throughout the State of Oregon (ONHP 2001).
- The Washington Natural Heritage Program maintains a database on habitats and species occurrences throughout the State of Washington (Dept. of Natural Resources, and WDFW).
- The Oregon Trust Agreement Planning Project (BPA 1993) and Oregon GAP Analysis Project (ODFW 1997a) identified gaps in bio-diversity and needs for terrestrial habitat restoration. The result was a prioritized list of potential habitat restoration opportunities.
- A Columbia Basin- wide loss assessment was conducted in the late 1980s to quantify construction/inundation impacts from federal hydropower development (
- Table 32). Wildlife mitigation objectives for the Grande Ronde subbasin are based partially on the results of this loss assessment effort. Estimated wildlife losses caused by the construction/inundation of the federal hydropower system were amended into the Northwest Power Planning Council's (NWPPC) Fish and Wildlife Program. Losses were measured in Habitat Units (HUs) for selected target/indicator species (
- Table 33) and are linked to priority habitats (Rassmussen and Wright 1990a,b,c,d).

Table 32. Acreage of Vegetation and Cover Types Impacted by the Bonneville, The Dalles, John Day and McNary Projects.

Acreage of Vegetation and Cover Types Impacted by the Bonneville, The Dalles, John Day, and McNary Projects (Rassmussen and Wright 1989, a, b, c, d)				
VEGETATION TYPE	**BONNEVILLE**	**THE DALLES**	**JOHN DAY**	**MCNARY**
MAINLAND				
Conifer Forest, Open	151	N/A	N/A	N/A
Conifer - Hardwood Forest, Open	651	N/A	N/A	N/A
Confer - Hardwood Forest, Closed	21	N/A	N/A	N/A
Agricultural Lands	615	24	2,012	1,872
Shrub-Steppe/Grassland	330	385	10,175	7,416
Riparian Hardwood	536	183	960	1,028
Riparian Shrub	312	161	833	284
Riparian Herb	N/A	81	476	7
Emergent Wetland	9	15	511	248
Sand Dunes/Blowouts	N/A	93	1,966	977
Sand/Gravel/Cobble/Mud	2,947	325	2,439	577
Talus/Rock	335	390	830	0
Disturbed/Bare/Riprap	138	176	392	346
Open Water - Lakes & Ponds	328	50	182	6
Residential/Urban/Industrial	43	40	82	137
TOTAL MAINLAND	**6,416**	**1,923**	**20,858**	**12,898**

Acreage of Vegetation and Cover Types Impacted by the Bonneville, The Dalles, John Day, and McNary Projects (Rassmussen and Wright 1989, a, b, c, d)				
VEGETATION TYPE	**BONNEVILLE**	**THE DALLES**	**JOHN DAY**	**MCNARY**
ISLANDS				
Conifer - Hardwood Forest, Open	24			
Agricultural Lands	N/A	0	50	157
Shrub-Steppe/Grasslands	81	27	2,472	1,256
Riparian Hardwood	N/A	46	126	227
Riparian Shrub	13	28	252	81
Riparian Herb	N/A	0	702	7
Emergent Wetland	N/A	0	0	16
Sand Dunes/Blowouts	N/A	24	1,459	211
Sand/Cobble/Gravel/Mud	427	209	1,544	786
Talus/Rock	62	152	64	0
Open Water - Lakes & Ponds	4	1	10	0
Residential/Urban/Industrial	N/A	1	29	0
TOTAL ISLANDS	**611**	**488**	**6,708**	**2,741**
RIVER				
Open Water - Celilo Canal	N/A	141	N/A	N/A
Open Water - River	13,722	6,627	21,103	15,685
TOTAL RIVERS	**13,722**	**6,768**	**21,103**	**15,685**
TOTAL RIPARIAN/ WETLAND/RIVER	**20,749**	**9,179**	**29,138**	**18,952**

Table 33. Estimated Losses in Habitat Units (HU's) from the Bonneville, John Day, The Dalles and McNary Dams.

Estimated Losses in Habitat Units (HU's) from the Wildlife Impact Assessments for Bonneville, John Day, The Dalles, and McNary Dams (Rasmussen and Wright 1990 a, b, c, d)				
SPECIES	**BONNEVILLE**	**THE DALLES**	**JOHN DAY**	**MCNARY**
Spotted sandpiper	2,767	534	3,186	1,363
Lesser scaup	+2,671	+2,068	+14,398	0
Canada goose	2,443	439	8,010	3,484
Great blue heron	4,300	427	3,186	0
Yellow warbler	163	170	1,085	329
Black-capped chickadee	1,022	183	869	0
Mink	1,622	330	1,437	1,250
Western meadowlark	0	247	5,059	3,469
California quail	0	0	6,324	6,314
Mallard	0	0	7,399	6,959
Downy woodpecker	0	0	0	377
Totals	**12,317**	**2,330**	**36,555**	**23,545**

- Streamflow Restoration Prioritization – ODFW and OWRD have established priorities for restoration of streamflow from consumptive uses as part of the Oregon Plan for Salmon and Watersheds (Measure IV.A.8). ODFW has identified the "need" for streamflow restoration through ranking of biological and physical factors, water use patterns and the extent to which flow is a primary limiting factor. The OWRD ranked the opportunities and likelihood for achieving meaningful streamflow restoration. Rankings were performed for subwatersheds at approximately the fifth field hydrologic units (HUCs). OWRD Watermasters will incorporate the priorities into their field work activities as a means to implement flow restoration measures. The "needs" priorities will be used by the Oregon Watershed Enhancement Board as one criterion in determining funding priorities for enhancement and restoration projects. Watershed councils and other entities may also use the needs priorities as one piece of information determining high priority restoration projects.

- Interior Columbia Basin Ecosystem Management Project (ICBEMP) – Initiated by the Forest Service and Bureau of Land Management to respond to several critical issues in the interior Columbia Basin, including forest and rangeland health, anadromous fish concerns, and terrestrial species concerns, provides a comprehensive assessment for USFS and BLM-administered lands in Oregon (USDA and USDI 2000). Several assessments derived from this project and conducted by the Project's Science Integration Team include *Source Habitats for Terrestrial Vertebrates of Focus in the Interior Columbia Basin: Broad-scale Trends and Management Implications* (Wisdom, et al 1998), *An Assessment of Ecosystem Components in the Interior Columbia Basin and Portions of the Klamath and Great Basins* (Quigley and Arbelbide 1997), and *An Integrated Scientific Assessment for Ecosystem Management in the Interior Columbia Basin and Portions of the Klamath and Great Basins* (Quigley et al. 1996). These assessments characterize historical and current conditions and associated trends, and document accelerated changes in vegetation patterns, fish and wildlife distributions, and terrestrial and aquatic ecosystem processes that have occurred in the past century.
- The Northwest Power Planning Council documented changed conditions within the Columbia Basin hydropower system in its *Return to the River* report (NWPPC 1996).
- Columbia Basin System Planning Salmon and Steelhead Production Plan for the Grande Ronde River Subbasin (ODFW et al. 1990) – developed in response to the need for an Integrated System Plan, as part of the Northwest Power Planning Council's Fish and Wildlife Program. The plan provided the basis for salmon and steelhead production strategies, documented current and potential production, summarized agency and Tribal management goals and objectives, documented current management efforts, identified problems and opportunities associated with increasing salmon and steelhead numbers, and presented preferred and alternative management strategies.
- Forest Service Resource Management Plans and Environmental Impact Statements were developed in the early 1990s for each National Forest within the Grande Ronde subbasin (USDA 1990a, 1990b) in accordance with the National Forest Management Act (1976). Plans and documents included assessments of current resource conditions, issues, concerns, and opportunities, and proposed management actions.
- The Oregon Department of Environmental Quality and the Natural Resource Conservation Service initiated a process to develop a Unified Watershed Assessment (UWA) as part of the federal Clean Water Action Plan (CWAP) put forth by the USDA and EPA. Using existing assessment information, public input, and Tribal, Federal, and State participation, the 1998 Unified Watershed Assessment and Restoration Priorities for Oregon assessed the condition of water resources and prioritized watersheds for restoration. (www.deq.state.or.us). The Assessment is intended to

identify potential opportunities to link the Oregon Plan, Tribal restoration plans, Federal plans, and other collaborative watershed assessment and restoration efforts.

- The ODEQ and Oregon Watershed Health Program completed the River Basin Assessment, Upper/Middle Grande Ronde River & Catherine Creek. 1995. Reported that, in general, stream temperature and habitat quality are limiting salmonid viability throughout the subbasin. Widespread grazing, timber harvesting and roading have contributed to moving water quantity and quality away from desired values. Specific streams and stream reaches are evaluated relative to water quality and habitat criteria.
- In association with the UWA effort, the Division of State Lands (DSL) produced a Watershed Assessment Report (ODSL 1998) that prioritized subbasins based on the greatest natural resource value, the least impact to condition, and the greatest risk to condition. These three categories of criteria were used to establish priority rankings for subbasins that could benefit most from a watershed management or restoration approach.
- The DEQ has also inventoried state waters for listing through the Oregon DEQ's Clean Water Act Section 303(d).
- The Inter-tribal *Wy-Kan-Ush Mi-Wa-Kish-Wit* (Spirit of the Salmon) restoration plan (CRITFC 1995) provides a foundation for meeting Tribal treaty and trust obligations in the Columbia River basin. The long-term plan also addresses the causes of anadromous fish declines, provides information on fish stock status and habitat, and makes recommendations to protect and restore declining fish populations.
- The Grande Ronde Model Watershed Program has initiated water quality and habitat assessments in the Grande Ronde River subbasin in cooperation with other agencies and groups. Huntington's 1993 report, "Stream and Riparian Conditions in the Grande Ronde Basin" assesses water quality, aquatic habitat and riparian conditions in the subbasin including the Imnaha subbasin. The findings of this report are also summarized in the Grande Ronde Model Watershed Program Operations – Action Plan (1994). Mobrand and Lestelle (1997) Applied the Ecosystem Diagnosis and Treatment Method (EDT) to the subbasin with spring chinook salmon as the focal species.
- The Upper Grande Ronde River Sub-basin Total Maximum Daily Load (TMDL) and Water Quality Management Plan (WQMP) were prepared by the Oregon Department of Environmental Quality (1999). The TMDL identifies water quality limited streams and presents a framework for water quality mangement. The WQMP is a locally-developed plan for water quality management in the upper Grande Ronde subbasin. The TMDL's and WQMP's for the lower Grande Ronde and Wallowa watersheds are in development at this time.
- The Wallowa County/Nez Perce Tribe Salmon Habitat Recovery Plan and Multi-Species Strategy (Wallowa County/Nez Perce Tribe1993). This plan was developed by Wallowa County and the Nez Perce Tribe as a habitat inventory of chinook streams in Wallowa County. The plan was developed by an ad-hoc committee, with representation from the County government, the Nez Perce Tribe, Federal and State agencies, the timber industry, ranching, local businesses, and the environmental community. The Plan was expanded in 1999 to include all terrestrial vertebrate species known to exist or might have existed in Wallowa County in historic times.

- The Bear Creek Action Plan (Grande Ronde Model Watershed, et al, 1994) provided an in depth assessment of Bear Creek, tributary to the Wallowa River. Information from the Wallowa County/Nez Perce Tribe Salmon Habitat Recovery Plan was compared to current Hankin and Reeves methodology stream survey data from the U.S. Forest Service and the Oregon Department of Fish and Wildlife. An analysis of habitat conditions was made and an action plan was developed to correct identified habitat problems. Uncertainties were also identified.
- The Grande Ronde Model; Watershed EDT Planning Project (Mobrand , 1997) was the first application of the Eco-system Diagnosis and Treatment Project on a subbasin scale. Spring chinook were chosen as the indicator species. A committee made up of Federal, State and Tribal employees familiar with fishery management issues in the subbasin developed the list of environmental attributes to be used in determining habitat suitability for the different life stages.
- The Grande Ronde Model Watershed Program contracted with Clearwater BioStudies to develop an assessment of stream and riparian conditions in the Grande Ronde and Imnaha subbasins (Clearwater BioStudies, 1993).
- The Grande Ronde Model Watershed Program (1994) used the information presented in the Clearwater BioStudies Report (1993) to develop the Grande Ronde Model Watershed Program Operations-Action Plan. This plan provides the direction and priorities that the Model Watershed Board uses in their annual planning process.
- The Bureau of Reclamation (1981) produced the Grande Ronde River Basin Appraisal Report. The purpose of the report was to evaluate the potential of enhancing anadromous fish production on the Grande Ronde River and its tributaries. The method used was to evaluate the potential of augmenting seasonal low stream flows through construction of headwater storage and stream improvement structures and protecting and restoring stream bank vegetation. Other potential beneficiaries that were evaluated were irrigation, flood control, water quality, fish and wildlife, and recreation.
- The Bureau of Reclamation (1993) developed the Prairie Creek Watershed Study. The study was initiated as a possible opportunity to enhance water quality and conserve water currently diverted for irrigation from the Wallowa River but not delivered to the farm turnouts due to in-system losses. A portion of the conserved distribution losses would remain in storage behind Wallowa Lake Dam for irrigation supply while a portion of the conserved water would remain in the Wallowa River to provide better spawning and rearing flows.
- Thompson and Haas (1960) surveyed watersheds in the Grande Ronde Subbasin for habitat condition, quantity, and quality for salmon and steelhead. They also reviewed potential hatchery sites.
- Parkhurst (1950) surveyed watersheds in the Grande Ronde Subbasin and reported on habitat conditions for salmon and steelhead.
- Schoning (1947) surveyed the Grande Ronde Subbasin for the presence of fall spawning salmonids.
- Chapman (1940) reported on the presence of salmon and steelhead in various streams in the Grande Ronde Subbasin.
- Evermann and Meek (1898) reported on chinook and sockeye in Wallowa County.

Limiting Factors

The Grande Ronde subbasin is an example of the sensitivity of watersheds in the interior Columbia Basin to human activity. Loss of quality habitat and a loss of connectedness are the over-riding limiting factors to fish and wildlife production in the Grande Ronde subbasin (ODFW et al. 1990, Clearwater Biostudies 1993, NWPPC 1994). Because salmon, steelhead, lamprey, and some trout are migratory fish to varying degrees, intact and healthy habitat is required throughout their life cycle range for healthy populations to exist. For wildlife, habitat loss has restricted the range of many species through fragmentation and isolation, and altered species communities. Furthermore, both migratory fish and wildlife have limiting factors outside the subbasin. For example, neotropical birds need good overwintering habitat; anadromous fish need good passage conditions and estuary rearing habitat.

Two key physical concerns form the context for the analysis of habitat conditions, the limiting factors for fish and wildlife resources, and ultimately the restoration recommendations for the Grande Ronde subbasin. First, historic, recent and current land use practices have altered the hydrologic cycle – the storage, movement, and character of the water resource over entire areas of the Grande Ronde subbasin. Changes in the hydrologic cycle are demonstrated by excessive runoff, altered peak flow regimes, lack of ground water recharge, reduction in soil moisture storage, and low late-season flow. Second, historic and current land uses, in combination with hydrologic changes, have resulted in some portions of the Grande Ronde subbasin reflecting marked stream channel instability (i.e., channel widening, downcutting, vertical cut banks, and excessive gully development). Each of the limiting factors specifically within the Grande Ronde subbasin and highlighted in this report is related in part to the broad-scale problems of hydrology and basin-wide stream channel instability. The actual causes of these conditions in the Grande Ronde subbasin are multiple; therefore, the restoration of stream flows and stream channel stability will require combined action across many land uses and geographic areas in the basin (K. Vandemoer, NMFS, personal communication 2001).

Hydropower System Development and Operations

Development and operation of the Federal Columbia River Power System (FCRPS), which includes 13 mainstem dams used for hydropower, navigation, flood control, and irrigation in the Columbia River basin, resulted in widespread changes in riparian, riverine, and upland habitats. Because of the significant loss of mainstem habitat and habitat function associated with the FCRPS, tributary habitat has become more critical to the survival and recovery of Endangered Species Act listed species throughout the Columbia basin, including in the Grande Ronde River subbasin.

Because of direct and indirect effects of the FCRPS on fish and wildlife habitat, tributary habitat improvements are required as part of off-site mitigation activities of the U.S. Army Corps of Engineers, the Bureau of Reclamation, and the Bonneville Power Administration for continued operation of the system under the Endangered Species Act. These habitat improvement activities were specified in a Biological Opinion issued by the National Marine Fisheries Service in December, 2000, entitled, "Reinitiation of Consultation on Operation of the Federal Columbia River Power System, Including Juvenile Fish transportation program, and 19 Bureau of Reclamation Projects in the Columbia Basin".

Fish Habitat and Production

Limiting factors occur at two levels, regional and local. These are discussed separately below.

Regional Scale: While clearly acknowledged as a problem in the subbasin, regional scale (out-of-subbasin) limiting factors are often difficult to precisely link to a given fish population; they are not discussed in detail in this document but are addressed briefly here. Anadromous fish production in the Grande Ronde River subbasin is limited by two primary factors. Adult escapement of salmon and steelhead is currently being determined by out-of-subbasin issues and is insufficient to fully seed the available habitat. The carrying capacity of the habitat and fish survival have been reduced within the subbasin by land management activities which impact hydrology, sedimentation, habitat distribution and complexity, and water quality (Columbia Basin Fish and Wildlife Authority 1999, Mobrand and Lestelle 1997, Wallowa County and Nez Perce Tribe 1993). It is generally accepted that hydropower development on the lower Snake River and Columbia River is the primary cause of decline of Snake River salmon and steelhead (IDFG 1998, CBFWA 1991, NPPC 1992, NMFS 1995, 1997, NRC 1995, Williams et al. 1996). There is less agreement that the hydropower system is the primary factor limiting recovery (Mamorek and Peters 1998). This limiting factor has the effect of keeping yearly effective population size (N_e) low, increasing genetic risk and demographic risk of localized extinction.
Local Scale: Local scale, in-subbasin, limiting factors are generally easier to link to specific fish populations (
Table 34). A more detailed discussion of in-basin limiting factors is included below. It is important to acknowledge that factors limiting local fish production or survival may differ from those defined across broader scales, and that limiting factors in a given location may vary between species.

Aquatic habitats in the subbasin have undergone both chronic and acute destabilization throughout recent history (McIntosh et al. 1994). Historic improperly managed grazing, mining, logging, stream channelization, riparian clearing, wetlands filling and other developments have all contributed to reduced riparian and stream habitat productivity. Ongoing effects from improperly managed livestock grazing, instream heavy equipment use, road-related activities, and catastrophic floods are responsible for many negative effects to spawning and rearing habitat (Table 35, Bottom et al. 1985). Spring chinook salmon and summer steelhead production is limited primarily by existing spawning and rearing conditions. Land use activities have not only detrimentally affected habitats for fish, but also water quality and quantity, and trophic organization (CRITFC 1995, Wallowa Co. and NPT 1999). These activities act to destabilize natural hydrologic processes and amplify the impacts of natural events such as storms. Riparian habitat degradation is the most serious habitat problem in the subbasin for fish (McIntosh 1992, Wissmar et al 1994, ICBEMP 2000). This loss leads to secondary effects that are equally harmful and limiting, including increased water temperature, low summer flows, excessive winter runoff, and sedimentation (Bottom et al. 1985). Additionally, water withdrawals and channel modification have had serious negative impacts on in-stream and riparian habitats and contribute to problems with temperature and flow. The largest scale impacts to riparian habitat have taken place in the Grande Ronde and Wallowa valleys where most water withdrawals and channel modification occur as a result of agriculture, road construction and flood control.

Table 34. In-basin Factors Limiting VariousLife-history Stages of Resident and Anadromous Fish Populations in the Grande Ronde Subbasin (summarized from Ashe et al. 200; Huntington 1994; Mobrand and Lestelle 1997; Mundy and Witty 1998; Platz 1994; Platz 1998a; Platz 1998b).

Spring/Summer and Fall Chinook					
Location	**AP**[1]	**S&I**[2]	**C&R**[3]	**R&O**[4]	**SM**[5]
Lower Grande Ronde	Temps. May limit late season migration		Temps, hab. Diversity, sediment, chan. Stab.		
Upper Grande Ronde	Temps./flow may limit late season migration	Low flows, high summer temps., shade/canopy	Low flows, high temp., poor habitat diversity		
Wallowa		Low flows, high summer temps., shade/canopy	Low flows, high temp., poor habitat diversity		
Summer Steelhead					
Lower Grande Ronde	Temps>PACFISH & NMFS standards: sediment/mainstem below 9 Points Creek	Temps>PACFISH & NMFS standards	Temps, hab. Diversity, sediment, chan. Stab.		
Upper Grande Ronde		Sediment	Low flows, high temp., poor habitat diversity		
Wallowa		Sediment	Low flows, high temp., poor habitat diversity		
Bull Trout					
Lower Grande Ronde			Flows temp		
Upper Grande Ronde	Lookingglass need improved passage		Flows temp sediment		
Wallowa	Low flows Hurricane Bear, Alder Slope diversion (Hurricane Creek)		Flows temp sediment		

[1] AP=Adult Passage; [2] S&I=Spawning and Incubation; [3] C&R=Colonization and summer Rearing; [4] R&O=fall Redistribution and Overwintering; [5] SM=Smolt Migration

In some cases, research and/or monitoring has not been completed in order to determine the limiting factors for specific populations (i.e data on adult steelhead spawner abundance; (SAR's).

Table 35. Detrimental Effects of Land Use Activities on Fish Habitat and Water Quality (CRITFC 1995).

Detrimental Effects	Land Use Activity
Channel cross sectioning (*increase*)	Grazing, Logging
Surface fines (*increase*)	Grazing, Logging, Road building, Mining, Agriculture
Cobble embededness (*increase*)	Grazing, Logging, Road building, Mining, Agriculture
Water temperature (*increase*)	Grazing, Logging, Road building, Agriculture
Organic pollution (*increase*)	Grazing, Agriculture
Inorganic pollution (*increase*)	Mining, Agriculture
Runoff (*increase*)	Grazing, Logging, Agriculture, Urban development
Wetland destruction (*increase*)	Grazing, Agriculture
Migration problems (*increase*)	Agriculture
Migration blockages (*increase*)	Road building
Peak flow (*increase*)	Road building
Mass failure and surface erosion (*increase*)	Road building
Bank stability (*decrease*)	Grazing
Riparian vegetation (*decrease*)	Grazing, Logging, Agriculture
Pool volume (*decrease*)	Grazing, Logging, Road building, Mining, Agriculture
Groundwater base flow (*decrease*)	Grazing, Logging, Road building, Agriculture
Large woody debris (*decrease*)	Logging
Summer low flow (*decrease*)	Agriculture

Riparian Habitat Loss

Approximately 379 degraded stream miles have been identified in the Grande Ronde subbasin (ODFW et al. 1990). Plentiful riparian cover along streambanks is a vital part of a healthy watershed, providing multiple benefits in the form of nutrient cycling, shading and cover, bank stability, water storage, and filtration and retention (Bottom et al. 1985, Wissmar et al. 1994). Riparian vegetation also hosts various insect species for the aquatic food chain. Loss of riparian cover leads to accelerated surface runoff and erosion, which in turn leads to siltation of spawning beds. Loss of riparian areas increases solar insolation, elevating water temperatures in summer, or reducing the tempering of water temperature in winter. Cumulative losses of habitat complexity can make fish populations more vulnerable to flash floods (Li et al. 1994). Loss of riparian cover potentially exposes spawning adults and rearing juveniles to predation and disturbance (Federal Caucus 2000).

When riparian vegetation is lost, channel structure becomes more simple as inputs of large woody debris and their influence on channel structure are diminished, affecting instream habitat (Li et al.1994).

Sedimentation

Fine sediment in spawning substrate has a major effect on salmon survival from egg to smolt (Rhodes et al. 2000). As silt settles into coarse gravels, spawning habitat is eliminated and eggs are suffocated by reduced water and oxygen flow. Sedimentation increases temperature and reduces dissolved oxygen concentrations (Federal Caucus 2000) and is abrasive to gill tissue. High turbidity can delay adult migration and interferes with foraging by fish that rely on sight, including salmonids (Bottom et al. 1985)

Flows

Peak flows from increased, unretained runoff scour redds and dislodge eggs or alevins. Low summer streamflows also occur in many of the streams in the Grande Ronde Subbasin, primarily as a combined result of water rights uses and degraded channels. In some mid-elevation tributaries and streams, irrigation affects migration and rearing for spring chinook salmon. Irrigation withdrawals in higher elevation streams limit spawning and early rearing. Lack of flow interferes with movement, spawning, and rearing of salmon, steelhead, and trout and significantly impairs habitat productivity and causes stream intermittency (Bottom et al. 1985). Studies suggest that minimum water depth for passage by chinook salmon is 9 in. (Hall 1994). Lack of adequate water depth reduces the connectivity between aquatic systems, impeding passage to traditional chinook salmon spawning grounds, affecting rearing of juvenile steelhead, and impacting all life stages of redband and bull trout. Low flows also reduce the depth of pools used for holding adults and rearing juveniles. Low summer flows also have the effect of concentrating pollutants (phosphates, nitrogen), which can be hazardous to aquatic health.

Temperature

Low flows, reduced riparian cover, and sedimentation also elevate water temperature, considered one of the most important habitat factors in the subbasin endangering salmonids and the top impairment to water quality (Li et al. 2000). Overgrazing on riparian vegetation increases the amount of insolation reaching streams, resulting in cumulative increases in stream temperatures downstream (ODEQ 1999). Water quality problems related to temperature are found in all major subbasin watersheds. The preferred temperature range for salmonids is between 45° - 60° F, with bull trout preferring colder temperatures (Oregon Plan, Monitoring Protocol). Generally, temperature above 64°F is beyond the thermal threshold of cold-water salmonids (Table 2). Elevated temperature increases metabolic rate, increases the risk of disease, reduces dissolved oxygen, and affects behavior patterns (Oregon Plan, Monitoring Protocol), all of which impose high metabolic costs and impair survival (ODEQ 1999). High water temperatures in the mainstem tributaries (Grande Ronde River above Elgin, Catherine Creek near Union, Lower Joseph Creek) limit salmonid production and force salmonids to limited cold-water refugia. Low flows and high water temperatures have reduced the historic range of spawning and rearing habitat and contribute to spring chinook pre-spawning mortality. Increased temperatures also interfere with the ability of juvenile salmon to achieve smoltification. Mid-summer temperatures have been recorded above 70°F in many tributary systems (ODEQ data; Table 3, Table 4, Table 5; Figure 6).

Instream Habitat Loss

Loss of instream habitat and habitat diversity limits salmonid production. Improperly managed livestock grazing in riparian areas has led to entrenchment of streams or wider and shallower channels, reducing or destroying in-stream habitat necessary for spawning and rearing. Human-caused channelization has eliminated floodplains and wetlands and reduced channel complexity, eliminating rearing habitat for juveniles and disconnecting floodplains with the stream. For example, the State Ditch was constructed in the Grande Ronde Valley in the late 1800's as a flood control cut-off channel but, according to Thompson and Haas (1960), when the channel captured the entire Grande Ronde River it reduced the stream distance by 29 miles. A reduction in beaver populations has also limited their contribution to forming wetland and riparian habitat (Wissmar et al 1994). Reduced riparian areas also limit woody debris in streams, diminishing pool quality and frequency, which are important for holding adults and rearing juveniles. Spawning habitat was destroyed in portions of the upper Grande Ronde River above Starkey by gold dredging in years past as stream channel hydrology was altered, preferred gravels displaced, and riparian vegetation eliminated (McIntosh et al. 1994). Past splash damming in some streams (e.g.: Minam river, upper Grande Ronde River, Meadow Creek) also dramatically altered habitat (Farnell 1979). Streamside vegetation and rocks were removed to allow construction of splash dams and the intense scouring caused by their use removed preferred gravels and virtually all structural components in the stream. Loss of floodplains and wetlands has eliminated rearing areas for juveniles. Loss of instream habitat also increases vulnerability to predation (Federal Caucus 2000).

Passage Barriers and Irrigation

Common irrigation practices can present passage barriers to migrating salmonids within the Grande Ronde subbasin (ODFW et al 1990; OWRD 1993). Push-up dams, less common now than historically, greatly restrict passage, both for upstream and downstream migrations if not properly constructed. Although all diversions within spring chinook salmon range in the subbasin meet NMFS specifications for screening, some in steelhead range do not. This may result in impingement or entrainment of rearing or migrating juvenile steelhead. There is little screening in non-anadromous streams in the subbasin. Wallowa Lake Dam and Upper Alder Slope Diversion are significant barriers to fish passage. The barrier presented by Wallowa Lake Dam precluded reestablishment of sockeye salmon after their extirpation from the system. Other passage barriers include thermal or flow barriers, and impassable culverts, which restrict or limit movement of fish. Irrigation withdrawals can "dewater" sections of streams precluding passage and impairing water quality. Overland return flows from irrigation systems can warm streams, contribute to high levels of fecal coliform, and in some instances load them with silt.

Introduced Species

The Grande Ronde River system hosts a complex of introduced species (Table 11). Although the impacts of these species on native communities are largely undocumented, they likely have a negative effect. Direct impacts may be through predation, competition, disease vector, or interbreeding. Brook trout, a species introduced to many lakes and streams, may interbreed with bull trout, a Threatened species and produce sterile offspring. Lake Trout, introduced to Wallowa Lake, prey on native kokanee in the lake.

The past introduction of lake trout and subsequently *mysis* shrimp to Wallowa Lake may have consequences for the native kokanee population and for potential reintroduction of sockeye. In a number of Northwest lakes the combination of lake trout and *mysis* shrimp introductions has led to ecological changes and severe reduction in kokanee population productivity. In some cases kokanee populations have been eliminated.

Recent changes in key population indicators suggest Wallowa Lake's kokanee population may be incurring similar impacts from those introductions. Over the past few years average size of kokanee caught in the fishery increased while catch rate declined. These factors indicate fewer kokanee in the lake. If survival of juvenile kokanee in the lake is being affected by *mysis* shrimp or lake trout, similar impacts could be expected for naturally produced sockeye. A better understanding of the current ecology of the lake is needed in order to make informed decisions regarding the potential success of sockeye introduction to the system.

Numerous introduced species occur near the mouth of the Grande Ronde River. Several of these introduced warm-water species are documented to be significant predators on juvenile salmonids in other areas of the Columbia Basin. More complete information regarding these species, their distribution and abundance, and their interactions with listed salmonids is needed in the lower Grande Ronde River.

Reduction in Salmon Escapement

Salmon provide enrichment to natal streams and the adjacent terrestrial environment through both direct consumption of carcasses and through decomposition. Salmon carcasses may be essential to the health of both aquatic and terrestrial systems. Salmon transport marine nutrients to natal streams, and deposit those nutrients as carcasses when they die. Salmon carcasses have been shown to increase production at several trophic levels in streams, including: periphyton production (Foggin and McClelland 1983; Kline et al. 1993; Schuldt and Hershey 1995), invertebrate production (Schuldt and Hershey 1995; Wipfli et al. 1998), and fish production (Bilby et al 1996; and Bilby et al. 1998). Nutrients from salmon are available through direct consumption by invertebrates, juvenile salmonids, and terrestrial animals or as dissolved nutrients following decomposition. Reductions in salmon biomass in natal streams may limit production at one or more trophic levels.

Salmon carcasses may be an essential source of nutrients for both aquatic and terrestrial communities. Willson and Halupka (1995) note that the availability of anadromous fish may be a critical factor in the survival and reproduction of some wildlife species. They note that wildlife species may change their distribution and breeding biology to capitalize on the abundance of anadromous fish. In addition, Cederholm (1989) described 22 species of mammals and birds that consumed coho salmon carcasses. As a result of declines in salmon biomass, salmonid populations may be experiencing a negative nutrient feedback loop. Larkin and Slaney (1997) describe the potential for a negative feedback loop from loss of salmon carcasses that could have significant impacts on the production of several fish species. Larkin and Slaney (1997) also state that in streams with small salmon escapements, stocks already in decline are likely to decrease further in a negative feedback loop.

Dissolved nutrients from the decomposition of salmon carcasses are also available for stream and riparian plant production. Bilby et al. (1996) noted that approximately 17% of the nitrogen in riparian vegetation on a coastal coho stream originated from salmon carcasses. Based on limited nutrient monitoring data, some stream reaches in those tributaries of the Grande Ronde subbasin that originate in the Wallowa Mountains (e.g., upper Lostine River, upper Minam River) may be oligotrophic and production may be limited by this factor. There are, however, other reaches (e.g., Grande Ronde River below La Grande, Catherine Creek below Union) where the opposite condition – eutrophication – is well documented and is a result of human-caused nutrient (nitrogen and phosphorus) pollution (DEQ 2000). Eutrophication results in excessive primary production and violations of water quality standards for dissolved oxygen and pH and may limit fish spawning and rearing in those stream reaches. Upstream of those reaches, in the upper Grande Ronde River and tributaries originating in the Blue Mountains, there is no evidence to date that low phosphorus concentration is limiting primary or secondary production. When other factors, such as temperature and habitat, are not limiting, macroinvertebrate production appears to be robust (DEQ 1998). While there may be other benefits of fish carcasses (e.g., to terrestrial wildlife), there does not appear to be a need for increased phosphorus. There is, in fact, a demonstrated need to reduce human contributed nitrogen and phosphorus in much of the Grande Ronde drainage above the confluence with the Wallowa River (DEQ 2000).

Hatchery/Natural Interaction

Hatcheries play a significant role in meeting social and recovery goals of the Blue Mountain Province. Co-mangers have restructured Grande Ronde spring chinook programs to support recovery (ODFW 1996, see *Artificial Production*). The general body of science regarding hatcheries as recovery tools suggest that natural spawning by hatchery fish can provide benefits as well as pose risks to wild populations (IMST 2001, ISAB 2001, and Brannon 2001). It is clear that hatcheries can provide a production boost for a host population, potentially preserving a population or rescuing it from a production bottleneck. The risks hatchery intervention poses to wild populations tend to be site specific and include management associated (i.e. over-harvest of weak stocks in mixed stock fisheries), genetic (i.e. outbreeding depression) and ecological impacts (i.e. increased competition). Given the current state of our knowledge of these benefits and risks, hatchery programs should be used appropriately considering site-specific needs to insure recovery goals are achieved. NMFS (2000a &b) [section 10 permits] concluded that the artificial propagation program in the Grande Ronde subbasin is appropriate for enhancement of Grande Ronde stocks and is not likely to jeopardize the continued existence of listed Snake River spring/summer chinook salmon.

Wildlife Habitat and Production

In support of the Interior Columbia Basin Ecosystem Management Project (ICBEMP), Wisdom et al. (1994) analyzed habitat change and road associated affects on selected terrestrial vertebrate species in the Interior Columbia Basin. They concluded that changes in terrestrial habitats and disturbances since European settlement have had the most significant effects on terrestrial vertebrates. The most important changes are dramatic shifts in fire regimes; reductions in area of native grassland, shrublands and wetlands; declines in early and late seral stages of forest development; degradation of riparian habitats and increases in road density (Hann et al. 1997, Quigley et al. 1996, USDA Forest Service 1996).

Loss and degradation of terrestrial habitats limits wildlife abundance and diversity in a variety of ways. Habitat conversion and/or invasion by noxious weeds may reduce quality and availability of forage, thus affecting the nutritional condition of wildlife. Changes in forest successional stage availability may have a negative impact on wildlife breeding, denning, and thermal cover. Increasing road density may result in direct mortality (collisions, hunting), indirect disturbance, and interruption of migration routes all of which limit survival and reproduction. Limiting factors for terrestrial and semi-aquatic wildlife include:

Loss of Classified Wetland Function

Functioning wetlands of all kinds are important to the natural hydrology of an area. They store and release water in ways that dampen the effects of flooding and reduce erosion. Wetlands also support diverse communities of plants and terrestrial wildlife as well as contributing to the quality of aquatic habitats. Classified wetlands can be divided into three categories:

Wet Meadows: Wet meadows and emergent wetlands such as those found near Prairie Creek and Ladd Marsh were once relatively common throughout the subbasin. The historic Tule Lake, remnants of which can be found in the Ladd Marsh Wildlife Area, covered nearly 20,000 acres of the Grande Ronde Valley before it was drained for agricultural use. These wetland areas served an important function in the hydrology of the area by collecting and filtering water for slow release into the system. Beavers were an integral part of these wetland systems; beaver dams created a succession of wetland types from open water ponds to wet meadows. Wetlands are also home to large and diverse populations of wildlife including shorebirds, waterfowl, raptors, mustelids and amphibians. Wet meadows and emergent wetlands were lost or degraded by conversion to agriculture, road building, livestock introduction and removal of beavers.

Deciduous Riparian Areas: These bench wetlands in the foothills of the Wallowa and Blue mountains were historically abundant in areas such as Alder Slope near Enterprise, Oregon. Deciduous riparian areas perform a water storage function, allowing for slow release and dampening the affect of heavy rains and snow melt. This habitat type also serves a variety of wildlife functions including winter range for large ungulates and nesting for resident and neotropical land birds. This wetland type has been drained and cleared for agricultural use, primarily pasture.

Riverine Deciduous: Riverine deciduous wetland and riparian areas were historically found adjacent to all major stream courses in the subbasin including the Grande Ronde, Minam, Wallowa and Wenaha rivers. These areas store water, dampen the effects of high water and help prevent erosion. Their functions for terrestrial wildlife include winter range for large ungulates; breeding areas for neotropical migrant birds; habitat for all life stages of resident land birds; waterfowl nesting; and food, cover and reproduction for a wide array of mammals, reptiles and amphibians. Riverine wetland and riparian areas also provide habitat for anadromous and resident fish by shading streams and serving as sources of woody debris and other structural components as well as insects for the aquatic food chain. These areas have been lost or degraded through conversion to agriculture, grazing, flood control efforts and construction of large transportation corridors.

Loss of Low Elevation Ponderosa Pine Habitat

Low-elevation Ponderosa Pine (*Pinus ponderosa*) forests were once common on the gentle slopes of the mountain foothills. These forests are the interface between forested and non-forested areas and are home to many species that utilize the grass- and shrub-lands downslope or the forested habitats at higher elevation. These areas are important winter range for large mammals. Species associated with this habitat type by Wisdom et al. (2000) include the white-headed woodpecker, white-breasted nuthatch, pygmy nuthatch and migratory populations of Lewis' woodpecker. The primary causes for decline in old-forest habitats are intensive timber harvest and large-scale fire exclusion (Hann et al. 1997). Development increasingly encroaches on remaining low-elevation forests, as well.

Factors Associated with Roads

Wisdom et al. (2000) identified 13 factors associated with roads that have a negative impact on terrestrial wildlife. The effect of roads may be direct, such as habitat loss or fragmentation (Miller et al. 1996, Reed et al. 1996), or indirect, such as population displacement or avoidance of areas near roads (Mader 1984). The road-associated factors identified in Wisdom et al. (2000) are: snag reduction; down log reduction; habitat loss and fragmentation; negative edge effects; over-hunting; over-trapping; poaching; collection; harassment or disturbance at specific use sites; collisions; movement barrier; displacement or avoidance and chronic, negative interactions with humans. The effects of these factors and references are given in Wisdom et al. (2000, p113). The same authors suggest that mitigating the negative effects of road-associated factors may be more challenging than restoring habitats degraded in other ways.

Loss of Native Prairie Habitats

Native prairie was formerly common in the subbasin, especially in the northeast where Zumwalt Prairie is located. Zumwalt Prairie is North America's largest remaining expanse of native bunchgrass prairie but it is a remnant of what once existed. Zumwalt Prairie is almost entirely in private ownership and only the nearly 27,000-acre Zumwalt Prairie Preserve (TNC) is protected. Native prairies are important for native ungulates and provide the sole habitat for species such as sharp-tail grouse, long-billed curlews and burrowing owls. Native prairie habitats throughout the subbasin have been lost or degraded due to excessive livestock grazing, fire suppression, road building, urbanization and conversion to agriculture (Wisdom et al. 2000).

Loss of Nutrients

Cederholm et al. (2001) present the many diverse relationships between Pacific salmon and terrestrial wildlife. Many species, such as bald eagles and black bears, directly consume salmon carcasses. Others may benefit from concentrations of invertebrates consuming carcasses. The entire system benefits in some way from the influx of nutrients in salmon carcasses as they become incorporated into both aquatic and terrestrial plants and animals. This once significant source of nutrients from outside the subbasin has been markedly diminished with the decline of anadromous fish runs. This reduction in nutrients likely limits productivity in many areas of the subbasin.

Introduced Species

As described in *Subbasin Description-Noxious Weeds*, invasive species in general are considered number two among threats to biodiversity. Noxious weeds present one of the greatest present threats in the Grande Ronde subbasin. Their spread in some areas is exponential with new areas of infestation discovered frequently (M. Porter, Wallowa Resources, personal communication). Further, funding for weed control programs has fallen during the last decade (ODA 2001) creating a situation where decreasing resources are fighting an increasing invasion. Noxious weeds limit the productivity of rangelands and reduce forage available to wildlife.

Introduced fauna also threaten biodiversity in the subbasin. Livestock compete with native wildlife for forage and cover and, especially in the case of domestic sheep, can be a vector for devastating diseases. It is thought that disease spread by domestic sheep and goats was most responsible for the extirpation of Rocky Mountain bighorn sheep in the subbasin (V. Coggins, personal communication).

Loss of Other Old-Growth Forested Habitats

Old-growth was estimated as 35-40% of historic eastside forests but now accounts for less than 5% of the Wallowa Whitman National Forest (Henjum et al. 1994). Old-growth forests, other than low-elevation Ponderosa Pine, provide structurally complex habitats important to a broad range of species including northern goshawk, American marten, fisher, blue grouse, great gray owl and winter wren (Henjum et al 1994). The primary causes for decline in old-forest habitats are intensive timber harvest and fire exclusion (Henjum et al. 1994).

Loss of Habitat Diversity

Many terrestrial species, including invertebrates, thrive in a complex of habitats with different types providing food, cover and breeding areas. Habitat diversity is diminished when aspen stands, shrub thickets and small wetlands are destroyed during timber harvest or development. Grazing can also reduce diversity on rangelands by favoring species more adapted to prolonged grazing pressure. Noxious weed infestations can reduce vegetation to a monoculture as weeds out-compete native plants.

Artificial Production

Three hatchery initiatives are currently under way in the Grande Ronde: The Lower Snake River Compensation Plan (LSRCP), Northeast Oregon Hatchery Program (NEOH), and the Grande Ronde Endemic Supplementation Program (GRESP). Each of these is described below.

The LSRCP was authorized by Congress in 1976 to mitigate for losses of chinook salmon and steelhead resulting from construction of dams in the lower Snake River (Herrig 1998). Hatchery and satellite facilities were developed under LSRCP to provide “in-kind, in-place” mitigation for lost chinook and steelhead production. The program is administered by US Fish and Wildlife Service (USFWS) and was expected to provide adult returns for sport and tribal harvest, hatchery broodstocks, and supplementation of natural production. LSRCP has provided harvestable returns of adult hatchery steelhead, but has not met expectations for adult chinook returns or enhancement of natural production of chinook or steelhead (Herrig 1998). A summary of the LSRCP program through 2000 is attached as Appendix E.

The NEOH program was included in Section 700 of the 1987 amendment to the Columbia River Basin Fish and Wildlife Program. NEOH was intended provide additional hatchery facilities and contribute to NPPC's doubling goal for adult returns to the Columbia River Basin (NPPC 1987). NEOH focused on spring chinook production in the Hood, Walla Walla, Grande Ronde and Imnaha basins but is not strictly limited to spring chinook. It also includes potential fall chinook salmon production in the Grande Ronde subbasin. It called for development of master plans to outline construction, operation, and management of additional production and release facilities to supplement natural production in the target basins. Plans are to be developed cooperatively by fish and wildlife agencies and tribes.

The Hood River program has developed independently and is currently being implemented. The Walla Walla program is currently under development.

The LSRCP and NEOH programs have been integrated together in the Grande Ronde subbasin and have been undergoing many changes since their respective inceptions. ESA listings, continued declines in natural production, poor performance of hatchery programs (especially for spring chinook), and increasing concerns about hatchery/wild interactions have contributed to changes in hatchery mitigation programs. Although agencies and tribes are continuing to pursue mitigation goals in the long-term, they are placing increasing short-term emphasis on use of hatcheries for conservation and recovery of ESA listed species.

The GRESP for spring chinook salmon reflects this shift in emphasis from a mitigation program to a conservation and recovery program. The LSRCP program in the Grande Ronde basin began in the early 1980's and used non-endemic Carson Hatchery and Rapid River Hatchery spring chinook. Concerns about the potential effects of interactions between non-endemic hatchery chinook and naturally produced chinook in the basin led to a dispute among comanagers about use of the Rapid River stock for supplementation. An independent scientific panel (ISP) was convened under US v. OR to resolve this dispute. As a result of recommendations from the ISP (Currens et al. 1996) and negotiations among comanagers, a program was initiated to develop endemic spring chinook broodstocks from the upper Grande Ronde River, Catherine Creek, and Lostine River. The GRESP, has captive broodstock and conventional supplementation components. Collections of juveniles for the captive component of the program began as an emergency measure in 1995 and continued under a plan described in the ESA Section 10 application for the captive broodstock program (ODFW 1996). Collection of adults for the conventional component began in 1997. These two programs are integrated with the captive brood portion serving in an experimental production role while the conventional production portion provides a production backbone.

The shift from one non-endemic stock to three endemic stocks requires additional facilities for adult collection, smolt acclimation, and for managing the three stocks at Lookingglass Hatchery. Funding from NEOH has allowed for the planning, construction, and operation of the additional adult collection and smolt acclimation facilities.

Facilities presently in use for artificial production and rearing of spring chinook salmon for the Grande Ronde River subbasin are Lookingglass Hatchery, near Elgin, Oregon, used for early captive brood rearing, and final rearing of juveniles; Bonneville

Hatchery, near Cascade Locks, Oregon, used for captive brood rearing, spawning, egg incubation and early rearing; Irrigon Hatchery, used for egg incubation and early rearing; Manchester Marine Laboratory on Clam Bay in Puget sound, used for captive brood rearing; and adult collection andacclimation facilities on Catherine Creek and the upper Grande Ronde and Lostine rivers. Although Lookingglass Hatchery was originally intended as the incubation and rearing facility for all the Grande Ronde stocks conventional and captive broodstock production, due to facility limitations, equipment failure and malfunction all eggs are shipped to Oxbow Hatchery or Irrigon Hatchery for incubation and early rearing of juveniles. In addition, production of each of the stocks has been reduced to fit current facility limitations. To alleviate the burden at Lookingglass Hatchery the Nez Perce Tribe proposed new production facilities and modifications at Lookingglass in the Grande Ronde and Imnaha Spring Chinook Master Plan submitted to the NPPC in April, 2000. The NPPC approved the master plan and authorized preliminary design and NEPA analysis of the proposed alternative in September 2000.

The co-managers are currently working with Montgomery Watson to develop and design new facilities and modifications to Lookingglass to fully implement the spring chinook programs for the Grande Ronde and Imnaha subbasins.

The first juveniles released from the GRESP were brood year 1997 smolts released into the Lostine River in 1999 followed by brood year 1998 smolts released in 2000 into Catherine Creek and the Lostine and upper Grande Ronde Rivers. The ODFW has prepared a Hatchery and Genetics Management Plan (HGMP) for Grande Ronde subbasin spring chinook salmon at the direction of NMFS. Although it is illustrative of the program, this is not a consensus document; it was prepared by ODFW without input from comanagers. A memo from ODFW to the USFWS describing the Grande Ronde HGMPs is attached as Appendix B. The HGMP for spring chinook salmon is attached as Appendix C.

Agencies and tribes are reviewing how to modify LSRCP Wallowa Hatchery summer steelhead broodstocks for mitigation and enhancement programs in the Grande Ronde basin. The Wallowa Hatchery stock is a Snake River conglomerate stock (Wallowa stock) used by both Oregon and Washington. The LSRCP steelhead programs in Oregon and Washington portions of the Grande Ronde basin have been successful in reestablishing sport and tribal fisheries (Herrig 1998). It is important, however, to insure that the existing Wallowa and Lyons Ferry hatchery programs do not place wild stocks in jeopardy. Co-managers of the Grande Ronde basin will be working to redevelop hatchery broodstocks and programs as necessary to meet natural production and harvest augmentation objectives and meet NMFS requirements. This effort will require a thorough review of available information on steelhead status and stock structure in the basin as well as a review of existing and needed facilities for endemic steelhead programs.

Facilities presently in use for the Grande Ronde subbasin summer steelhead program are Wallowa Hatchery near Wallowa, Oregon, used for adult collection, holding and spawning; Big Canyon acclimation facility near Minam, Oregon, for adult collection and holding and acclimation; and Irrigon Hatchery, near Irrigon, Oregon, for rearing, and Cottonwood acclimation facility, a short distance downstream of the Oregon border, for rearing. Historically, Wallowa stock production has targeted 1.6M smolts released into the Wallowa River, Catherine Creek, upper Grande Ronde River and lower Grande Ronde

River. Wallowa stock releases have been reduced to 890,000 smolts in Oregon and 200,000 in Washington (at Cottonwood). These programs may be further reduced in the future. The ODFW has prepared a Hatchery and Genetics Management Plan (HGMP) for Grande Ronde subbasin summer steelhead at the direction of NMFS. Although it is illustrative of the program and its past direction, this is not a consensus document; it was prepared by ODFW without input from comanagers. The HGMP is attached, as Appendix D. Future hatchery planning will focus on maintaining wild steelhead productivity, addressing listed species impacts and maintaining harvest opportunity.

Existing and Past Efforts

Grande Ronde Model Watershed Program

Many agencies, two Indian tribes, and numerous individuals and landowners have been actively restoring fish and wildlife habitats in the Grande Ronde Basin for many years. These efforts accelerated following the Endangered Species Act (ESA) listing of Snake River spring chinook salmon in the Grande Ronde Basin in 1992. The Grande Ronde Model Watershed Program (GRMWP) was selected at that time by the Northwest Power Planning Council to be the coordinating entity for watershed and habitat restoration. The State of Oregon became very active in 1994 with the formulation of the Oregon Watershed Health Program, which allocated over three million dollars to over 100 habitat restoration projects. The GRMWP has facilitated the implementation of nearly 300 restoration projects.

The GRMWP maintains a database of all habitat restoration projects and associated activities implemented in the Grande Ronde Basin from 1985 to present excluding NRCS and FSA projects. The following is a summary of on-the-ground restoration work completed during this period by all agencies for which there are records:

- 253 miles and 4,855 acres benefitted by riparian work (exclosure fencing, planting, etc.)
- 193 miles of in-channel restoration work including 2,602 structures (weirs, barbs, etc.)
- 31 project loctions addressing fish passage problems (road culverts, irrigation diversion structures, etc.)
- 26 stream crossing improvement projects (43 structures)
- 17 irrigation diversion improvements
- 323 miles of livestock exclosure fencing
- 183 miles of pasture fencing
- 398 off-stream livestock water developments
- 32,468 acres of upland vegetation enhancement/improvement (plantings, fencing, noxious weed treatment, tree thinning, etc.)
- 356 miles of road closures
- 332 miles of road obliteration
- 359 miles of road improvements (drainage, erosion control, etc.)

This summary does not include research activities, habitat and species surveys or the many projects that private landowners have implemented without agency or other assistance. Table 36contains a listing of projects completed in 1999 to serve as an example.

Table 36. Grande Ronde Subbasin Watershed Restoration Projects, 1999 (GRMWP database).

Organization(s). Lead in bold	**Project Name**	**Brief Description**	**Location**
CTUIR, DEQ, EPA, Contractor	The Grande Ronde Watershed History	Compilation of historic information from 1880's to present	Upper Grande Ronde River subbasin
DEQ, Contractor, Landowner	Forkan riparian buffer plantings	Streambank planting of trees and shrubs	Old Grande Ronde channel
DEQ, BPA, EPA, USFS	Grande Ronde River Basin Temperature Assessment	Collect/analyze stream temp. data at 46 sites using FLIR	Grande Ronde subbasin
DEQ, contractor, landowner	Tromp van Holst Riparian Plantings	Riparian plantings	Grande Ronde River near Imbler
FSA/NRCS/SWCD, ODF, landowner	Cricket Flat CREP-Baum Trust	Riparian planting, 15 yr CREP lease	Unnamed tributary to Grande Ronde
GWEB, ODFW, landowner	Upper Dry Creek road Rehab. & Riparian	Road obliteration, road improvement, exclosure fencing, livestock water	Dry Creek, rm 8-9
NPT	Precious Lands WMA fencing	Boundary fence to exclude cattle	Joseph Creek watershed
NPT, EPA, OWEB	Wter Quality Monitoring of NPT Property in Oregon	Monitor water quality & quantitysurvey stream channels, fish, macroinverts.	Joseph Cr. & Tamarack Cr. & tribs
NRCS/SWCD, BOR, GWEB, landowner(s)	Attebury Irrigation Improvement	Convert from flood to sprinkler irrigation	Poley Allen Ditch/Lostine R.
NRCS/SWCD, GWEB, OSUE, landowner(s)	Bakke Meadows Wetalnd Restoration	Wetalnd restoration; pasture fence, plantings	Headwaters of Tope Cr.
NRCS/SWCD,BPA, OWEB, landowner(s)	Bruce Rynearson/Dobbin Ditch	Ditch exclosure fence, plantings, bank stabilization	Dobbin Ditch
NRCS/SWCD, BPA, landowner(s)	Catherine Cr. Shelden/Sheehy Irrigation Improvements	Rock barbs, riparian exclusion fence, convert/improve irrigation	Catherine Cr. below Union

Organization(s). Lead in bold	**Project Name**	**Brief Description**	**Location**
NRCS/SWCD, FSA, landowner(s)	Crow Cr. Enhancement	Riparian exclosure fence, livestock water develop.	
NRCS/SWCD,OWEB, landowner(s)	Gomes Fence and Spring Development	Cross Fencing, livestock water dev.	Tribs of Catherine Creek NE of Union
NRCS/SWCD, GWEB, landowner(s)	Gordon Cr./Fruitts Streambank Stabilization & Enhancement	Rock barbs, riparian exclosure, plantings	Gordon Cr. north of Elgin
NRCS/SWCD, BPA, landowner(s)	Grande Ronde River / Dick Parsons Streambank Stabilization & Enhancement	Rock barbs, riparian exclosure, plantings	Grande Ronde R. north of Elgin
NRCS/SWCD, GWEB, USFWS, landowner(s)	Grande Ronde River / Hardy Riparian Enhancement	Riparian exclosure, livestock water developments	Grande Ronde R. ~ RM 90
NRCS/SWCDBOR, GWEB, landowner(s)	Larabee Irrigation Improvement	Convert from flood to sprinkler	Westside & Poley Allen Ditches, Lostine
NRCS/SWCD, GWEB, ODFW, landowner(s)	Loren Fleet Dike Setback & Wetland Restoration	Relocate dike, riparian planting	Catherine Cr. (old Grande Ronde River channel)
NRCS/SWCD, FSA, landowner(s)	Lostine River Tributary Enhancement	Riparian exclosure, plantings, livestock water development	unnamed trib to Lostine River
NRCS/SWCD, GWEB, landowner(s)	Lostine River / Bill Norman Riparian Enhancement	Riparian exclosure, rock barbs, root wads	Lostine River south of Lostine
NRCS/SWCD, BOR, BPA, FSA, GWEB, landowner(s)	Lower Leap Riparian & Rangeland Improvement	Crossfencing, livestock water, pond fencing	Trout Creek
NRCS/SWCD, GWEB, landowner(s)	Mainstem Grande Ronde / Fleet Streambank Stabilization and Enhancement	Rock barbs, riparian exclosure, planting	Grande Ronde River east of Alicel
NRCS/SWCD, GWEB, landowner(s)	McArtor / Wallowa River Riparian Improvement	Riparian exclosure, plantings, livestock water	Wallowa River, 2.5 mi. SE of Lostine
NRCS/SWCD, GEB landowner(s)	McClure Riparian Enhancement	Riparian exclosure, planting, livestock water, pond construction	Unnamed trib. of GRR, NE of Elgin
NRCS/SWCD, FSA	Poley Allen Ditch / Wetalnd Enhancement	Ditch/wetland exclosure, livestock water	Poley Allen Ditch / Lostine River
NRCS/SWCD, BPA, landowner(s)	Prairie Cr. Streambank Protection	Riparian fence, juniper riprap, rock barbs	Prairie Cr. ~ 2.5 mi. above Wallowa River

Organization(s). Lead in bold	Project Name	Brief Description	Location
NRCS/SWCD, BPA, landowner(s)	R-Y Timber Range Management System	Livestock water, fencing, road improvements, cattle guards	Bear Cr. & Little Bear Cr.
NRCS/SWCD, BPA, OWEB, landowner(s)	Wallowa County Direct Seeding Demonstration	Demonstrate application of direct seeding	Wallowa County, representative crop areas
NRCS/SWCD/USFS, BPA, CTUIR, NFWF, ODFW, landowner(s)	Grande Ronde Mainstem Fish Habitat Enhancement-Phase I	structure placement, streambank treatment, channel reconstruction, riparian planting, exclusion fencing, noxious weed control, other	upper Grande Ronde R., Bear Cr. to Bird Track Springs
ODA, GWEB landowner(s)	Hull Lane Streambank Protection	Reshape & stabilize bank, rock barbs, relocate dike	Grande Ronde R., east of Imbler
ODF, SWCD, GWEB, contractor, landowner(s)	Rock Creek Sediment Reduction & Road Rehab.	Relocate road from drawbottom	Trib to Dry Creek NW of Wallowa
ODFW, BPA, ODF, landowner(s)	Eaton Creek Fish Habitat	Land/stream lease, exclosure fence, woody material placement	Eaton Cr., trib to Tie Cr. / Fivepoints Cr.
ODFW, BPA, landowner(s)	Grande Ronde River Fish Habitat	Land/stream lease, riparian exclosure	Grande Ronde River
ODFW, landowner(s)	Lostine River Fence	Riparian exclosure	Lostine River
ODFW, BPA, landowner(s)	Whiskey Creek Fish Habitat	Land/stream lease, riparian exclosure	Whiskey Creek
ODFW, BPA, NRCS, SWCD, landowner(s)	Willow Creek Fish Passage	Diversion modification to allow fish passage	Willow Creek, ~ RM 1
OSPRD, BPA, ODFW	Catherine Creek State Park Interpretive Signing	Interpretive Signing	Catherine Creek State Park
OSUE, GWEB, ODA, OSU, SWCD, landowner(s)	Nutrient Management for Peppermint in Union Co., Phase II	Study nutrient use of peppermint to increase efficiency of fertilizer use, improve water quality	Grande Ronde Valley
OWRD, GWEB, Union County, USFS, landowner(s)	GRR Basin Water Quality Monitoring	Upgrade water quality monitoring equipment at 5 gage sites	Upper Grande Ronde subbasin
OWRD/USFS, BPA	Grande Ronde Basin Gaging Station Monitoring	Improve quality and quantity of streamflow data collected at 5 gaging stations	Upper Grande Ronde subbasin
SWCD, GWEB, landowner(s)	Dry Creek Sediment Reduction & Road Rehabilitation	Reconstruct & realign road	Dry Creek and tributary
SWCD, BOR, NPT, ODFW, OSUE, OWEB, OWRD, USFS,	Wallowa County Monitoring Coordinator	Coordinate water qaulity monitoring in Wallowa Co.	Wallowa County

Organization(s). Lead in bold	Project Name	Brief Description	Location
Joseph High School, Wallowa High School			
UNCO, BPA	Grande Ronde River / Mose Creek Lane Slide Improvement	Road Improvements	Grande Ronde River ~ RM 86
UNCO, BPA	Yarrington Road Improvement	Improve road drainage	Yarrington Road, GRR
USFS, GWEB	Cove Yellowstar Thistle	Noxious weed control	West slopes of Wallowa Mtns
USFS, BPA, NFF	Dark Canyon Creek Watershed Restoration	Instream structure, riparian planting, road obliteration, thinning	Dark Canyon Creek
USFS, BPA	Lookingglass Creek Road Obliteration	Obliterate and stabilize roads	Lookingglass Creek
USFS	Mud Creek Watershed Road Closures	Decommission 2 roads	McCubbin Creek
WACO, GWEB	Wallowa County Weed Inventory	Computer system, GPS software and hardware to establish weed inventory	Wallowa County
WACO, GWEB, NPT	Whiskey Creek Road	Road & drainage improvements	NF Whiskey Creek

Bonneville Power Administration

Over 100 BPA funded projects in the Grande Ronde subbasin are listed on the BPA website (http://www.bpa.gov/) an additional 31 proposals, submitted in 2000, are listed as well. Included are so-called "umbrella proposals" which summarized existing fish and wildlife status, restoration activities and needs. Table 37depicts those proposals submitted for BPA funding in 2000 with the BPA Project Number, a brief description and the lead agency/organization.

Table 37. BPA Project Proposals Submitted in 2000 for the Grande Ronde Subbasin.

BPA #	Project Description	Lead Agency/Organization
20541	Snake River fall chinook salmon studies	NPT,USFWS,USGS
9403400	Assessing summer and fall chinook restoration	NPT
9801003	Spawning distribution of Snake River fall chinook salmon	USFWS
9202409	Enhance conservation, enforcement for fish, wildlife, watersheds of the Nez Perce	NPT
20051	Decrease sedimentation and temperature in streams, educate resource managers	OSUE
20102	Research/evaluate restoration of NE Oregon streams and develop management guidelines	OSU/UO

BPA #	Project Description	Lead Agency/Organization
20016	Snake River steelhead hooking mortality study	WDFW
8909600	Monitor and evaluate genetic characteristics of supplemented salmon and steelhead	NMFS
9606700	Manchester spring chinook broodstock project	NMFS
9703800	Preserve listed salmonids stocks gametes	NPT
20531	Multi-year Grande Ronde anadromous fish plan	CBFWA
20556	Grande Ronde endemic spring chinook supplementation program umbrella	
9800702	Grande Ronde Supplementation O&M/M&E	NPT
9800703	Facility O&M and program M&E for Grande Ronde spring chinook salmon	CTUIR
9801006	Captive broodstock artificial propagation	NPT
8805301	Northeast Oregon hatchery master plan	NPT
20512	Grande Ronde River Basin umbrella	ODFW
8805305	Northeast Oregon hatcheries planning and implementation	ODFW
9801001	Grande Ronde Basin spring chinook captive broodstock	ODFW
9202604	Life history of spring chinook salmon and summer steelhead	ODFW
8402500	Protect & enhance anadromous fish habitat in Grande Ronde Basin streams	ODFW
9202601	Grande Ronde Model Watershed Program	GRMWP
9608300	Grande Ronde Basin watershed restoration	CTUIR
9403900	Wallowa Basin Project planner	NPT
9702500	Implement the Wallowa County/ Nez Perce Tribe Salmon Habitat Recovery Plan	NPT
20130	Northeast Oregon mitigation trust fund	NPT
9608000	Northeast Oregon Wildlife Mitigation Project	NPT
20112	Securing wildlife mitigation sites-Oregon. Wenaha WMA additions	ODFW
20114	Securing wildlife mitigation sites-Oregon. Ladd Marsh WMA additions	ODFW
20133	Irrigation as a management tool for stream temperature	OSU
20129	Dworshak mitigation cultural resource survey project	NPT

Nez Perce Tribe

In addition to projects listed above, the Nez Perce Tribe is engaged in a project under the LSRCP of the USFWS: the LSRCP Hatchery Evaluations Program. This project evaluates and monitors the performance of hatchery and natural production, interactions of hatchery and natural fish, and other aspects of the LSRCP hatchery programs.

US Bureau of Reclamation

The US Bureau of Reclamation also conducts research and restoration/enhancement projects in the subbasin (Table 38).

Table 38. Projects Ongoing in 2001 by U.S. Bureau of Reclamation and Other Partners.

Project	Location	Description
Lostine River hydrology study	Lostine River	Water budget analysis to understand base line hydrologic conditions by quantifying irrigation demands relative to basin water supply that will lead to developing water management alternatives to provide in stream flow during critical migration periods
Bear Creek hydrology study	Bear Creek	Water budget analysis to understand base line hydrologic conditions by quantifying irrigation demands relative to basin water supply that will lead to developing water management alternatives to provide in stream flow during critical migration periods
Wallowa Consolidated Ditch	Lostine River	Data collection and engineering design assistance for a pipeline delivery system to conserve water for instream flow and to reduce migration barriers
Data collection	Catherine Creek	Water quality and streamflow data collection
Conjunctive use study	Prairie Creek	Collect basic surface and groundwater data for later analysis of interrelationships
Conjunctive use study	Grande Ronde River	Install groundwater monitoring wells for collecting groundwater level measurements
Diversion improvements	Wallowa and upper Grande Ronde Rivers	Data collection and engineering design assistance for irrigation headgate and diversion dam replacements to conserve water for instream flow and reduce migration barriers
Water optimization study	Grande Ronde River	Study of structural stream improvement alternatives to aid fish passage, riparian areas, instream flows, and water quality
Wallowa Dam Rehabilitation	Wallowa and Lostine Rivers	Storage provided in exchange for funding structural rehabilitation of Wallowa Dam can be managed to improve migration and habitat in the mainstem of the Wallowa River and through exchange migration and habitat in the Lostine River

As part of its Water Conservation Field Services Program, Reclamation provides annual cost- share grants to the Union and Wallowa SWCDs. Grant monies have been used to line ditches to conserve water near La Grande and Cove and to install automated headgates with weirs and flumes equipped with continuous electronic data loggers to measure irrigation diversions in both districts. Automation of the Westside Ditch diversion from the Lostine River near Wallowa was completed in June, 2000. Automation allows for 24-hour diversion regulation and remote monitoring and adjustments of diversion gates through a telephone connection. Discussions to automate diversions from the Grande Ronde River are underway in 2001.

In 1991, the NWPPC requested Reclamation to undertake water conservation demonstration projects in selected Columbia River tributary subbasins. Reclamation, in cooperation with local farmers and ranchers, irrigation districts, Bonneville Power Administration, NRCS, Union and Wallowa SWCDs, Nez Perce Tribe, Oregon Department of Fish and Wildlife, FWS, and NMFS, completed projects related to diversion structures, irrigation system improvements, fish passage and enhancement, and monitoring (Table 39) in the Wallowa River watershed. Most of these projects were completed between 1995 and 1998.

Table 39. Wallowa River Watershed Water Conservation Demonstration Projects by the U.S. Bureau of Reclamation and Other Partners.

Project	**Location**	**Description**
Tulley Hill Diversion	Lostine River	Replaced gravel push-up diversion dam with permanent structure that provides fish passage, a headgate to control the diversion, and a flume to measure the diversion
Clearwater Ditch Diversion	Lostine River	Replaced gravel push-up diversion dam with permanent structure that provides fish passage, a headgate to control the diversion, a flume to measure the diversion, and new fish screens
Miles Ditch Diversion	Lostine River	Replaced gravel push-up diversion dam with permanent structure that provides fish passage, a headgate to control the diversion, a flume to measure the diversion, and new fish screens
Poley-Allen Diversion	Lostine River	Replaced gravel push-up diversion dam with permanent structure that provides fish passage, a headgate to control the diversion, a flume to measure the diversion, and new fish screens

Project	Location	Description
Lower Valley Ditch Consolidation	Wallowa River	Replaced four gravel push-up diversion dams with a single permanent structure that provides fish passage, headworks to control the diversion, a splitter structure to distribute the diversion, and measurement devices
Carman Ranch	Lostine River	Reduced diversion and improved water quality by converting from flood irrigation to gated pipe
Gordon Wolfe Ranch	Wallowa River	Reduced diversion and improved water quality by converting from flood irrigation to gated pipe
Willett Ranch	Wallowa River	Push-up dam eliminated, diversion reduced and water quality improved by converting from flood irrigation to gated pipe
Imsland Ranch	Lostine river	Reduced diversion and improved water quality by converting from flood irrigation to gated pipe
Attebury Ranch	Lostine River	Reduced diversion and improved water quality by converting from flood irrigation to gated pipe
Oveson Ranch	Wallowa River	Reduced diversion by converting from flood irrigation to sprinkler system and improved water quality by initiating cell grazing and fencing water courses from livestock
Clearwater Ditch Lining	Wallowa River	Reduced diversion by reducing canal seepage and improved water quality by reducing surface runoff
Westside Ditch Lining	Lostine River	Reduced diversion by reducing canal seepage
Lower Valley Ditch Lining	Wallowa River	Reduced diversion by reducing canal seepage
Johnston Ranch	Lostine and Wallowa Rivers	Improve water quality of return flows by fencing livestock from water sources, installing a gravity stock watering system, limiting return flows by converting from flood irrigation to gated pipe and installing culverts and headgates, constructing tailwater settling ponds, and regrading parts of the ditch
Wolfe Ranch	Lostine and Wallowa Rivers	Improve water quality of return flows by relocating a winter livestock feeding area to an area that drains away from the Lostine River, fencing livestock from water sources, constructing tailwater settling ponds, and developing a groundwater source for watering stock
Makens Ranch	Wallowa River	Improved water quality of return flows by developing a groundwater source for watering stock

Project	Location	Description
Arrowhead Pipeline Association	Hurricane Creek	Reduced diversion by replacing ineffective debris screen with turbulent fountain debris screen
Bear Creek Channel Improvement	Bear Creek	Twenty-five rock weirs concentrate water in low flow channel and provide pools to aid migration. Two root wads provide cover for fish and with 34 half-log and 10 whole-log structures protect erosion of stream banks
Bear Creek Low Flow Augmentation Study	Bear Creek	Appraisal study of potential to use reservoir storage to augment seasonal low flows to aid migration
Water Quality Monitoring	Wallowa River and tributaries	Nitrates, phosphates, nitrogen, fecal coliform, e. coli bacteria, and suspended solids were monitored at up to 17 sites to increase landowner awareness and obtain historical records
Flow Monitoring	Lostine, Bear, and Wallowa Rivers	Flow was monitored with voluntary landowner participation at 29 diversion structures and three return points to educate water users about diversions, help design better diversion structures and irrigation and delivery systems, and provide information for understanding fish passage

Wallowa Zone, Wallowa Whitman National Forest

Habitat Improvement Projects, 1970 – 2001, excluding La Grande Ranger District.

- Riparian Exclosure Fence - 30.25 miles of stream excluded from livestock (60.5 miles of fence)
- Riparian Pasture Fence - 2.5 miles of stream within riparian pastures.
- Large Woody Material Placement [hard structure (anchored within the stream)] - 30 stream miles.
- Large Woody Material Placement (soft structure (not anchored within the stream) - 102 miles of stream.
- Riparian Planting (includes both conifers and deciduous)- 31.5 miles of stream.
- Upland Exclosures (this includes springs, seeps, wetlands, intermittent draws, perennial nonfish-bearing streams, ephemerals, and ponds) - 126 upland exclosures
- Trail and campsite rehabilitation - 13.5 acres (includes: plantings, rehabilitating trails and sites, education signs installed, and defined access routes.

Oregon Department of Fish and Wildlife

In addition to projects listed elsewhere in this section, ODFW is involved in and has implemented other restoration and research projects including those below.

Streamflow Restoration Prioritization. ODFW has established the priorities for streamflow restoration needs in the Grande Ronde Basin (Figure 16), as well as all other basins in the state. Priorities are based on individual rankings of several biological and physical factors, water use patterns and restoration optimism. Biological and physical factors included the number of native anadromous species, presence of a designated "Core Area", fish related ecological benefits, other types of ecological benefits, physical habitat condition, the extent of human influence, water quality, current status or proposed as sensitive, threatened, or endangered, presence of instream flow protection (Instream Water Rights), and natural low flow problems. Water use pattern factors included the estimated amount of consumptive use and the frequency that an existing Instream Water Right is not satisfied. The final factor in the ranking of restoration need was an optimism factor of how well the fish resources would respond if flow were restored. Many of these factors were derived from existing data sources while others were ranked by ODFW's District Fish Biologists, based on local knowledge and professional judgement. Extensive use was made of Geographic Information Systems (GIS) and relational database analytical methods. The flow restoration priorities project was funded by the Oregon Watershed Enhancement Board, through a grant to the Oregon Water Resources Department.

Chinook salmon conventional and captive broodstock and steelhead hatchery programs. These programs have been implemented under the LSRCP and BPA for conservation, supplementation, and fisheries enhancement. ODFW is implementing steelhead hatchery programs under the LSRCP. ODFW has ongoing chinook salmon and steelhead research and monitoring projects evaluating hatchery effectiveness, life history, genetics, supplementation, hatchery-wild interactions, smolt migration and survival, production and productivity, and fisheries restoration. Details of these efforts are described in other sections of this document.

Union Soil and Water Conservation District

The Union Soil and Water Conservation District, in cooperation with Union County and the City of La Grande is in the planning stage of the Grande Ronde River Stream Restoration and Headcut Stabilization Project. The project is north of the City of La Grande, Oregon on a one-mile segment of the Grande Ronde River beginning at the Spruce Street Bridge on the west, and extending downstream one mile. This river segment was channelized following the 1964 flood creating deeper and steeper banks for flood control. The project includes a headcut stabilization treatment and channel and bank rehabilitation practices downstream one mile.

A project feasibility study report was prepared by the USCOE under the authority of Section1135 of the Water Resources Development Act of 1986 (PL 99-662). The USCOE is currently completing the design and specifications which will identify specific project treatments and project costs. If all parties agree to go forward, USCOE wil fund 75% and local sponsors will be responsible for 25% of the project cost.
Project treatments are designed to reflect natural conditions. The headcut stabilization will include stone channel weirs with 12-inch steps to allow fish passage. Channel and bank treatments will include instream structure such as root wads and j-hook bank control structures as well as riparian plantings. Adjacent property owners have been involved in planning and design of the project.

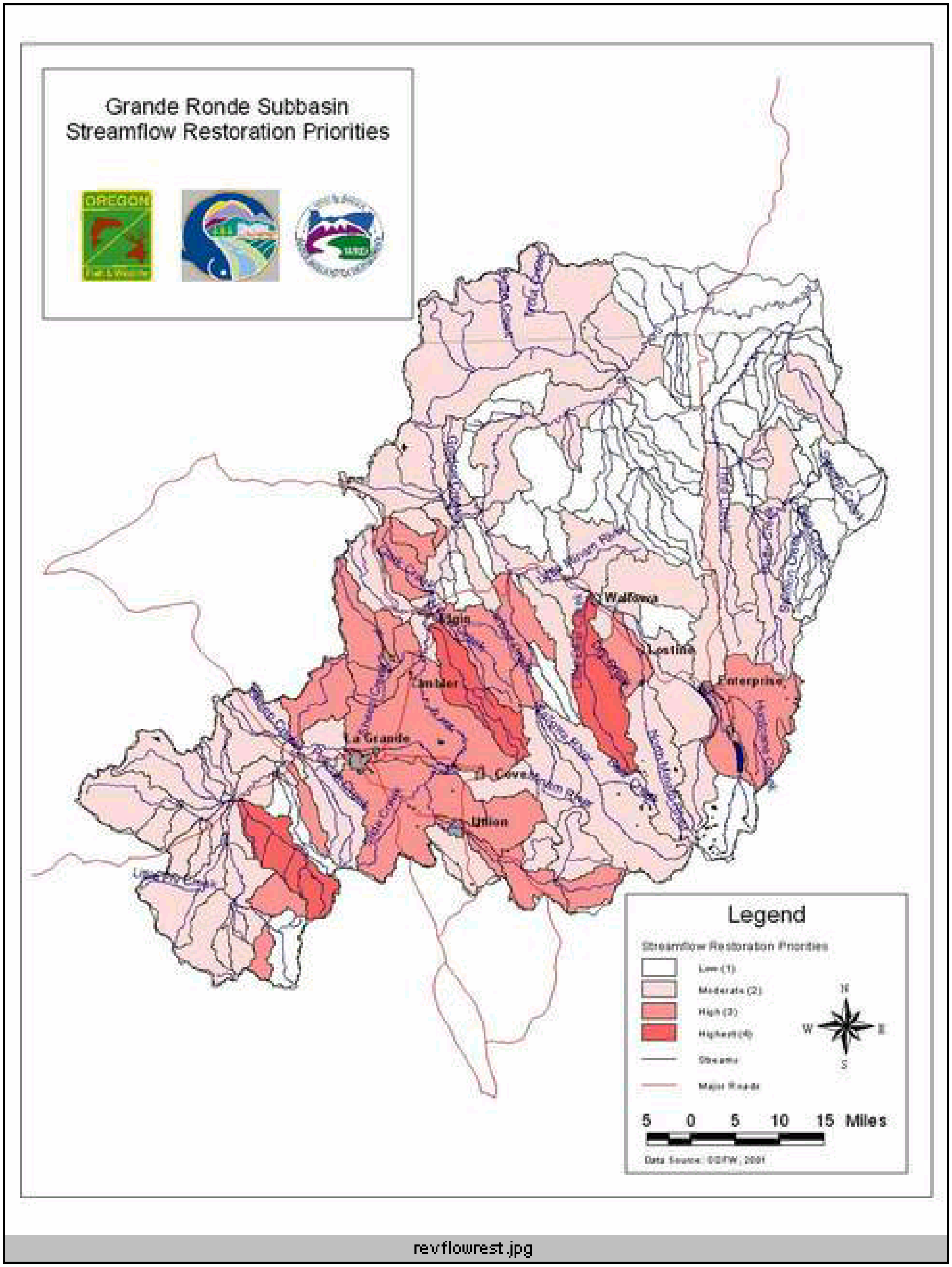

Figure 16. Streamflow Restoration Priorities in the Grande Ronde Subbasin.

Asotin County Conservation District

Riparian projects to reduce sedimentation and temperature and improve bank stability include fencing of the stream to reduce direct animal pressure on streambanks and allow for natural reproduction of riparian areas. Alternative water developments with fencing projects to allow animals sources of water without utilizing the stream are priorities for the Asotin County Conservation District. During the period from 1996 – 2000, the Asotin County Conservation District utilized $34,150 in State funding for riparian projects and installed 14,170 feet of riparian fencing, 5,800 feet of cross fencing and planted 100 acres to pasture/hayland in the uplands in the Grande Ronde subbasin.

Asotin County Noxious Weed Board

The Asotin County Noxious Weed Board (Weed Board) visually surveys approximately 130 out of 627 square miles in Asotin County yearly, including private and public lands. Approximately 40 percent of the riparian areas are infested with yellow starthistle (*Centaurea solstitialis*) and knapweeds (*Centaurea diffusa, Centaurea biebesteinii, Acroptilon repens*). Seventy percent of rangelands are infested with yellow starthistle. The Weed Board found limited amounts of rush skeletonweed (*Chondrilla juncea)* and is attempting to contain leafy spurge (*Euphorbia esula).*

Wallowa Resources

Wallowa Resources is presently involved in a number of projects aimed at meeting their goal of facilitating community based stewardship in Wallowa County. these projects include the following:

FOREST STEWARDSHIP

- Stewardship Contracting - Collaborative effort with the USFS to promote the use of Stewardship Contracting to conduct forest restoration and stewardship work on the Wallowa Whitman National Forest
- Habitat Restoration - Collaborative effort with the USFS, Private Land Owners, The Nature Conservancy, Sustainable Ecosystems Institute and others to initiate habitat restoration work with attention to riparian hardwood communities, ponderosa pine stands, and stands threatened by fire, insect and disease.
- Forest Certification - Collaborative effort with Private Land Owners, and local mills, to explore the potential resource management and market benefits of forest certification under the Forest Stewardship Council guidelines.
- Value-Added Processing - Collaborative effort with local mills, USFS (Forest Products Lab and others), Oregon State University, Sustainable Northwest, etc. to explore opportunities for value-added processing and marketing in Wallowa County. Initial work has focused on opportunities for small diameter logs and log yard residuals.

WETLAND AND RIPARIAN STEWARDSHIP

- Clear Lake Ridge Restoration - Collaborative effort with the USFS, The Nature Conservancy, and Private Land Owners to conserve upper elevation playas and the surrounding native grasslands which provide important habitat for a wide variety of plants and animals.
- Wallowa River Project - Collaborative effort with a private landowner to restore a braided meandering channel system to a portion of the Wallowa River.

RANGELAND STEWARDSHIP

- Lower Grande Ronde Noxious Weed Project - Collaborative effort with USFS, BLM, ODSL, Nez Perce Tribe, and Private Land Owners to coordinate and implement seamless treatment of noxious weeds across all ownerships.
- International Center for the Advancement of Pastoral Production - Assistance to various groups from USA, Canada, China, Mongolia, Norway, and Southern Africa in developing an international network to maintain and promote pastoral production systems.

Oregon Water Trust

Oregon's Instream Water Rights Law allows water rights holders to donate, lease or sell some or all of their water right for transfer to instream use. Oregon Water Trust, a private, non-profit group, negotiates voluntary donations, lease or permanent purchase of out-of-stream water rights to convert to instream water rights in those streams where acquisition will provide the greatest ecological benefits for fish and water quality. Acquired rights are held in trust for the people of Oregon by the Oregon Water Resources Department.

Present Subbasin Management

Existing Plans, Policies, and Guidelines

Multiple agencies and entities are involved in management and protection of fish and wildlife populations and their habitats in the Grande Ronde subbasin. Federal, state, and local regulations, plans, policies, initiatives, and guidelines are followed in this effort. The CTUIR, NPT, and ODFW share co-management authority over the fisheries resource. Federal involvement in this arena stems from Endangered Species Act responsibilities. Numerous federal, state, and local land managers are responsible for multipurpose land and water use management, including the protection and restoration of fish and wildlife habitat. Management entities and their associated legal and regulatory underpinnings for resource management and protection and species recovery are outlined below.

Federal Government

As a result of the federal government's significant role in the Columbia Basin, not only through the development of the federal hydropower system but as a land manager, and its responsibilities under Section 7(a) of the Endangered Species Act (ESA), several important documents have been published in the last year that will guide federal involvement in the Grande Ronde subbasin and the Blue Mountains. These documents are relevant to and provide opportunities for states, tribes, local governments, and private parties to strengthen existing projects, pursue new or additional restoration actions, and develop the institutional infrastructure for comprehensive fish and wildlife protection. The key documents include the FCRPS Biological Opinion (discussed previously), the federal All-H paper entitled, Conservation of Columbia Basin Salmon: A Coordinated Federal Strategy for the Recovery of the Columbia-Snake River Basin Salmon, and the Interior Columbia Basin Ecosystem Management Project (ICBEMP). All are briefly outlined below.

FCRPS BiOp

This is a biological opinion written by NMFS and the Fish and Wildlife Service (FWS) regarding the operation of the federal hydropower system on the Columbia River, and fulfills consultation requirements with the U.S. Army Corps of Engineers (USACE), the Bureau of Reclamation (USBR), and the Bonneville Power Administration (BPA) under Section 7 of the ESA. Part of the Reasonable and Prudent Alternative to prevent jeopardy to 12 stocks of anadromous fish considered in the BiOp includes an action to conduct off-site habitat improvement to correct all barrier, screen and flow deficiencies in certain tributary subbasins, including the Grande Ronde.

Federal Caucus All-H Paper

This document is a framework for basin-wide salmon recovery and identifies strategies for harvest management, hatchery reform, habitat restoration, and hydropower system operations.

ICBEMP

This document is a framework for land management for federal lands over the interior Columbia Basin, and was produced by the primary federal land management agencies, including the Forest Service (USFS) and the Bureau of Land Management (BLM). Significantly for this report, this document (if approved) will affect how these federal agencies prioritize actions and undertake and fund restoration activities.

By understanding the priorities outlined in these documents, significant opportunities for federally-funded restoration activities can be refined and further identified for the Grande Ronde subbasin.

Bonneville Power Administration

The Bonneville Power Administration has mitigation responsibility for fish and wildlife restoration under the Fish and Wildlife Program of the Northwest Power Planning Council as related to hydropower development. It is also accountable and responsible for mitigation related to federal Biological Opinions and Assessments for recovery of threatened, endangered, and sensitive species. The recently released FCRPS Biological Opinion calls for the BPA to expand habitat protection measures on non-federal lands. BPA plans to rely on the Council's program as its primary implementation tool for the FCRPS BiOp off-site mitigation requirements.

US Forest Service and Bureau of Land Management

The U.S. Forest Service is required to manage habitat to maintain viable populations of anadromous fish and other native and desirable non-native vertebrate species. Land and Resource Management Plans (Forest Plans) were developed for the Wallowa-Whitman National Forest (USDA 1990), and the Umatilla National Forest (USDA 1990). These Forest Plans guide all natural resource management activities, establish forest-wide multiple-use goals and objectives, and establish management standards and guidelines for the National Forests.

The Bureau of Land Management, in accordance with the Federal Land Policy and Management Act of 1976, is required to manage public lands to protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values. Both the USFS and BLM are required by the Clean Water Act to ensure that activities on administered lands comply with requirements concerning the discharge or run-off of pollutants.

In the Columbia River Basin, the Forest Service and the Bureau of Land Management manage salmonid habitat under the direction of PACFISH (USDA and USDI 1994) and INFISH (Inland Native Fish Strategy; USDA 1995). These interim management strategies aim to protect areas that contribute to salmonid recovery and improve riparian habitat and water quality throughout the Basin, including the Grande Ronde subbasin. These strategies have also facilitated the ability of the federal land managers to meet requirements of the ESA and avoid jeopardy. PACFISH guidelines are used in areas east of the Cascade Crest for anadromous fish. INFISH is for the protection of habitat and populations of resident fishes outside anadromous fish habitat. To meet recovery objectives, these strategies:

- ¨Establish watershed and riparian goals to maintain or restore all fish habitat.
- ¨Establish aquatic and riparian habitat management objectives.
- ¨Delineate riparian management areas.
- ¨Provide specific standards and guidelines for timber harvest, grazing, fire suppression and mining in riparian areas.
- ¨Provide a mechanism to delineate a system of key watersheds to protect and restore important fish habitats.
- ¨Use watershed analyses and subbasin reviews to set priorities and provide guidance on priorities for watershed restoration.
- ¨Provide general guidance on implementation and effectiveness monitoring.
- ¨Emphasize habitat restoration through such activities as closing and rehabilitating roads, replacing culverts, changing grazing and logging practices, and replanting native vegetation along streams and rivers.

The Interior Columbia Basin Ecosystem Management Project (ICBEMP) is a regional-scale land-use plan that covers 63 million acres of federal lands in Oregon, Washington, Idaho, and Montana http://www.icbemp.gov/. The BLM and USFS released a Supplemental Draft Environmental Impact Statement for the ICBEMP Project in March 2000. The EIS focuses on the critical broad scale issues related to: landscape health; aquatic and terrestrial habitats; human needs; and products and services. If approved, ICBEMP will replace the interim management strategies, providing for longer-term management of lands east of the Cascades. As ICBEMP is implemented, subbasin and watershed assessments and plans will target further habitat work (NMFS 2000).

Both the USFS and BLM have developed Biological Assessments for Snake River bull trout, Snake River steelhead, steelhead proposed critical habitat and Snake River chinook salmon proposed critical habitat (1998a, 1998b 1998c, 1998d, 1998e, 1998f, 1999, 2001).

The Bureau of Land Management is developing the Northeastern Oregon Assembled Land Exchange (NOALE) and Resource Management Plan (RMP) for the retention, exchange, and disposal of public land (USDI 1998). The goal of the exchange is to enable the BLM to more effectively meet ecosystem management objectives, to consolidate BLM managed lands for more effective and efficient resource protection, enhancement, and use; and to ensure that retained lands have sufficient public benefit to merit the costs of management (Land Exchange Act).

Since the Salmon Summit Accord in the early 1990's, the USFS has been actively engaged in prioritizing land acquisition/exchange actions, under various Federal authorities, to benefit ESA listed fish species. Land exchange and acquisition in the Grande Ronde subbasin is an on-going activity and is identified as a high priority.

US Fish and Wildlife Service

The U.S. Fish and Wildlife Service administers the Endangered Species Act (ESA) for resident fish and wildlife. This act provides for the conservation of the ecosystem upon which T&E species of fish, wildlife, and plants depend and directs enforcement of federal protection laws. Within the Grande Ronde subbasin, the wintering bald eagle and bull trout are federally listed species. The endangered gray wolf (from Idaho reintroductions) has been discovered in the Blue Mountains west of the Grande Ronde subbasin although none are known to reside in the subbasin; it is included in USFWS species lists for consideration in consultation regarding federal activities in the Grande Ronde subbasin. A bull trout recovery strategy is currently being drafted for the Grande Ronde subbasin, to be incorporated in the Draft Bull Trout Recovery Plan being prepared by the USFWS. The federal Migratory Bird Act also protects migratory birds and their habitats within the subbasin. Additional programs include wetland habitat improvement and Partners for Wildlife.

The USFWS also administers the Lower Snake River Fish and Wildlife Compensation Plan (LSRCP) authorized by the Water Resources Development Act of 1976 (Public Law 94-587). The goal of the LSRCP is to mitigate and compensate for fish and wildlife resource losses caused by construction and operation of the four lower Snake River dams and navigation lock projects (FWS 1998). The fishery resource compensation plan identified the need to replace adult salmon and steelhead and resident trout fishing opportunities. The size of the anadromous program was based on estimates of adult salmon and steelhead returns to the Snake River basin prior to the construction of the four lower Snake River dams. Artificial production of anadromous fish in the Grande Ronde subbasin is funded through the LSRCP.

National Marine Fisheries Service

The National Marine Fisheries Service administers the ESA as it pertains to anadromous fish only. The NMFS has jurisdiction over actions pertaining to Snake River spring and fall chinook salmon and Snake River Basin Steelhead where they occur in the subbasin. Sockeye and coho salmon have been extirpated from the subbasin. Under the ESA's 4(d) rule, "take" of listed species is prohibited and permits are required for handling. Special permit applications have been pursued for research and management activities in the Grande Ronde subbasin. Harvest management plans are required for fisheries in the Snake River Basin. Fisheries Management and Evaluation Plans have been developed for warmwater fisheries and sturgeon in the Snake River basin, others are scheduled. Biological Opinions, recovery plans, and habitat conservation plans for federally listed fish and aquatic species help target and identify appropriate watershed protection and restoration measures.

The recent Federal Columbia River Power System (FCRPS) Biological Opinion and the Basinwide Salmon Recovery Strategy (All-H Paper) contain actions and strategies that are specific to the Grande Ronde subbasin for habitat restoration and protection. Other aspects of hatchery and harvest apply as well. Action Agencies (USBR, USACE, BPA) are identified that will potentially lead fast-start efforts in specific aspects of restoration on non-federal lands. Federal land management will be implemented by current programs that protect important aquatic habitats (PACFISH, ICBEMP). Actions within the FCRPS BiOp are intended to be consistent with or complement the NWPPC's amended Fish and

Wildlife Program, the Clean Water Action Plan, the Unified Federal Policy for a Watershed Approach to Federal Land and Resource Management, the Inter-Governmental Task Force for Monitoring Principles (Oregon Plan), and state and local watershed planning efforts.

The ODFW has prepared Hatchery and Genetics Management Plans (HGMP) for artificial production programs in the subbasin at the direction of NMFS. The HGMP's for the Grande Ronde River subbasin are attached as Appendix B and C.

Environmental Protection Agency

The U.S. Environmental Protection Agency is responsible for implementing and administering the Clean Water Act (CWA). Accelerated and strengthened efforts to achieve clean water and aquatic habitats was the intent of the Clean Water Initiative (1998), the core of which is the Clean Water Action Plan (CWAP), a federal partnership to promote and enhance locally based watershed improvements (the Unified Federal Policy for Ensuring a Watershed Approach to Federal Land and Resource Management). A key action with the CWAP was Unified Watershed Assessments (UWA), which identified watersheds not meeting state water quality standards and other restoration goals, and established restoration priorities. Restoration strategies called Total Maximum Daily Loads (TMDL) are being developed for the Columbia River mainstem and tributaries (including the Grande Ronde subbasin), based on court orders and negotiated agreements through CWA litigation. EPA serves an oversight and advisory role in development of TMDLs. Watershed level efforts through the CWAP will improve water quality, restore habitat, and recover threatened and endangered species. Other NRCS programs include river Basin Studies, Forestry Incentive program, Wildlife Habitat Improvement Program and Wetalnds Reserve Program.

U.S.D.A. Natural Resources Conservation Service

Within the U.S. Department of Agriculture (USDA), the Natural Resources Conservation Service (NRCS) oversees the implementation of conservation programs to help solve natural resource concerns. The Environmental Quality Incentives Program (EQIP), established in the 1996 Farm Bill, provides a voluntary conservation program for farmers and ranchers who face serious threats to soil, water, and related natural resources. The Conservation Reserve Program (CRP) puts sensitive croplands under permanent vegetative cover. The Conservation Reserve Enhancement Program (CREP) helps to establish forested riparian buffers. The NRCS assists landowners to develop farm conservation plans and provides engineering and other support for habitat protection and restoration (PL 566). The Farm Services Administration provides funds.

U.S. Bureau of Reclamation

As a water management agency, the Bureau of Reclamation has responsibility for certain hydropower and irrigation projects in the Columbia River basin. A Reclamation engineer has been stationed in La Grande, Oregon since October, 1999. This engineer provides technical assistance on fish barrier, passage, and other habitat issues in the Grande Ronde River Subbasin and serves to enlist technical assistance from other Reclamation engineers and resource specialists as needed.

Reclamation activities in the Subbasin are coordinated through the Grande Ronde Model Watershed Program and Union and Wallowa SWCDs in cooperation with local farmers and ranchers, irrigation districts, Bonneville Power Administration, NRCS, Union and Wallowa SWCDs, Nez Perce Tribe, Confederated Tribes of the Umatilla Indian Reservation, Oregon Department of Fish and Wildlife, USFWS, and NMFS. Reclamation activities ongoing in 2001 are summarized in table XX. Reclamation also provides financial assistance in cooperation with BPA in support of a Model Watershed technician in La Grande and a Nez Perce Tribal fisheries biologist in Enterprise.

Farm Services Agency

The Farm Services Agency (FSA) administers U.S. Department of Agriculture farm commodity programs; operating and emergency loans; conservation and environmental programs; emergency and disaster assistance; domestic and international food assistance and international export credit programs. Conservation program payments that FSA administers include the CRP and the Environmental Quality Incentives Program (EQIP). Technical assistance for these programs is provided by the NRCS.

U.S. v Oregon

The November 9, 1987 Columbia River Fish Management Plan was an agreement entered into by the parties pursuant to the September 1, 1983 Order of the United States District Court for the District of Oregon (Court) in the case of United States et al. v, Oregon, Washington et al., (Case No. 68-513). The purpose of the management plan was to provide a framework within which the parties could exercise their sovereign powers in a coordinated and systematic manner in order to protect, rebuild, and enhance upper Columbia River fish runs while providing harvests for both treaty Indian and non-Indian fisheries. The agreement established goals (rebuild weak runs and fairly sharing harvest), means (habitat protection, enhancement, artificial production and harvest management), and procedures (facilitate communication and resolve disputes) to implement the plan.

The 1987 agreement was in effect until December 31, 1998, when it expired. The parties have agreed to continue meeting to address harvest and production issues until a new process has been developed for negotiating a long-term agreement.

Tribal Government

By treaty with the United States in 1855, the Umatilla and Nez Perce Tribes reserved certain rights within the Grande Ronde subbasin in compensation for ceding lands to the federal government. These reserved rights provide part of the basis for a wide range of rights and interests for the protection, enhancement, management, and harvest of anadromous fish in the subbasin.

Confederated Tribes of the Umatilla Indian Reservation

The CTUIR is responsible for protecting and enhancing treaty fish and wildlife resources and habitats for present and future generations. Members of the CTUIR have federal reserved treaty fishing and hunting rights pursuant to the 1855 Treaty with the United States government. CTUIR co-manages fisheries resources with ODFW and individually and/or jointly implements restoration and mitigation activities throughout the areas of interest and influence in northeast Oregon and southeast Washington. The lands include but are not limited to the areas of the Grande Ronde subbasin in which CTUIR held aboriginal title and exercised usual and accustomed use. CTUIR fish and wildlife activities relate to all aspects of management (habitat, fish passage, hatchery actions, harvest, research, etc.). CTUIR policies and plans applicable to subbasin management include the CTUIR Columbia Basin Policy (1996), Wy-Kan-Ush-Mi Wa-Kish-Wit: Spirit of the Salmon (CRITFC 1995).

Nez Perce Tribe

Since time immemorial, the Nez Perce Tribe has used and occupied much of northeastern Oregon and a portion of southeastern Washington. Archaeological sites and artifacts spanning thousands of years have been documented throughout the area. Major highways now follow the ancient routes. Trails into the high mountains and deep canyons follow prehistoric pathways. The towns of Joseph, Enterprise, Lostine, Wallowa and Elgin, Oregon are located near significant Indian camps. County maps are filled with names such as Chesnimnus, Minam, and Powwatka – words of Nez Perce origin.

By virtue of the Treaty of 1855, the Nez Perce Tribe reserved as a homeland vast areas of northeast Oregon, southeast Washington, and central Idaho. In this treaty, the Tribe reserved the rights to fish, hunt, and gather roots and berries and to graze domestic livestock. The subsequent Treaty of 1863 removed the areas in northeast Oregon and southeast Washington from the Nez Perce Reservation but did not diminish any of these reserved rights.

The Nez Perce Tribe is responsible for managing, protecting, and enhancing treaty fish and wildlife resources and habitats for present and future generations in the Grande Ronde River subbasin. Tribal government headquarters are located in Lapwai, Idaho with regional offices in Kamiah, Orofino and McCall, Idaho and Enterprise, Oregon. The Nez Perce Tribe individually and/or jointly implements restoration and mitigation activities throughout their areas of interest and influence. These lands include but are not limited to the Grande Ronde River subbasin

The Tribe's Department of Fisheries Resources Management is responsible for conducting fisheries management. The vision of the Department is to manage fisheries resources to provide for healthy, self sustaining populations of historically present species, to management and promote healthy ecosystem processes and rich species biodiversity. Inherent in this vision is the policy desire to provide for harvestable fish populations. The Fisheries headquarters are located in Lapwai with a Field Office in Enterprise. Nez Perce Tribal fish and wildlife activities relate to all aspects of management, including recovery, restoration, mitigation, enforcement, and resident fish programs. Nez Perce Tribal policies and plans applicable to subbasin management include Nez Perce Tribal Executive Committee Resolutions, the Wallowa County/Nez Perce Tribe Salmon Habitat Recovery Plan and Multi-Species Strategy (Wallow County and Nez Perce Tribe, 1993), the Wy-Kan-Ush-Mi Wa-Kish-Wit: Spirit of the Salmon (Columbia River Inter-tribal Fish Commission 1996a, 1996b), the Nez Perce Fish and Wildlife Code, and Reports to General Council.

Columbia River Intertribal Fish Commission

The Columbia River Intertribal Fish Commission was established in 1974 by four treaty tribes, the Warm Springs, Nez Perce, Yakama and Confederated Tribes of the Umatilla Indian Reservation. The tribal Columbia River Anadromous Fish Restoration Plan, or Wy-Kan-Ush-Mi Wa-Kish-Wit (CRITFC 1995) was developed by the commission. Recommendations set forth in this plan for salmon recovery address three types of actions:

institutional, technical, and watershed, with the over-riding goal of simply putting fish back in the river (gravel to gravel management). Objectives and strategies specific to the Grande Ronde subbasin are included in Wy-Kan-Ush-Mi Wa-Kish-Wit. http://www.critfc.org/

Federal, State, Tribal and Private Partnership

Blue Mountains Demonstration Area

Three million acres in the Blue Mountains were designated in 1999 as a demonstration area to address habitat restoration needs and community concerns in a coordinated and integrated effort. The area is intended to foster ongoing efforts and to serve as a development site for tools, processes and relationships that will be exported to other restoration efforts. As of 2000, there were over 40 state and private partners in addition to the CTUIR, NPT, USFS, BLM, USFWS, EPA, NMFS and the Oregon Governor's Office. A summary of project proposals for FY 2001 is attached as Appendix F.

Blue Mountains Elk Initiative

The Blue Mountains Elk Initiative is a federal, private, state and tribal Partnership to manage elk in the Blue Mountains of Oregon and Washington. The mission of the Initiative is to more effectively manage elk and elk habitat in the Blue Mountains with an emphasis on working closely with landowners to alleviate damage, using more than 90 percent of funding for on-the-ground projects and obtaining consensus on elk management from all partners and interested groups. Partners in the Blue Mountains Elk Initiative employ a variety of methods to improve elk and habitat management including fencing, water development, noxious weed control, and research and education.

State Government - Oregon

House Bill 3609

This legislation directs the development of plans for fully seeded, sustainable production of natural anadromous fish runs in Oregon river subbasins above Bonneville Dam, including the Grande Ronde subbasin, through consultation among state and tribal entities. Adopted plans are not to be bound by wild fish management policies but will be based on sound science and adaptive management, incorporate M&E and objectives and outcomes benefiting fish and wildlife, and be consistent with NMFS requirements for recovery of salmonid populations under the federal ESA.

Senate Bill 1010

Senate Bill 1010 allows the Oregon Department of Agriculture (ODA) to develop Water Quality Management plans for agricultural lands where such actions are required by state or federal law, such as TMDL requirements. The Water Quality Management Plan should be crafted in such a way that landowners in the local area can prevent and control water pollution resulting from agricultural activities. Local stakeholders will be asked to take corrective action against identified problems such as soil erosion, nutrient transport to waterways and degraded riparian areas. It is the ODA's intent to establish WQMPs on a voluntary basis. Senate Bill 1010 allows the ODA to use civil penalties when necessary to enforce against agricultural activity that is found to transgress parameters of an approved WQMP.

Oregon Plan

Passed into law in 1997 by Executive Order, the Oregon Plan for Salmon and Watersheds (http://www.oregon-plan.org/) and the Steelhead Supplement to the Oregon Plan outlines a statewide approach to ESA concerns based on watershed restoration and ecosystem management to protect and improve salmon and steelhead habitat in Oregon. The Oregon Plan Monitoring Program, successfully implemented in coastal watersheds, provides the necessary approach for rigorous sampling design to answer key monitoring questions, which will be applied to the Grande Ronde subbasin. The Oregon Watershed Enhancement Board (OWEB) facilitates and promotes coordination among state agencies, administers a grant program, and provides technical assistance to local Watershed Councils and others to implement the Oregon Plan through watershed assessments and restoration action plans.

Oregon Department of Fish and Wildlife

Oregon Department of Fish and Wildlife is responsible for protecting and enhancing Oregon fish and wildlife and their habitats for present and future generations. ODFW co-manages fishery resources with the NPT, CTUIR and Washington Department of Fish and Wildlife (WDFW). Management of the fish and wildlife and their habitats in and along the Grande Ronde Subbasin is guided by ODFW policies, collaborative efforts with affected tribes, and federal and state legislation. Direction for ODFW fish and wildlife management and habitat protection is based on the amendments and statutes passed by the Oregon Legislature through the 2001 session. For example, Oregon Administrative Rule (OAR) 635 Division 07 – Fish Management and Hatchery Operation sets forth policies on general fish management goals, the Natural Production Policy, the Wild Fish Management Policy, and other fish management policies and OAR 635 Division 008 – Department of Wildlife Lands sets forth management goals for each State Wildlife Area. Another pertinent ODFW policy is the Oregon Guidelines for Timing of In-Water Work to Protect Fish and Wildlife Resources (ODFW 1997b). In addition to the OAR's, ODFW has developed a variety of species-specific management plans. http://www.dfw.state.or.us/

Mule Deer Management Plan

The goal of ODFW's Mule Deer Management Plan (ODFW 1990) is to manage mule deer populations to provide optimum recreational benefits to the public, and to be compatible with habitat capability and primary land uses. The plan summarizes the life history of mule deer and their management in Oregon, lists concerns and the strategies to be used in addressing identified problems, and provides management direction to inform the interested public of how mule deer will be managed.

Elk Management Plan

The goal of ODFW's Elk Management Plan (ODFW 1992) is to protect and enhance elk populations in Oregon to provide optimum recreational benefits to the public and to be compatible with habitat capability and primary land uses. The plan summarizes the life history of elk and their management in Oregon. The plan also lists concerns and the strategies to be used in addressing identified problems and provides management direction to inform the interested public of how elk will be managed.

Bighorn Sheep Management Plan

ODFW's Bighorn Sheep Management Plan (ODFW 1992) summarizes the history and status of Oregon's bighorn sheep and presents a means by which they will be restored to remaining suitable habitat. The plan serves as a guide for transplanting efforts, assists concerned resource management agencies with wildlife planning efforts, and provides management direction for Oregon's bighorn sheep program. The plan describes 16 bighorn sheep management concerns and recommends strategies to address these concerns.

Mountain Goat Management Plan

ODFW's Interim Mountain Goat Management Plan (2000) summarizes the history and status of mountain goats in Oregon and presents a means by which they will be restored to remaining suitable habitat. The plan provides a record of reintroductions and a guide for future efforts as well as offering management direction for Oregon's mountain goat program.

Cougar Management Plan

The three goals of ODFW's Cougar Management Plan (ODFW 1993) are 1) recognize the cougar as an important part of Oregon's wildlife fauna, valued by many Oregonians, 2) maintain healthy cougar populations within the state and into the future, and 3) conduct a management program that maintains healthy populations of cougar and recognizes the desires of the public and the statutory obligations of the Department. The plan summarizes the life history of cougar and their management in Oregon. The plan also lists concerns and the strategies to be used in addressing identified problems. Management direction is provided to inform the interested public of how cougar will be managed.

Black Bear Management Plan

The three goals of ODFW's Black Bear Management Plan (ODFW 1987) are 1) recognize the black bear as an important part of Oregon's wildlife fauna, valued by many Oregonians, 2) maintain healthy black bear populations within the state and into the future, and 3) conduct a management program that maintains healthy populations of black bear and recognizes the desires of the public and the statutory obligations of ODFW. The plan summarizes the life history of black bear and their management in Oregon. The plan lists concerns and the strategies to be used in addressing identified problems and provides management direction to inform the interested public of how black bear will be managed.

Migratory Game Bird Program Strategic Management Plan

The mission of ODFW's Migratory Game Bird Program Strategic Management Plan (ODFW 1993) is to protect and enhance populations and habitats of native migratory game birds and associated species at prescribed levels as determined by national, state, and flyway plans) throughout natural geographic ranges in Oregon and the Pacific Flyway to contribute to Oregon's wildlife diversity and the uses of those resources. Strategies are described that assist in the development of specific operational plans to achieve the program mission and integrate with other state and federal agencies and private organizations. The plan mandates the formation and implementation of more specific operational plans, especially in regard to habitat programs and biological surveys.

Oregon Wildlife Diversity Plan

ODFW's Oregon Wildlife Diversity Plan (ODFW 1993) provides policy direction for the maintenance and enhancement of the vertebrate wildlife resources in Oregon. The plan identifies goals and objectives for maintaining a diversity of non-game wildlife species in Oregon, and provides for coordination of game and non-game activities for the benefit of all species.

Fish Species Plans

ODFW uses plans that provide statewide direction for approaches to trout, steelhead, warmwater fish, coastal chinook, and coho salmon management to frame strategies subsequently proposed in basin-specific fish management plans. These plans contain broad guidelines and statewide directions. In the Blue Mountains Province, the trout, steelhead, and warmwater plans are pertinent.

Oregon's Trout Plan

The trout plan describes a series of management alternatives that provide guidelines and criteria for protecting wild fish and providing angling in a variety of circumstances. In basin plans, these alternatives provide a context for specific angling regulations. Management objectives are focused on the protection of wild fish and their habitats, providing diverse angling opportunities, making hatchery programs effective and diminishing dependence on hatchery releases, and making the public more aware of trout resources and management issues.

Warmwater Fish Plan

The warmwater plan also categorizes management into alternatives that frame regulations. Because warmwater fishes are non-native, the focus is not on species conservation but on providing diverse angling opportunities reflecting the wide distribution of the many species that are classified as "warmwater". Where biological and physical conditions are suitable, the plan directs management to increase the quality of angling. Management of these species is constrained by conservation needs of native fishes.

Comprehensive Plan for Production and Management of Oregon's Anadromous Salmon and Trout, Part III: Steelhead Plan

The steelhead plan is focused on conservation of wild steelhead; providing public benefits that include angling, tribal uses, and others; and engaging the public, tribes, and agencies in management processes. The conservation approach describes habitat, harvest, and hatchery fish considerations intended to maintain healthy and abundant wild populations.

Native Fish Conservation Policy

In accordance with Governor's Executive Order #99-01, ODFW is reviewing its Wild Fish Management Policy and creating a new Native Fish Conservation Policy. This policy will describe a framework for decision making on native fish conservation on a basin by basin basis. ODFW is currently working with constituents, comanagers and the Oregon Legislature on this new policy, which should be adopted some time in 2001.

Oregon State Police

The Fish and Wildlife Division of the Oregon State Police (OSP) is responsible for enforcement of fish and wildlife regulations in the State of Oregon. The Coordinated Enforcement Program (CEP) ensures effective enforcement by coordinating enforcement priorities and plans by and between OSP officers and ODFW biologists. OSP develops yearly Actions Plans to guide protection efforts for critical species and their habitats. Action Plans are implemented through enforcement patrols, public education, and agency coordination. Voluntary and informed compliance is cornerstone with the Oregon Plan concept. The need for continued fish protection is a priority in accordance with Governors Excecutive Order 99-01.

Oregon Division of State Lands

The Oregon Division of State Lands (ODSL) regulates fill and/or removal of material from the bed or banks of streams (ORS 196.800 – 196.990) through the issuance of permits. Permit applications are reviewed by ODFW, U.S. Army Corps of Engineers, DEQ, the counties, and adjoining landowners, and may be modified or denied based on project impacts to fish populations or significant comments received during the review process.

Oregon Water Resources Department

The Oregon Water Resources Department (OWRD) regulates water use in the subbasin in accordance with Oregon Water Law. Statutes for water appropriation (ORS 537) govern the use of public waters; Water Right Certificates appurtenant to the different lands within the subbasin specify the maximum rate and/or volume of water that can be legally diverted. Oregon water law is based on the prior appropriation doctrine, which results in water being distributed to senior water right holders over junior water right holders during times of deficiency. The law also requires the diverted water be put to beneficial use without waste. WRD acts as trustee for in-stream water rights issued by the state of Oregon and held in trust for the people of the state. The Water Allocation Policy (1992) tailors future appropriations to the capacity of the resource, and considers water to be “over-appropriated” if there is not enough water to meet all demands at least 80% of the time (80% exceedence). The OWRD is a partner in the Oregon Plan. The ODFW has developed a list of streamflow restoration priorities for fish in the Grande Ronde subbasin in Oregon. http://www.wrd.state.or.us/

Oregon Department of Environmental Quality

The Oregon Department of Environmental Quality (DEQ) is the regulatory agency responsible for implementing the 1972 federal Clean Water Act and enforcing state water quality standards for protection of aquatic life and other beneficial uses. It is instrumental in designating 303(d) water quality limited streams and is charged with developing Total Maximum Daily Load (TMDL) programs.

Oregon Department of Agriculture

The Department of Agriculture oversees several programs in the Natural Resource Division that address soil, water, and plant conservation in the Grande Ronde subbasin. Soil and Water Conservation Districts, Watershed Councils, the Environmental Quality Incentives Program (EQIP), and Coordinated Resource Management Planning (CRMP) are under the jurisdiction of the Department of Agriculture as is the Oregon Noxious Weed Strategic Plan. The Coordinated Resource Management Planning (CRMP) group addresses watershed management issues within specific subbasins and develops stream restoration goals and objectives. The ODA is responsible for the agricultural portion of the WQMP and TMDL.

Oregon Department of Forestry

The Oregon Department of Forestry enforces the Oregon Forest Practices Act (OAR 629-Division 600 to 680 and ORS 527) regulating commercial timber production and harvest on state and private lands. The OFPA contains guidelines to protect fish bearing streams during logging and other forest management activities, which address stream buffers, riparian management, and road maintenance. The ODF is a partner in the Oregon Plan and uses its guidelines for watershed work and assessments in the Grande Ronde Subbasin. The Oregon Department of Forestry is responsible through the OFPA for administering the forestry portion of the Water Quality Management Plan and TMDL and provides technical input to the conservation reserve enhancement program (CREP).

Oregon Department of Parks and Recreation

The Oregon Department of Parks and Recreation implements the State Scenic Waterways Act and administers and manages State Parks within the subbasin including Wallowa Lake and Catherine Creek State Parks.

The Land Conservation and Development Commission

The Land Conservation and Development Commission regulates land use on a statewide level. County land use plans must comply with statewide land use goals. Effective land use plans and policies are essential tools to protect against permanent fish and wildlife habitat losses and degradation, particularly excessive development along streams, wetlands, and floodplains and in sensitive wildlife areas.

State Government – Washington

Washington Department of Fish and Wildlife

The WDFW is responsible for preserving, protecting, and perpetuating populations of fish and wildlife. Washington State laws, policies or guidance that WDFW uses to carry out its responsibilities include:

Hydraulic Code (RCW 75.20.100-160): This law requires that any person, organization, or government agency that conducts any construction activity in or near state waters must comply with the terms of a Hydraulic Project Approval permit issued by WDFW. State waters include all marine waters and fresh waters. The law's purpose is to ensure that needed construction is done in a manner that prevents damage to the state's fish, shellfish, and their associated habitat(s).

Strategy to Recover Salmon (part of *Extinction is not an Option*): The strategy is intended to be a guide, and it articulates the mission, goals, and objectives for salmon recovery. The goal is to restore salmon, steelhead, and trout populations to healthy harvestable levels and improve those habitats on which the fish rely. The early action plan identifies specific activities related to salmon recovery that state agencies will undertake in the 1999-2001 biennium and forms the first chapter in a long-term implementation plan currently under development. The early actions are driven by the goals and objectives of the Strategy. Many of the expected outcomes from the early actions will directly benefit regional and local recovery efforts.

The *Bull Trout and Dolly Varden Management Plan*: Describes the goal, objectives, and strategies to restore and maintain the health and diversity of self-sustaining bull trout and Dolly Varden stock and their habitats.

The *Wild Salmonid Policy for Washington*: Describes the direction the WDFW will take to protect and enhance native salmonid fish. The document includes proposed changes in hatchery management, general fish management, habitat management, and regulation/enforcement.

The *Draft Steelhead Management Plan*: Describes the goals, objectives, policies, and guidelines to be used to manage the steelhead resource.

Washington Priority Habitats and Species (PHS): A guide to management of fish and wildlife "critical areas" habitat on all State and private lands as they relate to the Growth Management Act of 1990. The recommendations address upland as well as riparian habitat and place emphasis on managing for the most critical species and its habitat.

Specific wildlife species management or recovery plans, (e.g., Blue Mt. Elk Herd Management Plan 2000, Statewide Elk Management Plan, Bighorn Sheep Herd and Statewide Management Plan, Black Bear, State Ferruginous Hawk Recovery Plan, Bald Eagle Recovery Plan).

The *Draft Snake River Wild Steelhead Recovery Plan*: This plan is an assessment of problems associated with the continuing decline in natural steelhead populations within the Snake River basin and includes recommendations to reverse the decline. The WDFW manages fisheries and fish populations to provide diverse recreational opportunity and conserve or enhance indigenous populations.

The *Lower Snake River Compensation Plan*: This program is funded by BPA and the USFWS through the LSRCP office, and the WDFW administers and implements the Washington portion of the program. The program mitigates for the loss of fish populations and recreational opportunities resulting from construction of the four lower Snake River dams. Specific mitigation goals include “in-place” and “in-kind” replacement of adult salmon and steelhead. The WDFW developed implementation plans as part of the LSRCP program.

The WDFW Snake River *Fishery Management and Evaluation Plan* (FMEP): A plan required by NMFS for all fisheries in the Snake River and its tributaries in Washington. The plan is an assessment of fisheries effects on listed anadromous salmonids.

The WDFW Enforcement Program enforces state laws concerning illegal harvest, fish passage, water surface screening requirements and stream hydraulics permitting. These state laws are normally in direct support of the protection provisions of the ESA for listed species. In the Asotin subbasin, officers patrol streams for closed season harvest or taking of protected species listed under both state law and the federal ESA, such as spring chinook salmon, fall chinook, summer steelhead, and bull trout. Officers also monitor for illegal habitat modification, alteration and destruction activities on area streams and ensure work occuring within the ordinary high water area of streams is conducted under authority of and in accordance with appropriate state hydraulic project approval (HPA) permits.

Washington Department of Ecology

The WDOE’s mission is to protect, preserve, and enhance Washington’s environment and promote the wise management of air, land, and water for the benefit of current and future generations. The agency monitors and sets regulatory standards for water quality within the subbasin.

In addition to regulating water quality the WDOE is responsible for water resource management, instream flow rule development, shoreline management, floodplain management, wetland management, and providing support for watershed management in the Asotin Creek subbasin.

The WDOE regulates surface and ground water quality within the Asotin Creek subbasin. The 1972 Federal Clean Water Act authorizes and requires states to establish water quality standards for specific pollutants. Every two years, the WDOE is required to list in Section 303(d) of the Clean Water Act those water bodies that do not meet surface water quality standards. The WDOE utilizes data collected by agency staff as well as data from tribal, state, local governments, and industries to determine whether or not a waterbody is listed on the 303(d) list. Total Maximum Daily Loads must be completed for every parameter that exceeds state water quality standards on listed water bodies.

The WDOE proposes several changes to surface water quality standards and the classification system. The revised standards must be applied so that they support the same uses covered under the current classification structure. Changes to the surface water quality standards will affect many programs, including monitoring, permits, TMDLs, and the 303(d) list.

Washington Department of Natural Resources

The WDNR manages state land throughout the subbasin. These lands are generally located in sections 16 and 36 within each township. The main goal of the WDNR is to maximize monetary returns from state lands in order to fund school construction. This type of management often reduces the habitat value for wildlife on WDNR lands. The WDNR also enforces and monitors logging practice regulations on private lands.

County and Local - Oregon

Grande Ronde Model Watershed Program

The Grande Ronde Model Watershed Program (GRMWP) was selected in 1992 by the Northwest Power Planning Council as the model watershed project in Oregon. The GRMWP has a Board of Directors, composed of local representatives, tribes and natural resource management agencies, to coordinate policy of the program. For the last nine years the GRMWP has served as an example of a watershed management partnership among local residents, agency staffs and public interest groups. The Program coordinates the implementation, maintenance and monitoring of habitat restoration projects. To date the Program has facilitated the implementation of nearly 300 restoration projects.

County Governments

County Commissioners have established Comprehensive Plans for land use within each county in Oregon. A riparian element within the Plan is designed to establish certain regulatory control over specific activities to 1) ensure open space, 2) protect scenic, historic, and natural resources for future generations, and 3) promote healthy and visually attractive environments in harmony with the natural landscape. A riparian setback is specified in the Riparian Overlay Area Designation to conserve fish and wildlife habitat and enhance streambank stability. Some counties also assist with funding of county watershed activities in collaboration with OWEB. Wallowa County has additionally developed a habitat recovery plan incorporated into the land use plan (Wallowa County and Nez Perce Tribe 1999).

Union Soil and Water Conservation District

The mission statement of the Union Soil and Water Conservation District is to assist and/or educate interested users in the development, protection, and conservation of natural resources. The primary function of the district is to collect available technical, financial, and educational resources from various sources and apply them in a focused way so that they meet the needs and objectives of the local land user.

Wallowa Soil and Water Conservation District

The purpose of the Wallowa Soil and Water Conservation District is to maintain or enhance natural resources within Wallowa County for the benefit of the flora and fauna that depend on healthy ecosystems and for the economic and environmental benefits of the people as authorized by the Oregon State Legislative Assembly in ORS 568.225.

Grande Ronde Water Quality Committee

The Grande Ronde Water Quality Committee is a group of representatives from interest groups affected by water quality issues and regulations. They developed the Upper Grande Ronde Water Quality Management Plan (ODEQ 1999). Similar plans for the lower Grande Ronde and Wallowa watersheds are in development. These WQMPs provide a framework for achieving the load allocations in the TMDL.

County and Local - Washington

Asotin County

Asotin County has enacted strong policies and ordinances to provide for the preservation of local streams and their riparian areas. These local regulations will, in turn, aid in the preservation and restoration of fish populations. The following is an overview of local regulations.

Asotin County Shorelines Master Program (1994): The Shorelines Master Program (Program) is responsible for protecting the classified Shorelines of Statewide Significance. Its paramount objectives are to protect and restore the valuable natural resources that shorelines represent and to plan for and foster all reasonable and appropriate uses that are dependant upon a waterfront location or that offer opportunities for the public to enjoy the states shorelines. The Program is based on specific goals and objectives directed towards specific land uses that are within 200 feet of the ordinary high water mark. The Program offers a cooperative balance by local and statewide interests in the management and development of the shoreline areas by requiring local governments to plan and regulate shoreline development. The program is essentially a shoreline comprehensive plan with a distinct environmental orientation applicable to shoreline areas and customized to local circumstances.

Asotin County Zoning Ordinance (April 2001): Asotin County has three separate zones within the areas of the Asotin Creek subbasin: Ag-Transition, Rural Residential, and Agricultural. To minimize development impacts within the subbasin, Asotin County designated minimum lot sizes for each zone. The Ag-Transition zone, 5 percent of the watershed, has a minimum lot size of one acre. The Rural Residential zone, approximately 25 percent of the watershed, consists of a five 5-acre minimum lot size. The Agricultural zone, 70 percent of the watershed, is comprised of 40-acre minimums.

Flood Damage Prevention Ordinance (1988): The intent of this ordinance is to restrict or prohibit uses which may be dangerous to health, safety, and property due to water or erosion hazards. The ordinance also is intended to control the alteration of the natural floodplain and stream channel, which would help keep the stream channel within the riparian areas. Filling, grading, and dredging within the floodplain are also addressed and monitored by Asotin County.

Critical Areas Ordinance (1988): This ordinance is primarily an overlay of the above stated programs and ordinances in recognizing the sensitivity of the shorelines, floodplains, riparian areas, and wetlands, and minimizes the impacts from development.

Asotin County Noxious Weed Board: The primary function of the Asotin County Noxious Weed Control Program is to provide technical assistance to the citizens of the county in developing effective control strategy's in dealing with their noxious weed problems and encourage people to be good land stewards. Currently the County has a three-quarter-time position working on an important resource issue within the county: fostering an understanding of and responsibility for weed issues within the county and encouraging individuals and agencies to do their part to reduce damages associated with the invasion of noxious weeds. Funding for the program is through local county tax revenues, either from a county general fund or by weed assessment. Since 1986, more than $100,000 from both state and county funds has been utilized for yellow starthistle control measures.

Asotin County Conservation District

The ACCD is Asotin County's designated lead agency for watershed planning and implementation. The ACCD is responsible for the implementation of the Asotin Creek Model Watershed Plan and the Washington State Salmon Recovery Act within Asotin County. The primary function of the ACCD is to assist landowners and land managers to adopt Best Management Practices to conserve and improve renewable natural resources. Through its volunteer Board of Supervisors and affiliated agencies, the ACCD also identifies resource conservation issues and secures and administers cost-sharing programs towards solving these resource issues.

Other Entities and Organizations

Oregon Water Trust

Oregon Water Trust (OWT), a private, non-profit group, leases and purchases consumptive water rights for in-stream use to enhance streamflows in Oregon. Added responsibility for water brokerage contracts to restore instream flows is implied in the FRCPS BiOp. http://www.owt.org/

The Nature Conservancy

The Nature Conservancy protects the lands and waters, which plant and animals species need to survive. It is instrumental in purchasing lands for habitat protection, working with agencies with similar objectives, and has been involved in the Grande Ronde subbasin. http://nature.org/

Wallowa Resources

Established in 1996, Wallowa Resources works through partnerships with a diverse group of people to design and realize a new, healthier rural community. Recognizing that sustainable livelihoods require the maintenance of long-term ecological and economic health, the diverse constituents of Wallowa County are uniting to find local small-scale solutions to the community's needs.

Northwest Power Planning Council - NWPPC

Formed under the Pacific Northwest Electric Power Planning and Conservation Act of 1980, the NWPPC is directed to develop a program to "protect, mitigate, and enhance fish and wildlife, included related spawning grounds and habitat, in the Columbia River and its tributaries… affected by the development, operation, and management of [hydroelectric project]…" the BPA funds the Council's program. http://www.nwcouncil.org/

Columbia River Basin Forum

Formerly called The Three Sovereigns, the Columbia River Basin Forum is designed to improve management of fish and wildlife resources in the Columbia River Basin. The process is an effort to create a new forum where the federal government, Northwest states and tribes could better discuss, coordinate, and resolve basinwide fish and wildlife issues under the authority of existing laws. The Forum is included as a vehicle for implementation of the Basinwide Salmon Recovery Strategy.

Existing Goals, Objectives, and Strategies

The Grande Ronde subbasin has diverse populations of fish and wildlife and unique areas of habitat that are of economic and ecological significance to the people of the State of Oregon and the Northwest, and of special cultural significance to members of the Nez Perce and Umatilla Tribes. Many of the natural resources of the Grande Ronde subbasin are managed for the benefit of the people of the entire Nation by way of the large amount of federal land. The overall goal for the Grande Ronde subbasin is to restore the health and function of the ecosystem to ensure continued viability of these important populations.

Numerous federal, state, and local entities are charged with maintenance and protection of the natural resources of the Grande Ronde subbasin. The following section, organized by entity, illustrates the full range of goals, objectives and strategies guiding activities relative to fish, wildlife and habitats in the Grande Ronde River subbasin. To the casual observer, these may appear redundant and leave the impression that each entity is working independently and only toward its own goals. However, agencies, tribes and other entities in the Grande Ronde subbasin are working together toward these goals through a variety of coalitions (e.g., US v OR, NEOH, GRMWP). On a case by case basis, cooperators in the subbasin combine individual institutional goals to achieve a common subbasin goal.

Federal

National Marine Fisheries Service and Federal Caucus

The goal of the NMFS with respect to the Grande Ronde Subbasin is to achieve the recovery of the salmon resource. This requires the development of watershed-wide properly functioning habitat conditions and a population level that is viable according to standards and criteria identified by NMFS in two key documents [Matrix of Pathways and Indicators (1996); Viable Salmonid Populations (2000)]. Actions which contribute to these objectives include moisture retention on crop lands, development of riparian vegetation, restoration of streamflow and appropriate hydrologic peak flow conditions, passage improvements and screening, and many other activities. By virtue of Section 7 responsibilities, any federal action requires consultation with NMFS. The recovery planning framework and effort will build upon existing conservation measures and develop additional critical information useful to fish and wildlife managers.

The federal Basinwide Strategy for salmon recovery developed by the federal caucus identifies immediate and long-term actions in the hydropower, hatchery, harvest, and habitat arenas. Importantly for this summary, it commits federal assistance to local efforts in these areas. These goals are outlined below.

Habitat Goal

The habitat goals of the Basinwide Salmon Recovery Strategy are: the existence of high quality habitats that are protected, degraded habitats that are restored and connected to other functioning habitats, and a system where further degradation of tributary and estuary habitat and water quality is prevented.

Near-term (5-10 year) objectives for tributary habitat within the Grande Ronde subbasin include:

Objective 1. Restore and increase tributary flows to improve fish spawning, rearing, and migration.

Objective 2. Screen diversions, combine diversions, and rescreen existing diversions to comply with NMFS criteria to reduce overall mortality.

Objective 3. Reduce passage obstructions to provide immediate benefit to migration, spawning, and rearing.

Strategy 1. Federal agencies, state, and other to address all flow, passage, and screening problems over the next 10 years in the Grande Ronde subbasin.

Strategy 2. BPA funds protection of currently productive non-federal habitat, especially if at risk of being degraded.

Strategy 3. Increase tributary flows through innovation actions.

Strategy 4. Action Agencies to coordinate efforts and support off-site habitat enhancement measures undertaken by others

The program for tributary habitat is premised on the idea that securing the health of these habitats will boost productivity of listed stocks.

Hatchery Goal

Research Monitoring and Evaluation Goal

Identified trends in abundance and productivity in populations of listed anadromous salmonids.

Objective 1. Conduct population status monitoring to determine juvenile and adult distribution, population status, and trends.

Objective 2. Monitor the status of environmental attributes potentially affecting salmonid populations, their trends, and associations with salmonid population status.

Objective 3. Monitor the effectiveness of intended management actions on aquatic systems, and the response of salmonid populations to those actions.

Objective 4. Assess quality of available regional databases, in terms of accuracy and completeness, which represent habitat quality throughout the basin.

Objective 5. Monitor compliance of management actions toward proper implementation and maintenance.

Strategy 1. Conduct Tier 1 sampling to monitor broad-scale population status and habitat conditions.

Strategy 2. Conduct Tier 2 monitoring to obtain detailed population assessments and assessments of relationships between environmental characteristics and salmonid population trends.

Strategy 3. Conduct Tier 3 monitoring to establish mechanistic links between management actions and fish population response.

Bureau of Reclamation

Reclamation plans to work with willing private landowners through the existing local infrastructure to improve conditions related to instream flow, barriers, and habitat for anadromous fish. Reclamation plans to continue to work to meet these objectives in the subbasin as long as necessary.

Objective 1. Restore and increase main stem and tributary flows to improve fish spawning, rearing, and migration.

Strategy 1. Plan and design pipelines, canal lining, diversion automation, and other water conservation measures to provide water to meet irrigation demands and retain residual flow in the stream.

Strategy 2. Plan and design stream restoration modifications to enhance natural stream function.

Strategy 3. Continue participation in water exchange proposals associated with Wallowa Dam rehabilitation project.

Objective 2. Eliminate barriers to fish passage.

Strategy 1. Provide planning and engineering design assistance to replace barriers with permanent structures that will freely pass fish.

Objective 3. Improve habitat for migrating, spawning, and rearing anadromous fish.

Strategy 1. Plan and design structures and other features to improve habitat.

US Fish and Wildlife Service

Below are the goals, objectives, and strategies for the USFWS (Idaho Fisheries Resource Office and the Idaho Fish Health Center). Service goals and responsibilities are guided by many federal laws, agreements, and court orders such as the Endangered Species Act and tribal trust responsibilities. We are also actively involved in a variety of coordination efforts in the Snake basin and are committed to coordinate all Service fishery projects with co-managers in the basin.

Goal:

- Protect, restore, and enhance native anadromous and resident fish populations in the Grande Ronde River Basin.

Objective 1. Reverse declining trends of bull trout populations in the Grande Ronde River basin.

Strategy 1.1. Monitor population size and trends.

Strategy 1.2. Determine bull trout distribution in the Grande Ronde River basin.

Strategy 1.3. Identify and implement habitat improvement projects.

Strategy 1.4. Eradicate and control non-native char populations in the Grande Ronde River Basin.

Strategy 1.5. Evaluate bull trout populations for presence of pathogens

Objective 2. Increase natural production of anadromous salmonids to meet carrying capacities of the basin.

Strategy 2.1. Determine the various anadromous salmonid carrying capacities for the Snake basin.

Strategy 2.2. Evaluate supplementation efforts to rebuild fall chinook salmon populations in Grande Ronde River Basin.

Strategy 2.3. Monitor spawning distribution of fall chinook salmon in the Grande Ronde River.

Strategy 2.4. Monitor natural fall chinook salmon emergence and growth in the Grande Ronde River Basin.

Strategy 2.5. Evaluate natural fall chinook salmon juvenile emigration survival to Lower Granite Dam.

Strategy 2.6. Develop a systematic plan for sampling wild, natural, and feral fish populations for pathogens that potentially would affect wild fish, attempts to restore stock, and hatchery fish released into the system.

Lower Snake River Compensation Plan

The Fish and Wildlife Service, LSRCP Office administers and funds the operation, maintenance, and evaluation of all LSRCP facilities in the Grande Ronde River Basin through cooperative agreements with the agencies and tribes. As the agency who markets Columbia River generated power, the Bonneville Power Administration (BPA) reimburses the FWS for all power-related LSRCP costs. The basis for the development of the LSRCP was derived from the Special Report, Lower Snake River Fish and Wildlife Compensation Plan, Lower Snake River, Washington and Idaho, June 1975 . (Corps, 1975) and further described in “A Review of the Lower Snake River Compensation Plan Hatchery Program” (Herrig, 1990). The USFWS is also required to comply with the Endangered Species Act, to meet tribal trust responsibilities, to adhere to various federal laws, agreements, and court orders, and to pursue the USFWS Mission and Vision (USFWS 1998).

The LSRCP spring/summer chinook program in the Grande Ronde River Basin consists of one hatchery (Lookingglass FH). The LSRCP goal is to return 5,820 spring/summer chinook adults to the Snake River basin above Lower Granite Dam (USFWS, 2001). The hatchery is operated by Oregon Department of Fish and Wildlife.

The LSRCP steelhead program in the Grande Ronde River consists of three hatcheries and associated satellite facilities that rear and acclimate steelhead (Irrigon FH, Wallowa FH, Lyons Ferry FH, Big Canyon SF, Little Sheep SF, and Cottonwood SF). The LSRCP goal is to return 9,184 steelhead adults to the Snake River Basin above Lower Granite Dam. Irrigon FH, Wallowa FH, Big Canyon SF, and Little Sheep SF are operated by Oregon Department of Fish and Wildlife while Lyons Ferry FH and Cottonwood SF are operated by Washington Department of Fish and Wildlife.

As LSRCP cooperators, the Nez Perce Tribe and Confederated Tribes of the Umatilla Indina Reservation also participate in operation and management decisions in all

LSRCP spring/summer chinook and summer steelhead programs in the Grande Ronde River Basin. All cooperators are funded to conduct monitoring and evaluation studies and fish health.

Goal:

- Return 5,820 spring/summer chinook and 9,184 summer steelhead to the Snake River Basin above Lower Granite Dam.

Objective 1. Provide harvest for sport anglers and tribes.
Objective 2. Provide brood stock for hatchery programs.
Objective 3. Provide some natural spawning escapement where appropriate.
Objective 4. Comply with the Endangered Species Act.
Objective 5. Meet tribal trust responsibilities.
Objective 6. Adhere to federal laws, agreements, and court orders.
Objective 7. Pursue the USFWS Mission and Vision.

US Forest Service

Management Objectives

(PACFISH/INFISH 1995) part of amended Forest LRMP for Wallowa-Whitman and Umatilla NFs:

Fish and Fish Habitat Objectives (Riparian Management Objectives - RMO)

Objective 1. Establish Pool Frequencies (#pools/mi) dependent on width of wetted stream Width 10 20 25 50 75 100 125 150 200; # pools 96 56 47 26 23 18 14 12 9
Objective 2. Comply with state water quality standards in all systems (max < 68°F)
Objective 3. Establish large woody debris in all forested systems (> 20 pieces/mi, > 12 in diameter, > 35 ft length).
Objective 4. Ensure > 80% bank stability in non-forested systems
Objective 5. Reduce bank angles (undercuts) in non-forested systems (> 75% of banks with < 90% angle).
Objective 6. Establish appropriate width/depth ratios in all systems (< 10, mean wetted width divided by mean depth).

General Riparian Area Management

Objective 1. Identify and cooperate with federal, Tribal, and state and local governments to secure instream flows needed to maintain riparian resources, channel conditions, and aquatic habitat
Objective 2. Fell trees in Riparian Habitat Conservation Areas when they pose a safety risk. Keep felled trees on site when needed to meet woody debris objectives.
Objective 3. Apply herbicides, pesticides, and other toxicants/chemicals in a manner to avoid impacts that are inconsistent with attainment of RMOs.
Objective 4. Locate water drafting sites to minimize adverse effects on stream channel stability, sedimentation, and in-stream flows.

Watershed and Habitat Restoration

Objective 1. Design and implement watershed restoration projects in a manner that promotes the long-term ecological integrity of ecosystems, conserve the genetic integrity of native species, and contributes to attainment of RMOs.

Objective 2. Cooperate with federal, state, and tribal agencies, and private landowners to develop watershed-based CRMPs or other cooperative agreements to meet RMOs.

Fisheries and Wildlife Restoration

Objective 1. Design and implement fish and wildlife habitat restoration and enhancement activities in a manner that contributes to attainment of the RMOs.

Objective 2. Design, construct, and operate fish and wildlife interpretive and other use-enhancement facilities in a manner that is consistent with attainment of RMOs.

Objective 3. Cooperate with federal, state, and tribal wildlife management agencies to identify and eliminate wild ungulate impacts that are inconsistent with attainment of RMOs.

Objective 4. Cooperate with federal, state, and tribal fish management agencies to identify and eliminate impacts associated with habitat manipulation, fish stocking, fish harvest, and poaching that threaten the continued existence and distribution of native fish stocks inhabiting federal lands.

Tribal

Nez Perce Tribe

Goals

- Restore anadromous fishes to the rivers and streams that support the historical, cultural and economic practices of the Nez Perce Tribe (CRITFC 1995).
- Emphasize restoration strategies that rely on natural production and healthy river systems (CRITFC 1995).
- Protect Tribal sovereignty and treaty rights (CRITFC 1995).
- Reclaim the anadromous fish resource and the environment upon which it depends for future generations (CRITFC 1995).
- Conserve, restore and recover native resident fish populations (NPT DFRM 2000).
- Restore upland habitat and the native wildlife populations that depend on it.

Management Objectives

Objective 1. Restore and recover historically present fish species.

Objective 2. Provide for harvestable, self-sustaining populations of anadromous and resident fish species in their native habitat.

Objective 3. Manage salmon and steelhead for long-term population persistence.
Objective 4. Manage aquatic resources for healthy ecosystem function and rich species biodiversity.
Objective 5. Implement and enforce existing federal laws for protection of water quality, habitat and aquatic resources.
Objective 6. Protect and enhance treaty fishing rights and fishing opportunities.
Objective 7. Provide optimum tributary stream flows to meet life stage specific habitat requirements of resident and anadromous fish species and all other aquatic species.
Objective 8. Provide optimum mainstem river flows for anadromous fish passage and water spill at mainstem dams to maximize fish survival.
Objective 9. Integrate aquatic habitat and species management with terrestrial species management.
Objective 10. Maintain a natural smolt-to-adult survival rate of 2 to 6% for salmon and steelhead.
Objective 11. Meet federal fisheries mitigation responsibilities for LSRCP program.
Objective 12. Provide for Tribal hatchery production needs in federal and state managed facilities.
Objective 13. Address key limiting survival factors at mainstem hydroelectric facilities.
Objective 14. Coordinate with the National Marine Fisheries Service and U.S. Fish and Wildlife Service to fund and implement actions identified in the Biological Opinions, and to implement other emergency actions that address imminent risk to listed salmon, steelhead, and bull trout populations.
Objective 15. Develop conservation hatcheries for supplementation of ESA listed fish populations.

Management Strategies

Strategy 1. Implement natural river drawdown strategy, for recovery of anadromous fish stocks, with necessary investments in community infrastructure.
Strategy 2. Implement a no-net decline management criteria for anadromous fish stocks.
Strategy 3. Implement Northeast Oregon Hatchery production releases.
Strategy 4. Monitor steelhead in key tributary streams.
Strategy 5. Implement native steelhead broodstock development in conservation hatcheries.
Strategy 6. Implement effective monitoring and evaluation
Strategy 7. Conduct necessary planning activities.
Strategy 8. Restore the natural production potential of anadromous and resident fish species.

Research Monitoring and Evaluation

Objective 1. Establish baseline information on the Lostine River chinook salmon subpopulation prior to supplementation and monitor and evaluate the effectiveness of supplementation (NPT DFRM 2000).

Strategy 1. Conduct project planning and coordination with fisheries co-managers.

Strategy 2. Collect baseline information on environmental conditions.

Strategy 3. Collect and analyze information on abundance, genetic and life history characteristics of the Lostine River chinook salmon subpopulation.

Strategy 4. Monitor and evaluate operation of adult collection (weir and trap) for adverse impacts to resident and/or anadromous fish populations.

Strategy 5. Monitor and evaluate conventional and captive broodstock smolt production.

Strategy 6. Transfer the technology through preparation of annual reports.

Objective 2. Implement a captive broodstock program to prevent extirpation of native Grande Ronde basin chinook salmon, and maintain genetic diversity in the artificially propagated population (NPT DFRM 2000).

Strategy 1. Coordinate captive broodstock program with state and federal managers.

Strategy 2. Monitor and evaluate Lostine River chinook salmon parr at Lookingglass Fish Hatchery, Bonneville Hatchery, and Manchester Marine Laboratory.

Strategy 3. Monitor the abundance and timing of migration of adult chinook salmon into the Lostine River.

Strategy 4. Monitor and evaluate the F1 generation offspring.

Strategy 5. Transfer the technology through preparation of annual reports.

Objective 3. Conduct Lower Snake River Compensation Plan (LSRCP) hatchery evaluations (NPT DFRM 2000, Hesse and Kucera 2000).

Strategy 1. Conduct salmon spawning ground surveys in the Lostine River and other reference streams for population trend monitoring.

Strategy 2. Conduct genetic analysis to examine stock structure, gene flow and genetic similarity of listed steelhead in the Grande Ronde River.

Strategy 3. Develop small-scale experiments to determine contribution of hatchery origin adults to juvenile production.

Strategy 4. Cooperatively conduct marking and mark efficiency evaluation studies of LSRCP hatchery production.

Strategy 5. Collect adult male gametes from chinook salmon and steelhead from LSRCP hatcheries and from selected tributary streams for gene conservation efforts (cryopreservation).

Objective 4. Develop a comprehensive monitoring and evaluation plan including a summary of existing information on chinook and steelhead population status, including base line genetic stock structure (NPT DFRM 2000).

Strategy 1. Synthesize existing data on chinook and steelhead adult abundance, spawning distribution and timing.

Strategy 2. Synthesize existing data on steelhead juvenile density, early-life history, and survival.

Strategy 3. Promote the genetic analysis of tissue samples collected from juvenile steelhead under the Lower Snake River Compensation Program. Assist with the acquiring of funding and assure comparable and transferable analysis methods are used.

Strategy 4. Summarize spawning distribution and timing, juvenile migration and survival, juvenile(hatchery) releases, life history, ecological interactions, genetics, and fish health.

Strategy 5. Identify critical uncertainties regarding the condition stocks in the Snake River Basin and associated with supplementation of those stocks.

Strategy 6. Develop an annotated bibliography of steelhead supplementation research and management actions.

Strategy 7. Develop a monitoring and evaluation plan for collection of baseline data in appropriate subbasin tributaries.

Strategy 8. Evaluate the feasibility of conducting juvenile production monitoring, including the engineering design of trapping facilities to support year-round sampling.

Strategy 9. Develop a conservation biology assessment of adult escapement goals.

Objective 5. Preserve the genetic diversity of salmonid populations at high risk of extirpation through application of cryogenic techniques (NPT DFRM 2000, Armstrong 2000).

Strategy 1. Coordinate salmonid gamete preservation with management agencies in the Snake River basin.

Strategy 2. Refine gene bank cryopreservation project goals for salmonid spawning aggregates at high risk of extirpation in the Snake River basin.

Strategy 3. Collect gametes from ESA-listed chinook salmon and steelhead for application of cryopreservation techniques and conduct genetic analysis of fish represented in the germplasm repository for salmonid conservation units at low levels of abundance and high risk of extirpation.

Strategy 4. Technology transfer through annual reports.

Strategy 5. Operation and maintenance of germplasm repository

Objective 6. Accurately determine adult chinook salmon spawner abundance and spawner migration timing into the Minam River on an annual basis (NPT DFRM 2000).

Strategy 1. Determine adult salmon spawner abundance in relation to proposed recovery abundance levels (NMFS 2000).

Strategy 2. Monitor adult salmon spawner migration timing.

Strategy3. Effectively communicate project results to co-managers through briefings and annual reports.

Artificial Production

Objective 1. Complete planning and development of spring chinook conservation facilities as proposed in the spring chinook master plan.

Strategy 1.1. Complete preliminary and final design of proposed facilities on the Imnaha and Lostine rivers and modifications to Lookingglass Fish Hatchery.

Strategy 1.2. Complete NEPA analysis of proposed alternative for facilities on the Imnaha and Lostine rivers.

Strategy 1.3. Construct proposed production facilities on the Imnaha and Lostine rivers to implement the conservation hatchery program.

Strategy 1.4. Coordinate planning and development of NEOH facilities and programs with appropriate entities.

Objective 2. Develop a master plan for the development of a native broodstock for steelhead conservation and restoration in the Grande Ronde subbasin and transition of steelhead production in the Imnaha subbasin from mitigation to conservation and restoration.

Strategy 2.1. Determine critical uncertainties regarding the condition of steelhead populations in the Grande Ronde and Imnaha subbasins and develop a plan for collection of baseline data in appropriate subbasin tributaries.

Strategy 2.2. Collect and summarize existing information on population status.

Strategy 2.3. Conduct review of existing production facilities and the potential for modification to meet restoration program needs.

Strategy 2.4. Identify potential options for new supplementation programs and/or modification of existing LSRCP production programs to implement restoration program.

Strategy 2.5. Identify potential site locations for adult trapping facilities, incubation and rearing facilities, stream-side incubators, acclimation and release facilities.

Objective 3. Reintroduce and restore coho salmon in the Grande Ronde subbasin.

Strategy 3.1. Complete the master plan for reintroduction and restoration program.

Objective 4. Restore fall chinook salmon in the Imnaha and Grande Ronde subbasins.

Strategy 4.1. Complete the comprehensive Snake River fall chinook recovery plan.

Strategy 4.2. Identify facilities necessary for implementation

Objective 5. Reintroduce and restore sockeye salmon to Wallowa Lake in the Grande Ronde subbasin.

Strategy 5.1. Complete a master plan for reintroduction and restoration program.

Strategy 5.2. Provide fish passage facilities in Wallowa Lake Dam for adult and juvenile passage.

Watershed

Goals:

- Implement the Wallowa County/Nez Perce Tribe Salmon Habitat Recovery Plan and Multi-Species Strategy.
- Provide habitat for the restoration and enhancement of anadromous salmonids and other native fish species.
- Develop recommendations for management and utilization of water by agriculture and other industries.
- Conduct a public involvement program to address concerns of landowners, land managers and resource users.

- Provide recommendations for management of resources which will enhance the quality and quantity of stream flows.
- Recommend resource management and research activities.
- Assure that watershed restoration activities implemented in the Basin are adequately monitored and evaluated.
- Restore upland habitat and the native wildlife populations that depend on it.

Objective 1. Coordinate watershed restoration activities.

Strategy 1.1. Facilitate inter-agency coordination of program activities and projects.
Strategy 1.2. Coordinate planning, prioritization, design and implementation of restoration projects.
Strategy 1.3. Provide technical support for project planning, design and implementation.
Strategy 1.4. Maintain basin-wide restoration activity database.
Strategy 1.5. Prepare watershed assessments/updates and NEPA documentation.
Strategy 1.6. Conduct educational outreach.
Strategy 1.7. Coordinate project effectiveness and basin-wide water quality monitoring.

Objective 2. Improve in-stream habitat diversity for salmonid spawning and rearing.

Strategy 2.1. Add large wood component to mainstem streams and tributaries.
Strategy 2.2. Rock and log structure placements.
Strategy 2.3. Install grade control structures.
Strategy 2.4. Reconstruct channel meanders.
Strategy 2.5. Construct off-channel rearing habitat
Strategy 2.6. Implement riparian tree planting

Objective 3. Enhance riparian condition (vegetation, function, etc.)

Strategy 3.1. Construct riparian livestock fencing
Strategy 3.2. Restore wet meadows
Strategy 3.3. Develop off-stream livestock water sources
Strategy 3.4. Close/obliterate draw-bottom roads where possible.
Strategy 3.5. Revegetate streambanks and riparian zones.

Objective 4. Reduce stream sedimentation.

Strategy 4.1. Revegetate streambanks.
Strategy 4.2. Construct rock barbs with embedded wood or use other structures as appropriate to the site (e.g., J-hooks, W-weirs).
Strategy 4.3. Use bio-engineering where hard structures are not appropriate or possible.
Strategy 4.4. Determine the source of the problem (e.g., land use, changed hydrograph) and correct if possible.

Objective 5. Increase late-season streamflows.

Strategy 5.1. Improve water conveyance efficiency in irrigation ditches.
Strategy 5.2. Improve water application efficiency on irrigated lands.
Strategy 5.3. Acquire in-stream water rights.
Strategy 5.4. Lease water rights.

Objective 6. Improve upland watershed condition and function.

Strategy 6.1. Treat and contain noxious weeds.
Strategy 6.2. Construct livestock pasture fencing.
Strategy 6.3. Manipulate tree density.
Strategy 6.4. Enhance vegetative cover (seeding).

Strategy 6.5. Reduce risk of catastrophic fire.

Strategy 6.6. Develop an assessment of upland habitat conditions and prioritize restoration actions.

Strategy 6.7. Develop a habitat type/cover type GIS overlay with condition factor.

Objective 7. Improve adult and juvenile salmonid fish passage.

Strategy 7.1. Prioritize replacement/modification of inadequate culverts based on an accepted culvert inventory methodology (e.g. U.S. Forest Service, Region 6).

Strategy 7.2. Replace/modify culverts based on the prioritization.

Strategy 7.3. Repair inadequate crossings (fords) by hardening the entrances and stream bottom or by replacing them with culverts or bridges as appropriate.

Strategy 7.4. Replace push-up gravel irrigation diversions.

Strategy 7.5. Modify impassable irrigation diversion structures.

Objective 8. Improve water quality.

Strategies: All tasks under Obj's 3, 4, 5, 6.

Confederated Tribes of the Umatilla Indian Reservation

Goals:

- Protect, enhance and restore wild and natural populations of spring and fall chinook, summer steelhead, bull trout, shellfish and other indigenous fish in the Grande Ronde Basin.
- Reestablish runs of extirpated coho and sockeye salmon and Pacific lamprey into the Grande Ronde River Basin.
- Provide sustainable ceremonial, subsistence, and recreational fisheries and non-consumptive fish benefits such as cultural and ecological values.
- Maintain genetic and other biological characteristics of indigenous populations and genetic viability of reintroduced populations.

Objective 1. Achieve and maintain an average run of 16,400 spring chinook to the Grand Ronde River mouth for purposes of natural production, fisheries, and broodstock.

Objective 2. Achieve and maintain an average run of 10,000 fall chinook to the Grande Ronde River mouth for purposes of natural production, fisheries, and broodstock.

Objective 3. Achieve and maintain an average run of 27,500 summer steelhead to the Grande Ronde River mouth for purposes of natural production, fisheries, and broodstock.

Objective 4. Reestablish and maintain an average run of 3,500 coho to the Grande Ronde River mouth for purposes of natural production, fisheries, and broodstock.

Objective 5. Reestablish and maintain an average run of 2,500 sockeye to the Grande Ronde River mouth for purposes of natural production, fisheries, and broodstock.

Objective 6. Achieve and maintain self-sustaining populations and fisheries of Pacific lamprey, bull trout and other indigenous fishes in the Grande Ronde subbasin.

Strategy 1. Enforce protection, enhancement and restoration of indigenous fish including federal and state threatened and sensitive fish species in the subbasin.

Strategy 2. Protect, enhance or restore water quality to improve the survival, abundance and distribution of indigenous resident and anadromous fish.

Strategy 3. Protect, enhance and restore instream and riparian habitat to improve the survival, abundance and distribution of indigenous resident and anadromous fish.

Strategy 4. Protect, enhance and restore instream flows to improve passage conditions and increase rearing habitat for anadromous and resident fishes.

Strategy 5. Restore or enhance fish passage for resident and anadromous upstream and downstream migrants.

Strategy 6. Continue use of artificial propagation for supplementation and/or reintroduction of endemic stock spring chinook into the Grande Ronde subbasin tributaries to provide natural production and harvest.

Strategy 7. Develop and implement artificial propagation program utilizing local summer steelhead broodstock to enhance natural production and provide harvest opportunities.

Strategy 8. Develop and implement artificial propagation programs for reintroduction of coho and sockeye salmon.

Strategy 9. Monitor and evaluate hatchery programs to ensure they are successful and minimize adverse effects on listed or other indigenous species.

Strategy 10. Implement artificial propagation practices to maintain the genetic and biological integrity of supplemented stocks.

Strategy 11. Monitor genetic characteristics of salmonid populations.

Strategy 12. Monitor and evaluate the productivity, abundance, distribution, life history and biological characteristics of anadromous and resident fish, and relationship with instream and riparian habitat conditions within the subbasin to assess the success of management strategies.

Strategy 13. Conduct initial population investigations and develop a restoration plan for Pacific lamprey.

Strategy 14. Improve out-of-basin survival of migratory fish to increase juvenile survival and adult returns to the Grande Ronde subbasin.

Tribal and State

Confederated Tribes of the Umatilla Indian Reservation, Nez Perce Tribe and Oregon Department of Fish and Wildlife

The vision for the Grande Ronde Subbasin agreed upon in 1990 among state and tribal resource managers is improved basin habitat for the enhancement and productivity of wild spring chinook salmon, summer steelhead, native resident trout, and numerous wildlife species (ODFW et al. 1990). The goals and objectives developed cooperatively by ODFW, NPT and CTUIR and included in "Salmon and Steelhead Production Plan, Grande

Ronde River Subbasin" (ODFW et al. 1990) as part of the System Planning effort for NWPPC are outlined below.

Habitat Goal and Objectives

Goal:

- Protect and enhance fish habitat of endemic stocks of resident and anadromous salmonids, and maximize natural fish production potential.

Objective 1. Achieve a net gain in fish habitat quantity and quality in the subbasin.

Objective 2. Develop a habitat database that provides a basis for monitoring short- and long-term change.

Objective 3. Develop monitoring programs that ensure land-use practices comply with established standards.

Objective 4. Achieve and maintain minimum streamflows.

Fish Goal and Objectives

Goal:

- Productive, healthy, and sustainable wild populations of anadromous spring and fall chinook salmon, summer steelhead, and resident trout populations and protected habitat for their continued viability.

Spring Chinook Salmon Objective: Achieve restored annual returns of spring chinook salmon to meet recovery goals and allow for resumption of tribal and sport harvest.

Fall Chinook Salmon Objective: Increased annual returns of fall chinook salmon to meet recovery goals and allow for harvest to meet social goals.

Summer Steelhead Objective: Achieve restored annual returns of summer steelhead to meet recovery goals and provide for tribal and sport harvest to meet social goals.

Coho Salmon Objective: Develop and maintain a hatchery-supplemented and naturally reproducing run of coho salmon to meet recovery goals and provide harvest to meet social goals.

Sockeye Salmon Objective: Develop and maintain a hatchery-supplemented and naturally producing run of sockeye salmon to meet recovery goals and provide harvest to meet social goals.

Bull Trout Recovery Team (State, Federal, Tribal)

The Grande Ronde Recovery Unit Chapter of the USFWS draft Bull Trout Recovery Plan is being prepared with input from the Grande Ronde Recovery Unit Team (RUT) and with guidance from the USFWS. The RUT consists of state, federal, and tribal technical experts from the basin as well as other affected interests. ODFW is coordinating the planning. When completed the plan will address current population status, factors limiting production, and identify goals, objectives, and recovery actions to restore bull trout populations in the Grande Ronde subbasin. Publication of the draft recovery plan is expected in 2001.

The **Goal** for recovery of bull trout in the Grande Ronde Recovery Unit is to increase their stability and long-term persistence.

Objective 1 Maintain or expand distribution of bull trout within their current range in the Grande Ronde Recovery Unit.

Objective 2 Maintain stable or increasing trends in abundance of bull trout.

Objective 3 Restore and maintain suitable habitat conditions for all bull trout life history stages and strategies.

Objective 4 Provide opportunities for genetic exchange between local populations.

State of Oregon

Oregon Department of Forestry

Goal: Protect, manage and promote a healthy forest environment which will enhance Oregon's livability and economy for today and tomorrow.

Oregon Department of Agriculture

Oregon Noxious Weed Strategic Plan

Goal: Heightened awareness among Oregon's citizens, the legislature, local governments, tribal governments, conservation organizations and land managers of the impact of noxious weeds and the need for effective noxious weed management.

Objective 1. Leadership and Organization
Strategy: Provide consistent statewide and local leadership and organization

Objective 2. Cooperative Partnerships
Strategy: Develop and expand partnerships

Objective 3. Planning and Prioritizing
Strategy. Develop and maintain noxious weed lists and plans all levels

Objective 4. Education and Awareness
Strategy: Provide education and awareness

Objective 5. Integrated Weed Management (IWM)
Strategy: Continue to support and advocate the principles of IWM

Objective 6. Early Detection and Control of New Invaders
Strategy: Implement early detection and control

Objective 7. Noxious Weed Information System and Data Collection
Strategy: Upgrade Noxious Weed Information System

Objective 8. Monitoring and Evaluation
Strategy: Monitor noxious weed projects to evaluate effectiveness

Objective 9. Policy, Mandates, Law Compliance and Enforcement
Strategy: Use mandates, policy and law to encourage effective weed management

Objective 10. Funding and Resources
Strategy: Increase base level funding for state, county local, and federal noxious weed control programs to address priorities and to assist private land managers.
Strategy: Additional funding sources for weed control.

Oregon Department of Environmental Quality

Goal:
- Restore, maintain and enhance the quality of Oregon's air, water and land.

Oregon Parks and Recreation Department

Goal:
- Provide and protect outstanding natural, scenic, cultural, historic, and recreational sites for the enjoyment and education of present and future generations.

Oregon Division of State Lands

Goals:
- Manage and protect state trust lands for the maximum long-term benefit of the public schools, consistent with sound stewardship, conservation and business management principles.
- Manage non-trust lands for the greatest benefit of all the people of the state.

Oregon State Police

Goal:
- Develop, promote and maintain protection of the people, property, and natural resources of the state.

Department of Land Conservation and Development

Goals:
- Establish a framework for all land use decisions and actions.
- Preserve and maintain all agricultural lands.
- Conserve forest lands in a manner consistent with sound management of soil, air, water, and fish and wildlife resources, and to provide for recreational opportunities and agriculture.
- Protect natural resources and conserve scenic and historic areas and open spaces.
- Maintain and improve the quality of the air, water, and land resources of the state.
- Protect life and property from natural disasters and hazards.

Oregon Water Resources Department

Goal: To serve the public by practicing and promoting wise long-term water management.

Oregon Revised Statutes are laws passed by the legislative bodies (House and Senate) of Oregon, giving guidance to ODFW for management of fish and wildlife resources. ORS 496.012 refers specifically to wildlife, but fish are included as part of wildlife.

Oregon Revised Statute - ORS 496.012

Goals:
- Species of wildlife maintained at optimum levels.
- Lands and waters of this state that are developed and managed to enhance the production and public enjoyment of wildlife.
- Utilization of wildlife that is orderly and equitable.

- Public access to lands and waters of the state, and the wildlife resources thereon, that are developed and maintained.
- Wildlife populations and public enjoyment of wildlife are regulated compatibly with primary uses of the lands and waters of the state.
- Provision of optimal recreational benefits

Oregon Department of Fish and Wildlife

ODFW's vision is that "Oregon's fish and wildlife are thriving in healthy habitats due to cooperative efforts and support by all Oregonians" (ODFW 2000). The vision for the Grande Ronde subbasin is to improve habitat health and function for the enhancement and productivity of wild spring chinook salmon, summer steelhead, native resident trout, and numerous wildlife species (ODFW 1990)

Fish Objectives and Strategies

Overall goals for fish recovery and production are defined through the LSRCP, NEOH and GRESP programs. Our objectives and strategies specific to the Grande Ronde subbasin are:

Objectives for Steelhead and Spring Chinook Salmon

Objective 1: Achieve a sufficient spawner numbers and productivity of Grande Ronde Basin spring chinook salmon, by restoring and maintaining natural spawning populations, to will allow delisting.

Objective 2: Reduce the demographic risks associated with the low productivity and decline of native spring chinook salmon populations in Catherine Creek, Lostine River and Grande Ronde River.

Objective 3: Maintain artificial production programs for spring chinook salmon and steelhead, using locally-adapted broodstocks to meet recovery, conservation and harvest goals, and mitigate for fish losses associated with construction and operation of lower Snake River dams.

Objective 4: Establish an annual supply of steelhead and spring chinook salmon brood fish capable of meeting annual production goals.

Objective 5: Maintain sport and tribal fisheries for steelhead and reestablish fisheries for spring chinook salmon, consistent with protection of endemic, naturally-produced stocks. Determine the number of summer steelhead and spring chinook salmon harvested annually and angler effort in recreational fisheries on the Grande Ronde and Wallowa rivers.

Objective 6: Identify, conserve, and monitor the life history characteristics of chinook salmon and resident and anadromous forms of Oncorhynchus mykiss in northeast Oregon.

Objective 7: Maintain genetic diversity of indigenous, artificially-propagated spring chinook salmon populations in Catherine Creek, Lostine River and Grande Ronde River.

Objective 8: Identify, evaluate, conserve and enhance natural production and genetic diversity of natural stocks of steelhead and chinook salmon (e.g., Minam and Wenaha rivers).
Objective 9: Minimize impacts of hatchery programs on resident fish and naturally produced spring chinook salmon and steelhead.
Objective 10: Modify facilities at Lookingglass Fish Hatchery to provide capability to implement Captive and Conventional hatchery programs.
Objective 11: Determine optimum program operational criteria to ensure success of achieving objectives.
Objective 12: Assess utility of Conventional and Captive broodstock programs for use in recovering salmonid populations.
Objective 13: Develop facilities and operations to improve safety and productivity of the hatchery environment for captive and conventional chinook salmon programs.
Objective 14: Collect information to allow implementation of adaptive management process to evaluate management practices in the Grande Ronde Basin.

Strategies for Spring Chinook Salmon

Strategy 1. Use artificial propagation to enhance natural production and fisheries in the Grande Ronde Basin.

- Action 1.1. Improve existing hatchery facilities and construct additional facilities to increase the effectiveness of programs conducted at these sites and their potential to achieve their goals.
- Action 1.2.Provide for a regulated tribal and sport harvest of spring chinook salmon in the Grande Ronde River. Conduct creel surveys to estimate catch rates in recreational fisheries in the Grande Ronde Basin and record marks and collect coded wire tags to estimate catch and harvest of hatchery and wild fish.
- Action 1.3. Collect returning adult spring chinook salmon at weirs on Catherine Creek, Lostine River and Grande Ronde River.
- Action 1.4.Collect 500 parr from each of Catherine Creek, Lostine River and Grande Ronde River for Captive Broodstock Program.
- Action 1.5.Rear Captive Broodstock Program fish under one of two pre-smolt (natural vs. accelerated growth) and one of two post-smolt (freshwater vs. accelerated) treatment regimes.
- Action 1.6. Monitor health of adult and juvenile spring chinook salmon, providing prophylactic treatments and treat for disease outbreaks, as necessary, and determine etiology of morbidity and mortality for Captive Broodstock fish.
- Action 1.7.Spawn fish within stocks and treatments (Captive Broodstock Program and using matrices to maximize genetic diversity of offspring.
- Action 1.8.Rear juveniles, with segregation (where possible) by treatment group and/or BKD status, to produce smolts similar to wild smolts.
- Action 1.9.Acclimate juveniles at sites located on the home stream of each stock and release as smolts.

- Action 1.10.Develop and maintain a database for Captive and Conventional broodstock programs.
- Action 1.11.Develop Annual Operations Plan for Captive and Conventional broodstock programs.
- Action 1.12.Evaluate programs at each life history stage: spawning, incubation, parr-smolt rearing, smolt release and adult returns for Captive and Conventional broodstock programs; and parr collection, post-smolt rearing and maturation for the Captive Broodstock Program.
- Action 1.13.Coordinate ESA permit activities and participate in program planning and oversight.
- Action 1.14.Summarize data and prepare and submit annual reports.

Strategy 2: Implement monitoring and evaluation to assess health, status and productivity of natural populations.

- Action 2.1. Conduct spawning ground surveys of streams within the Grande Ronde River Basin. Count number of redds, live and dead adult salmon, examine carcasses for marks and collect coded wire tags, collect scales and determine age of maturity, prespawn mortality, spawner distribution and hatchery:wild ratio.
- Action 2.2.Capture and enumerate returning adult fish at weirs on Catherine Creek, Lostine River and Grande Ronde River. If appropriate, use weir trapping to make population estimate.
- Action 2.3.Develop and maintain a database for spawning ground surveys.
- Action 2.4.Monitor run size and develop run size estimate models based on previous years escapement, spawning ground information and other available data (e.g., smolt indices, dam passage counts) to make sound harvest allocation decisions.
- Action 2.5.Evaluate ability to estimate escapement and straying and to characterize the spawning populations in the system.
- Action 2.6.Determine progeny:parent ratios (productivity) based on spawner and recruit information.
- Action 2.7. Document the in-basin production and migration patterns for spring chinook salmon juveniles in the upper Grande Ronde River, Catherine Creek, Minam River and the Lostine River tributary populations, including abundance of migrants, migration timing and duration.
- Action 2.8. Estimate and compare smolt detection rates at mainstem Columbia and Snake River dams for fall and spring migrating spring chinook salmon from tributary populations in the upper Grande Ronde River, Catherine Creek, Minam River and the Lostine River.
- Action 2.9.Document the annual migration patterns for spring chinook salmon juveniles from local, natural populations in the Grande Ronde Subbasin.
- Action 2.10. Determine survival to parr stage for spring chinook salmon in local, natural populations in the Grande Ronde Subbasin.
- Action 2.11 Investigate the significance of alternative life history strategies of spring chinook salmon in two local populations in the Grande Ronde River subbasin.

Strategy 3: Implement monitoring and evaluation to assess health, status and productivity of hatchery fish and effectiveness of hatcheries to accomplish objectives.

- Action 3.1.Monitor straying of hatchery fish into Minam and Wenaha rivers and implement measures to reduce straying, if necessary.
- Action 3.2.Monitor and evaluate various experimental hatchery protocols (e.g., natural vs. accelerated growth, freshwater vs. saltwater rearing, size at release, diet, exercise, rearing density, acclimated vs. direct release).
- Action 3.3. Implement new treatments and prophyactic treatments for bacterial kidney disease under Investigational New Animal Drug protocols.
- Action 3.4. Evaluate fish culture practices and fish handling for situations that may contribute to impaired fish health or exacerbate disease.
- Action 3.5. Evaluate performance and life history characteristics of hatchery and wild fish in the wild, including smolt and adult migration characteristics, smolt-to-adult survival, age and size at maturity, run timing, progeny:parent ratio.
- Action 3.6. Evaluate effectiveness of Captive and Conventional broodstock programs to restore endemic stocks of spring chinook salmon in Catherine Creek, Lostine River and Grande Ronde River and maintain their genetic diversity. Examine various indices (e.g., egg-to-fry and fry-to-smolt survival, growth and health, fecundity, progeny:parent ratio) at specific life stages (incubation, fry-smolt rearing, post-smolt rearing and maturation) of all fish raised at hatcheries.
- Action 3.7. Develop and maintain a database for Captive and Conventional broodstock programs.

Strategies for Summer Steelhead

Strategy 1. Implement monitoring and evaluation to assess health, status and productivity of hatchery fish and effectiveness of hatcheries to accomplish objectives.

- Action 1.1. Document fish cultural and hatchery operational practices at each Lower Snake River Compensation Plan facility.
- Action 1.2. Develop rearing and release strategies that best achieve program objectives for hatchery-produced summer steelhead smolts using tag evaluation groups, monitor and evaluate indices of survival, growth, health, and productivity (Carmichael and Ruzycki 2000).
- Action 1.3. Determine total production of summer steelhead adults, index annual smolt survival and adult returns to Lower Granite Dam for production groups, summarize fishery recovery and escapement information, and determine exploitation rates for each stock.
- Action 1.4. Conduct creel surveys to estimate catch rates on the Grande Ronde and Wallowa rivers by interviewing anglers and collect coded-wire-tagged fish to estimate number of fish harvested.
- Action 1.5. Develop a within-subbasin, endemic brood stock using genetic and life-history information, or an out-of-basin stock that has limited impacts on native stocks throughout the Columbia River basin.

- Action 1.6. Identify and implement strategies that limit straying rate of hatchery steelhead.
- Action 1.7. Monitor health of adult and juvenile summer steelhead, providing prophylactic treatments and treat for disease outbreaks, as necessary.

Strategy 2. Implement monitoring and evaluation to assess health, status and productivity of natural populations.

- Action 2.1. Using DNA analysis, determine genetic diversity and stock structure of natural steelhead stocks in the Grande Ronde River basin by sampling 13 representative tributary basins for four consecutive years.
- Action 2.2. Monitor natural escapement and characterize spawning populations.
- Action 2.3. Evaluate ability to estimate escapement and straying and ability to characterize spawning populations.
- Action 2.4. Capture and enumerate returning adult fish at weirs on the Grande Ronde River and tributaries.
- Action 2.5. Determine the relationship between anadromous and resident forms of O. mykiss in NE Oregon using otolith microchemistry analysis and known-parentage, hatchery crosses.
- Action 2.6. Determine phenotypic plasticity of life-history traits among and between anadromous and resident O. mykiss by conducting controlled, breeding experiments between life-history forms and monitoring traits of their progeny.
- Action 2.7. Monitor trend in spawner escapement in Grande Ronde basin streams by conducting annual spawning surveys in selected spawning areas.
- Action 2.8.Document patterns of movement and production for juvenile O. mykiss from tributary populations in Catherine Creek, the upper Grande Ronde, Minam, and the Lostine River. Include data on migration timing, duration, and smolt abundance.
- Action 2.9. Estimate and compare smolt detection rates at mainstem Columbia and Snake River dams for summer steelhead from the populations in Catherine Creek, the upper Grande Ronde, Minam and the Lostine rivers.
- Action 2.10. Evaluate methods to estimate the proportion of O. mykiss captured during fall trapping that migrate out of rearing areas in Catherine Creek, the upper Grande Ronde, Minam, and the Lostine rivers to undertake a smolt migration the following spring.
- Action 2.11. Describe the population characteristics of the juvenile O. mykiss population in Catherine Creek during summer.

Strategy 3. Use artificial propagation to enhance fisheries in the Grande Ronde Basin.

- Action 3.1.Improve existing hatchery facilities, increase the effectiveness of programs conducted at these sites, and their potential to achieve their goals.
- Action 3.2.Provide for a regulated tribal and sport harvest for steelhead in the Grande Ronde River.
- Action 3.3. Collect returning adult steelhead at weirs on Catherine Creek, Lookingglass creek, Lostine River, and Grande Ronde River.

- Action 3.4. Monitor health of adult and juvenile steelhead.
- Action 3.5.Develop Annual Operations Plan for hatchery programs.
- Action 3.6.Evaluate programs at each life history stage: spawning, incubation and parr-smolt rearing, smolt release, and adult returns.
- Action 3.7.Coordinate ESA permit activities and participate in program planning and oversight.
- Action 3.8.Summarize data and prepare and submit annual reports.

Warmwater Game Fish Plan

Goal:

- Provide optimum recreational benefits to the people of Oregon by managing warmwater game fishes and their habitats.

Objective 1. Provide diversity of angling opportunity

Strategy 1. Identify the public's needs and expectation for angling opportunity.
Strategy 2. Choose management alternatives for individual waters of groups of waters, and incorporate the alternatives in management plans subject to periodic public review.
Strategy 3. Design management approaches to attain the chosen alternative.
Strategy 4. Constantly remind the public of the consequences of unlawful transfers of fishes in order to reduce the incidence of the introductions.
Strategy 5. Inform the public as to why ODFW chooses particular management strategies, in order to establish a positive perception of warmwater game fish.
Strategy 6. Use existing state and federal laws and regulations to deal with illegal introductions.

Trout Plan

Goal:

- Achieve and maintain optimum populations and production of trout to maximize benefits and to insure a wide diversity of opportunity for present and future citizens.

Objective 1. Maintain the genetic diversity and integrity of wild trout stocks throughout Oregon.

Strategy 1. Identify wild trout stocks in the state.
Strategy 2. Minimize the adverse effects of hatchery trout on biological characteristics, genetic fitness, and production of wild stocks .
Strategy 3. Establish priorities for the protection of stocks of wild trout in the state.
Strategy 4. Evaluate the effectiveness of trout management programs in providing the populations of wild trout necessary to meet the desires of the public.

Objective 2. Protect, restore and enhance trout habitat.

Strategy 1. Continue to strongly advocate habitat protection with land and water management agencies and private landowners.

Objective 3. Provide a diversity of trout angling opportunities.

Strategy 1. Determine the desires and needs of anglers.

Strategy 2. Use management alternatives for classifying wild trout waters to provide diverse fisheries.

Strategy 3. Conduct an inventory of public access presently available to trout waters in the state.

Objective 4. Determine the statewide management needs for hatchery trout.

Strategy 1. Summarize information on the current hatchery program and determine necessary changes.

Strategy 2. Increase the involvement of the STEP program in the enhancement of trout.

Strategy 3. Publicize Oregon's trout management program through the ODFW office of Information and Education.

Steelhead Plan

Goal:

- Sustain healthy and abundant wild populations of steelhead.

Objective 1. Protect and restore spawning and rearing habitat.

Objective 2. Provide safe migration corridors .

Objective 3. Protect wild populations of steelhead from overharvest.

Objective 4. Protect wild populations of steelhead from detrimental interactions with hatchery fish .

Objective 5. Monitor the status of wild steelhead populations so that long-term trends in populations can be determined.

Goal:

- Provide recreational, economic, cultural and aesthetic benefits from fishing and non-fishing uses of steelhead.

Objective 6. Provide for harvest by Treaty Tribes without overharvesting wild fish.

Objective 7. Provide recreational angling opportunities reflecting the desires of the public while minimizing impacts on wild fish.

Objective 8. Increase non-angling uses of steelhead that provide recreation

Goal:

- Involve the public in steelhead management and coordinate ODFW actions with Tribes and other agencies.

Objective 9. Increase awareness of issues facing steelhead management and ODFW's management programs.

Objective 10. Provide a forum for public input on steelhead management.

Objective 11. Coordinate ODFW steelhead management activities with other habitat and fisheries managers.

Kokanee Plan

Goal:

- Maintain a productive population of kokanee in Wallowa Lake capable of sustaining recreational harvest.

Objective 1. Understand relationships among kokanee and introduced lake trout and *mysid* populations in Wallowa Lake.

Strategy 1.1. Monitor lake trout recruitment, abundance, growth, distribution and food habits.

Strategy 1.2. Monitor kokanee recruitment, abundance and growth rate.
Strategy 1.3. Monitor abundance of mysids and plankton species in the lake.

Objective 2. Identify potential tools to control lake trout abundance .

<u>Oregon Wildlife Diversity Plan (ODFW 1993)</u>

Goal:

- Maintain Oregon's wildlife diversity by protecting and enhancing populations and habitats of native non-game wildlife at self-sustaining levels throughout natural geographic ranges.

Objective 1. Protect and enhance populations of all existing native non-game species at self-sustaining levels throughout their natural geographic ranges by supporting the maintenance, improvement or expansion of habitats and by conducting other conservation actions.

Strategy 1.1. Maintain existing funding sources and develop new sources of public, long-term funding required to conserve the wildlife diversity of Oregon.

Strategy 1.2. Identify and assist in the preservation, restoration and enhancement of habitats needed to maintain Oregon's wildlife diversity and non-consumptive recreational opportunities.

Strategy 1.3. Monitor the status of non-game populations on a continuous basis as needed for appraising the need for management actions, the results of actions, and for evaluating habitat and other environmental changes.

Objective 2. Restore and maintain self-sustaining populations of non-game species extirpated from the state or regions within the state, consistent with habitat availability, public acceptance, and other uses of the lands and waters of the state.

Strategy 2.1. Identify, establish standards and implement management measures required for restoring threatened and endangered species, preventing sensitive species from having to be listed as threatened or endangered, and maintaining or enhancing other species requiring special attention.

Strategy 2.2. Reintroduce species or populations where they have been extirpated as may be feasible.

Objective 3. Provide recreational, educational, aesthetic, scientific, economic and cultural benefits derived from Oregon's diversity of wildlife.

Strategy 3.1. Develop broad public awareness and understanding of the wildlife benefits and conservation needs in Oregon.

Strategy 3.2. Increase or enhance opportunities for the public to enjoy and learn about wildlife in their natural habitats.

Strategy 3.3. Seek outside opportunities, resources and authorities and cooperate with other agencies, private conservation organizations, scientific and educational institutions, industry and the general public in meeting Program Objectives.

Strategy 3.4 Maintain and enhance intra-agency coordination through dissemination of Program information, development of shared databases and coordination of activities that affect other Department divisions and programs; identify activities within other programs which affect the Wildlife Diversity program, and develop mutual goals.

Objective 4. Address conflicts between non-game wildlife and people to minimize adverse economic, social, and biological impacts.

Strategy 4.1. Assist with non-game property damage and nuisance problems without compromising wildlife objectives, using education and self-help in place of landowner assistance wherever possible.

Strategy 4.2. Administer the Wildlife Rehabilitation Program.

Strategy 4.3. Administer the Scientific Taking Permits Program.

Strategy 4.4. Administer Wildlife Holding and other miscellaneous permits.

Strategy 4.5. Provide biological input to the Falconry Program for the establishment of raptor-capture regulations.

Strategy 4.6. Update the Wildlife Diversity Plan every five years.

Oregon Black Bear Management Plan (ODFW 1987)

Goal:

- Protect and enhance black bear populations in Oregon to provide optimum recreational benefits to the public and to be compatible with habitat capability and primary land uses.

Objective 1. Determine black bear population characteristics.

Strategy 1.1. Implement or cooperate in research to learn more about black bear ecology in Oregon, develop accurate population estimates and provide a measurement of population trend.

Objective 2. Determine black bear harvest levels.

Strategy 2.1. Obtain improved harvest information through use of combination report card/tooth envelope.

Strategy 2.2. Monitor black bear harvest and implement harvest restrictions if necessary.

Strategy 2.3. Develop an educational program to alert black bear hunters of the need for improved black bear population information.

Strategy 2.4. If necessary, initiate mandatory check of harvested black bear.

Objective 3. Continue current practice of allowing private and public landowners to take damage causing black bear without a permit.

Strategy 3.1. The Department will not seek any changes in current statutes.

Strategy 3.2. Continue to work with other agencies and private landowners in solving black bear depredation problems.

Strategy 3.3. Explore the possibility of using sport hunters for damage control.

Oregon's Cougar Management Plan (ODFW 1993a)

Goals:

- Recognize the cougar as an important part of Oregon's wildlife fauna, valued by many Oregonians.
- Maintain healthy cougar populations within the state into the future.
- Conduct a management program that maintains healthy populations of cougar and recognizes the desires of the public and the statutory obligations of the Department.

Objective 1. Continue to gather information on which to base cougar management.

Strategy 1.1. Continue to authorize controlled cougar hunting seasons conducted in a manner that meets the statutory mandates to maintain the species and provide consumptive and non-consumptive recreational opportunities.

Strategy 1.2. Continue to study cougar population characteristics as well as the impact of hunting on cougar populations.

Strategy 1.3. Continue to update and apply population modeling to track the overall cougar population status.

Strategy 1.4. Continue mandatory check of all hunter-harvested cougar and evaluate the information collected on population characteristics for use in setting harvest seasons.

Strategy 1.5. Continue development of a tooth aging (cementum annuli) technique.

Objective 2. Continue to enforce cougar harvest regulations.

Strategy 2.1. Continue to work with OSP to monitor the level of illegal cougar hunting activity.

Strategy 2.2. Implement appropriate enforcement actions and make the necessary changes in regulations to reduce illegal cougar hunting.

Strategy 2.3. Continue to inspect taxidermist facilities and records to discourage and document the processing of cougar hides lacking Department seals.

Objective 3. Document and attempt to eliminate potential future human-cougar conflicts.

Strategy 3.1. Provide information to the public about cougar distribution, management needs, behavior, etc.

Strategy 3.2. Attempt to solve human-cougar conflicts by non-lethal methods.

Strategy 3.3. Consider additional hunting seasons or increased hunter numbers in areas where human-cougar conflicts develop.

Strategy 3.4. Manage for lower cougar population densities in areas of high human occupancy.

Objective 4. Manage cougar populations through controlled hunting seasons.

Strategy 4.1. Base regulation modifications on population trends, as annual fluctuations in the weather can greatly influence recreational cougar harvest.

Strategy 4.2. Continue to regulate cougar hunting through controlled permit seasons.

Objective 5. Continue to allow private and public landowners to take damage-causing cougar without a permit.

Strategy 5.1. No changes will be sought to existing damage control statutes.

Strategy 5.2. Continue to work with landowners to encourage reporting of potential damage before it occurs, with the goal of solving complaints by other than lethal means.

Strategy 5.3. Continue to emphasize that damage must occur before landowners or agents of the Department may remove an offending animal.

Strategy 5.4. Encourage improved livestock husbandry practices as a means of reducing cougar damage on domestic livestock.

Strategy 5.5. Continue to work with other agencies to solve cougar depredation problems.

Objective 6. Manage deer and elk populations to maintain the primary prey source for cougar.

Strategy 6.1. Work with landowners and public land managers to maintain satisfactory deer, elk and cougar habitat.

Strategy 6.2. Evaluate the effects of human activities and human disturbance on cougar.

Strategy 6.3. Take action to correct problems in areas where human access is detrimental to the welfare of cougar or their prey base.

Mule Deer Management Plan (ODFW 1990)

Goals:

- Increase deer numbers in units that are below management objectives and attempt to determine what factors are contributing to long term depressed mule deer populations.
- Maintain population levels where herds are at management objectives.
- Reduce populations in the areas where deer numbers exceed population management objectives.
- Population objectives were set by Oregon Department of Fish and Wildlife Commission action in 1982 and are to be considered maximums.

Objective 1. Set management objectives for buck ratio, population level/density and fawn:doe ratio benchmark for each hunt unit and adjust as necessary.

Strategy 1.1. Antlerless harvest will be used to reduce populations which exceed management objectives over a two or three year period or to address damage situations.

Strategy 1.2. Harvest tag numbers are adjusted to meet or exceed objectives within 2-3 bucks/100 does.

Strategy 1.3. Population trends will be measured with trend counts and harvest data and may include population modeling.

Strategy 1.4. Update Mule Deer Plan every five years.

Objective 2. Hunter opportunity will not be maintained at the expense of meeting population and buck ratio management objectives.

Oregon's Elk Management Plan (ODFW 1992)

Goal:

- Protect and enhance elk populations in Oregon to provide optimum recreational benefits to the public and to be compatible with habitat capability and primary land uses.

Objective 1. Maximize recruitment into elk populations and maintain bull ratios at Management Objective levels. Establish Management Objectives for population size in all herds, and maintain populations at or near those objectives.

Strategy 1.1. Maintain bull ratios at management objectives.

Strategy 1.2. Protect Oregon's wild elk from diseases, genetic degradation, and increased poaching which could result from transport and uncontrolled introduction of cervid species.

Strategy 1.3. Determine causes of calf elk mortality.

Strategy 1.4. Monitor elk populations for significant disease outbreaks, and take action when and were possible to alleviate the problem.

Strategy 1.5. Establish population models for aiding in herd or unit management decisions.
Strategy 1.6. Adequately inventory elk populations in all units with significant number of elk.

Objective 2. Coordinate with landowners to maintain, enhance and restore elk habitat.

Strategy 2.1. Ensure both adequate quantity and quality of forage to achieve elk population management objectives in each management unit.
Strategy 2.2. Ensure habitat conditions necessary to meet population management objectives are met on critical elk ranges.
Strategy 2.3. Minimize elk damage to private land where little or no natural winter range remains.
Strategy 2.4. Maintain public rangeland in a condition that will allow elk populations to meet and sustain management objectives in each unit.
Strategy 2.5. Reduce wildlife damage to private land.

Objective 3. Enhance consumptive and non-consumptive recreational uses of Oregon's elk resource.

Strategy 3.1. Develop a policy that outlines direction for addressing the issues of tag allocation to private landowners and public access to private lands in exchange for compensation to private landowners.
Strategy 3.2. Increase bull age structure and reduce illegal kill of bulls while maintaining recreational opportunities.
Strategy 3.3. Adjust levels of hunter recreation in all units commensurate with management objectives.
Strategy 3.4. Identify, better publicize, and increase the number of elk viewing opportunities in Oregon.

Oregon's Bighorn Sheep Management Plan (ODFW 1992)

Goal:

- Restore bighorn sheep into as much suitable unoccupied habitat as possible.

Objective 1. Maintain geographical separation of California and Rocky Mountain subspecies.

Strategy 1.1. California bighorn will be used in all sites in central and southeast Oregon, as well as the Burnt, Deschutes, and John Day river drainages.
Strategy 1.2. Coordinate transplant activities with adjacent states.
Strategy 1.3. Continue to use in-state sources of transplant stock while seeking transplant stock from out of state.
Strategy 1.4. Historic areas of bighorn sheep range containing suitable habitat will be identified and factors restricting reintroduction will be clearly explained for public review.

Objective 2. Maintain healthy bighorn sheep populations.

Strategy 2.1. Bighorn sheep will not be introduced into locations where they may be reasonably expected to come into contact with domestic or exotic sheep.

Strategy 2.2. Work with land management agencies and private individuals to minimize contact between established bighorn sheep herds and domestic or exotic sheep.

Strategy 2.3. Work with land management agencies to locate domestic sheep grazing allotments away from identified present and proposed bighorn sheep ranges.

Strategy 2.4. Maintain sufficient herd observations to ensure timely detection of disease and parasite problems.

Strategy 2.5. Promote and support aggressive research aimed at reducing bighorn vulnerability to diseases and parasites.

Strategy 2.6. Bighorn individuals that have known contact with domestic or exotic sheep will be captured, quarantined, and tested for disease. If capture is impossible, the bighorn will be destroyed before it has a chance to return to a herd and possibly transmit disease organisms to others in the herd.

Strategy 2.7. Bighorns of questionable health status will not be released in Oregon.

Objective 3. Improve bighorn sheep habitat as needed and as funding becomes available.

Strategy 3.1. Monitor range condition and use along with population characteristics.

Objective 4. Provide recreational ram harvest opportunities when bighorn sheep population levels reach 60 to 90 animals.

Strategy 4.1. To reduce possibility of black-market activity, all hunter-harvested horns will be permanently marked by the Department.

Strategy 4.2. Do not transplant bighorns on those areas where some reasonable amount of public access is not possible.

Strategy 4.3. Consider land purchase in order to put such land into public ownership.

Objective 5. Conduct annual herd composition, lamb production, summer lamb survival, habitat use and condition, and general herd health surveys.

Strategy 5.1. Maintain sufficient herd observations so as to ensure timely detection of disease and parasite problems. This will include mid- to late-summer, early winter, and later winter herd surveys.

Strategy 5.2. Initiate needed sampling and collections when problems are reported to verify the extent of the problem. Utilize the best veterinary assistance.

Strategy 5.3. Promote and support an aggressive research program aimed at reducing bighorn vulnerability to disease and parasites.

Strategy 5.4. Continue to test bighorns for presence of diseases of importance to both bighorn sheep and livestock.

Strategy 5.5. Monitoor range condition and use along with population characteristics.

Strategy 5.6. Conduct population modeling of all herds.

Strategy 5.7. Determine herd carrying capacity after consultation with the land manager.

Strategy 5.8. Investigate lamb production and survival as an indication of a population at carrying capacity.

<u>Oregon Migratory Game Bird Program Strategic Management Plan (ODFW 1993)</u>

Goal:

- Protect and enhance populations and habitats of native migratory game birds and associated species at prescribed levels throughout natural geographic ranges in Oregon and the Pacific flyway to contribute to Oregon's wildlife diversity and the uses of those resources.

Objective 1. Integrate state, federal, and local programs to coordinate biological surveys, research, and habitat development to obtain improved population information and secure habitats for the benefit of migratory game birds and other associated species.

Strategy 1.1. Establish an Oregon Migratory Game Bird Committee to provide management recommendations on all facets of the migratory game bird program.

Strategy 1.2. Use population and management objectives identified in Pacific Flyway Management Plans and Programs.

Strategy 1.3. Develop a statewide migratory game bird habitat acquisition, development, and enhancement plan based on flyway management plans, ODFW Regional recommendations, and other state, federal, and local agency programs.

Strategy 1.4. Implement a statewide migratory game bird biological monitoring program, including banding, breeding, production, migration, and wintering area surveys based on population information needs of the flyway and state.

Strategy 1.5. Develop a statewide program for the collection of harvest statistics.

Strategy 1.6. Prepare a priority plan for research needs based on flyway management programs.

Strategy 1.7. Annually prepare and review work plans for wildlife areas that are consistent with policies and strategies of this plan.

Strategy 1.8. Develop a migratory game bird disease contingency plan to address responsibilities and procedure to be taken in the case of disease outbreaks in the state. It will also address policies concerning "park ducks", captive-reared, and exotic game bird releases in Oregon.

Objective 2. Assist in the development and implementation of the migratory game bird management program through information exchange and training.

Strategy 2.1. Provide training for appropriate personnel on biological survey methodology, banding techniques, waterfowl identification, habitat development, disease problems, etc.

Objective 3. Provide recreational, aesthetic, educational, and cultural benefits from migratory game birds, other associated wildlife species, and their habitats.

Strategy 3.1. Provide migratory game bird harvest opportunity.

Strategy 3.2. Regulate harvest and other uses of migratory game birds at levels compatible with maintaining prescribed population levels.

Strategy 3.3. Eliminate impacts to endangered or threatened species.

Strategy 3.4. Reduce impacts to protected or sensitive species.

Strategy 3.5. Provide a variety of recreational opportunities and access, including viewing opportunities, throughout the state.

Strategy 3.6. Provide assistance in resolving migratory game bird damage complaints.

Strategy 3.7. Develop opportunities for private, public, tribal, and industry participation in migratory game bird programs including, but not limited to, conservation, educational, and scientific activities.

Strategy 3.8. Disseminate information to interested parties through periodic program activity reports, media releases, hunter education training, and other appropriate means.

Objective 4. Seek sufficient funds to accomplish programs consistent with the objectives outlined in the plan and allocate funds to programs based on management priorities.

Strategy 4.1. Use funds obtained through the sale of waterfowl stamps and art to fund all aspects of the waterfowl management program as allowable under ORS 497.151.

Strategy 4.2. Develop annual priorities and seek funding through the Federal Aid in Wildlife Restoration Act.

Strategy 4.3. Solicit funds from "Partners in Wildlife" as appropriate.

Strategy 4.4. Seek funds from a variety of conservation groups such as Ducks Unlimited and the Oregon Duck Hunter's Association.

Strategy 4.5. Solicit funds form the Access and Habitat Board as appropriate and based on criteria developed by the Board and the Fish and Wildlife Commission.

Strategy 4.6. Pursue funds from other new and traditional sources, such as corporate sponsors and private grants.

Other General Habitat Goals, Objectives and Strategies that might be applicable

Goal:

- Protect and maintain remaining high quality riparian, aquatic, and upland habitats.

Objective 1. Maintain or increase wildlife species diversity.

Strategy 1. . Protect, enhance, and restore wildlife habitat in the subbasin.

Action 1.1. Determine and monitor abundance and distribution of wildlife species to identify and prioritize wildlife habitat restoration needs in the subbasin.

Action 1.2. Conduct periodic comprehensive habitat and biological surveys to identify and prioritize wildlife habitat restoration needs in the subbasin.

Action 1.3. Implement wildlife habitat restoration projects in the subbasin.

Action 1.4. Acquire or lease lands with priority habitats to permanently protect wildlife habitats in the subbasin.

Action 1.5. More actively manage lands set aside for wildlife, such as CRP and CREP, to increase species diversity on those lands.

Action 1.6. Decommission unnecessary roads to reduce harassment of wildlife and encourage more uniform use of available wildlife habitat.

Action 1.7. Manage habitat to meet state management guidelines for upland birds and game mammals.

Strategy 2. Protect federal and state threatened, endangered, and sensitive wildlife species.

Action 2.1. Increase enforcement of laws pertaining to wildlife.

Action 2.2. Provide protection for federal and state threatened, endangered, and sensitive wildlife species in all resource management plans.

Action 2.3. Enforce state and local land use regulations designed to protect wildlife habitats.

Habitat Strategies

- Grazing: Develop livestock control measures to include limited grazing periods, reduced stocking rates, temporary or permanent stream corridor fencing, and management of riparian pasture systems.
- Mining: Require mining and dredging operations to meet county, state, and federal regulations. Ensure that the Department of Environmental Quality, Environmental Protection Agency, and Oregon Division of State Lands jointly develop guidelines, standards, and enforcement procedures for protection of streambed conditions under provisions of the 1987 amendments to the Clean Water Act, Title III – Standards and Enforcement, Sections 301-310, and 404. Prevent mining activities in or near critical fish habitat.
- Road Building: Enforce Forest Service Practices Rules requiring adequate maintenance or closure and rehabilitation of roads. Social, economic, wildlife, fisheries, and recreation factors must be considered and positive road management plans developed to close unnecessary roads and return them into resource production where possible. Examine alternative road construction sites in areas classified as having high erosion and slope failure potential.
- Timber Harvest: Develop a system for classifying and mapping forest lands susceptible to erosion, including slope failures, streamside landslides, gully erosion, and surface erosion. Such a system should take into account the potential for damage to downstream resources in addition to the potential for on-site erosion.
- Timber Harvest: Require the USFS, BLM, and ODF to increase monitoring of timber harvest activities for compliance with rules, guidelines, and recommendations for habitat protection.
- Pesticide and Herbicide Use: Ensure that chemical treatments from federal, state, and private individuals for plant and insect control adjacent to waters in the Grande Ronde River subbasin will not endanger fish life and aquatic organisms or damage watershed and riparian systems.
- Water Quality and Quantity: Require the EPA, ODEQ, BLM, and USFS to establish monitoring programs required by the Clean Water Act (Sections 301-310), the National Forest Management Act, and the National Environmental Protection Act (NEPA).

- Require the ODEQ, EPA, and DSL to enforce guidelines, standards, and procedures for protection of streambed conditions under provisions of the Clean Water Act (1987 amended)
- Continue landowner involvement and cooperation in protecting, restoring, and enhancing riparian systems and watersheds.
- Require the DSL to develop procedures and provide manpower to monitor compliance with fill and removal permit conditions.
- Develop acceptable methods of erosion control for necessary bank protection, through agency and landowner cooperation.
- Apply for instream water rights or recommend additional sites for adoption of minimum streamflow by the Water Resources Commission.
- Require all diversion inlets be properly screened and maintained as required by the Fish Screen Law (1987) and ORS 509.615.
- Monitor irrigators to ensure all diversion structures minimally provide adult and juvenile passage as required by state law.
- Obtain funding for landowners through state and federal agencies to implement more efficient irrigation methods and develop water conservation practices benefiting landowners and instream flows.
- Purchase, lease, exchange, or seasonally rent water rights for selected fish habitat during critical low flow periods.
- Develop a comprehensive plan for reintroduction, regulation, and management of beaver in suitable sites in the Grande Ronde subbasin for the specific purpose of using beaver to restore streamflows, improve fish habitat, and improve watersheds.
- Support and expand existing watershed programs.
- Develop a system of riparian natural areas associated with critical fish habitat throughout the basin.

Sate of Washington

Washington Department of Fish and Wildlife

Goal:

- Protect, restore, and enhance the abundance and distribution of wild summer steelhead, spring chinook salmon, bull trout and other indigenous fish in the subbasin to provide non-consumptive fish benefits including cultural or ecological values.
- Maintain, enhance, or restore sustainable fishery and harvest opportunities for anadromous and resident fish.
- Maintain or enhance genetic and other biological characteristics of naturally and hatchery produced anadromous and resident fish.

Objective 1. Increase native or hatchery chinook salmon to sustainable and harvestable levels. Determine the wild and hatchery escapement goals to meet this objective.

Objective 2. Increase native summer steelhead to sustainable and harvestable levels. Refine the wild fish escapement goal and needs. Meet the LSRCP goal to return an average of 1,250 adult hatchery steelhead to the Lower Grande Ronde River annually for harvest.

Objective 3. Restore and maintain the health and diversity of bull trout and other resident salmonids to sustainable and harvestable levels. Determine the spawning escapement goals and population needs of resident fish.

Objective 4. Maintain warmwater and other fisheries as appropriate without conflicting with indigenous fish needs.

County and Local

Wallowa County

Wallowa County is located in the extreme northeast corner of Oregon State and was established February 11, 1887. The County's population is slightly over 7,000. Elevations range from 975 feet at the mouth of the Imnaha River to 10,000 feet in the Eagle Cap Wilderness. The county's river valleys, deeply incised canyons, prairies, high plateaus, and Wallowa Lake plus numerous high mountain lakes provide a large variety of habitats for fish and wildlife. The economy is based primarily on farming, ranching and timber harvest and milling. Government employment, tourism, services, and bronze foundries and other arts make up the balance of the employment. Sixty-five percent of the county is in public ownership (USFS, BLM, state).

In 1993 Wallowa County, the Nez Perce Tribe, and a public ad hoc committee completed the Wallowa County/Nez Perce Tribe Salmon Habitat Recovery Plan (Plan) as a response to the listing of Snake River spring and summer chinook by the National Marine Fisheries Service under the Endangered Species Act in 1992. All streams in Wallowa County with known chinook populations were analyzed for a variety of habitat conditions relating to salmon survival. A section of the Plan contained a list of solutions relating to specific identified problems as an aid to landowners. The 16-person public ad hoc committee included members from Federal and State agencies, private landowners, timber, ranching, and business interests, the environmental community, and the County and Tribe. The Plan was appended to the County's Comprehensive Land Use Plan making it State law in Wallowa County. The mission statement for the Plan is:

"To develop a management plan and a multi-species strategy to assure that watershed conditions in Wallowa County provide habitat necessary for salmonids and other vertebrate species occurring in Wallowa County by protecting and enhancing conditions as needed. The plan will provide the best watershed conditions available consistent with the needs of the people of Wallowa County, the Nez Perce Tribe, and the rest of the United States and is made an integral part of the Wallowa County Comprehensive Land Use Plan."

It was understood at the beginning of the Plan development that Wallowa County could not save the salmon in the Snake River. Most of the major problems, such as mainstem dams, fishing, and estuary and ocean conditions, were outside of the County's purview. The best Wallowa County could do was to provide quality habitat within the county.

A grant from the Regional Strategies Economic Development Department of the State of Oregon in 1998 provided funds to expand the Plan into a multi-species plan. All terrestrial vertebrate species known or thought to exist in Wallowa County were identified from the Interior Columbia Basin Ecosystem Management Project (ICBEMP) species lists. A matrix was constructed that listed the vertebrate species with their associated cover types and habitat types (which were also taken from ICBEMP). The expanded Plan was completed in 1999 and is now called The Wallowa County/Nez Perce Tribe Salmon Habitat Recovery Plan and Multi-Species Strategy (Wallowa County and Nez Perce Tribe 1999). The matrix will be expanded in the next phase to include time and type of use and a similar matrix will be developed for all fish species.

As part of the implementation of the Plan, Wallowa County established a Natural Resource Advisory Committee (NRAC) in 1996. The mission of the NRAC is

> "To review implementation of agricultural, forest, and natural resource provisions of Wallowa County's Comprehensive Land Use Plan."

The NRAC meets quarterly and its twenty members represent the same constituencies as in the original ad hoc committee. NRAC Standing and Technical Committees were also established which meet monthly. The Standing Committee advises the County Commissioners on natural resource issues. The Technical Committee reviews all on-the-ground projects from the County Planning Department and all project proposals from Wallowa County being presented to the Grande Ronde Model Watershed Program (GRMWP) or the Oregon Watershed Enhancement Board (OWEB) for funding. The Technical Committee does not determine if a project should or shouldn't be funded but instead makes recommendations on how to improve projects, either in location or technique. These recommendations are passed back to the individual that proposed the project and to the County Planning Department or the GRMWP or OWEB.

Goals:

- Wallowa County is part of the Grande Ronde Model Watershed Program and supports their goals, objectives, and strategies.
- Provide quality habitat for native wildlife found in the county.

Strategy 1.1. Implement the Wallowa County/Nez Perce Tribe Salmon Habitat Recovery Plan with Multi-Species Strategy.

Grande Ronde Model Watershed Program

The Grande Ronde Model Watershed Program (GRMWP) is a public citizens' advisory group, designated by the Northwest Power Planning council, the Governor's Strategic Water Management Group and the Union and Wallowa County Governments to be the central entity for resource coordination, planning and management in the Grande Ronde and Imnaha subbasins. The GRMWP represents the interests of the basin's residents to local, state and federal agencies and other public and private interests. The goals, objectives, and strategies listed below are accomplished through: coordination, education, technical assistance (project development, NEPA, ESA consultation), and funding assistance (primarily with Bonneville Power Administration funds).

GRMWP Mission Statement:

"To develop and oversee the implementation, maintenance, and monitoring of coordinated resource management that will enhance the natural resources of the Grande Ronde River Basin."

Goals:

- Provide habitat for the restoration and enhancement of anadromous salmonids and other native fish species.
- Develop recommendations for management and utilization of water by agriculture and other industries.
- Conduct a public involvement program to address concerns of landowners, land managers and resource users.
- Provide recommendations for management of resources which will enhance the quality and quantity of stream flows.
- Recommend resource management and research activities which meet the Program mission.
- Promote the mission, goals and objectives of he Program to regional, state and national entities.
- Assure that watershed restoration activities implemented in the Basin are adequately monitored and evaluated.
- Protect the customs, culture, and economic stability of the citizens of the Basin, the Nez Perce and Confederated Tribes of the Umatilla Indian Reservation, and the citizens of the United States of America.

Objective 1. Coordinate program administration and watershed restoration activities.

Strategy 1.1. Facilitate inter-agency coordination of program activities and projects.
Strategy 1.2. Coordinate planning, prioritization, design and implementation of restoration projects.
Strategy 1.3. Provide technical support for project planning, design and implementation.
Strategy 1.4. Maintain basin-wide restoration activity database.
Strategy 1.5. Prepare watershed assessments/updates and NEPA documentation.
Strategy 1.6. Conduct educational outreach.
Strategy 1.7. Coordinate project effectiveness and basin-wide water quality monitoring.

Objective 2. Improve in-stream habitat diversity for salmonid spawning and rearing.

Strategy 2.1. Add large wood component to mainstem streams and tributaries.
Strategy 2.2. Rock and log structure placements.
Strategy 2.3. Install grade control structures.
Strategy 2.4. Reconstruct channel meanders.
Strategy 2.5. Construct off-channel rearing habitat.
Strategy 2.6. Implement riparian tree planting

Objective 3. Enhance riparian condition (vegetation, function, etc.)

Strategy 3.1. Construct riparian livestock fencing
Strategy 3.2. Restore wet meadows
Strategy 3.3. Develop off-stream livestock water sources
Strategy 3.4. Close/obliterate draw-bottom roads.
Strategy 3.5. Revegetate streambanks and riparian zones.

Objective 4. Reduce stream sedimentation.

Strategy 4.1. Revegetate streambanks.
Strategy 4.2. Construct rock barbs with embedded wood or use other structures as appropriate to the site (e.g., J-hooks, W-weirs).

Strategy 4.3 Use bio-engineering where hard structures are not appropriate or possible.
Strategy 4.4 Determine the source of the problem (e.g., land use, changed hydrigraph) and correct if possible.

Objective 5. Increase late-season streamflows.
Strategy 5.1. Improve water conveyance efficiency in irrigation ditches.
Strategy 5.2. Improve water application efficiency on irrigated lands.
Strategy 5.3. Acquire in-stream water rights.
Strategy 5.4. Lease water rights.

Objective 6. Improve upland watershed condition and function.
Strategy 6.1. Treat and contain noxious weeds.
Strategy 6.2. Construct livestock pasture fencing.
Strategy 6.3. Manipulate tree density.
Strategy 6.4. Enhance vegetative cover (seeding).

Objective 7. Improve adult and juvenile salmonid fish passage.
Strategy 7.1. Replace/modify inadequate culverts.
Strategy 7.2. Repair inadequate crossings (fords) by hardening the entrances and stream bottom or by replacing them with culverts or bridges as appropriate.
Strategy 7.3. Replace push-up gravel irrigation diversions.
Strategy 7.4. Modify impassable irrigation diversion structures.

Objective 8. Improve water quality.
Strategies: All tasks under Obj's 3, 4, 5, 6.

Wallowa Soil and Water Conservation District

The purpose of the Wallowa Soil and Water Conservation District is to maintain or enhance natural resources within Wallowa County for the benefit of the flora and fauna that depends on healthy ecosystems and for the economic and environmental benefits of the people as authorized by the Oregon State Legislative Assembly in ORS 568.225.

Goals:

- Healthy economy and desirable quality of life in Wallowa County.
- Productive and healthy watersheds in Wallowa County.
- Habitat quality and quantity for sustainable populations of native and anadromous fish species and native wildlife.

Objective 1. Continue to assist landowners/cooperators in meeting local, state, and federal natural resource goals.
Strategy 1.1. Maintain well-qualified technical and planning staff.
Strategy 1.2. Maintain partnerships to fund program implementation.
Strategy 1.3. Participate with the NRCS and FSA in their programs (e.g. EQUIP, CREP, CRP) and serve on local action groups and basin work groups.
Strategy 1.4. Enhance and restore watersheds in conjunction with SB1010, the TMDL process, and implementation of the Wallowa County/Nez Perce Tribe Salmon Habitat Recovery Plan with Multi-Species Strategy.

Objective 2. Continue to promote efficient management and ranch planning for resource conservation and economic viability.
Strategy 2.1. Maintain well-qualified technical and planning staff.

Strategy 2.2. Maintain partnerships to fund program implementation.
Strategy 2.3. Promote Coordinated Resource Management Planning (CRMP).

Objective 3. Continue to address fish passage issues related to irrigation diversions.

Strategy 3.1. Design and install fish friendly diversion structures or infiltration galleries.
Strategy 3.2. Maintain partnerships to fund program implementation.

Objective 4. Continue to address irrigation tailwater returns.

Strategy 4.1. Design and install collection systems which return cleaner, cooler water to streams and rivers.
Strategy 4.2. Maintain partnerships to fund program implementation.

Objective 5. Continue to address water conservation and efficient use of irrigation water.

Strategy 5.1. Design and install pump stations, sprinkler systems and/or gated pipe systems where feasible and desirable.
Strategy 5.2. Maintain partnerships to fund program implementation.

Objective 6. Continue to address riparian ecosystem restoration and enhancement.

Strategy 6.1. Install practices which may include: juniper riprap, root wads, rock weirs (e.g. J-hooks, W-weirs, vortex weirs), rock barbs, or rock riprap, if appropriate, to reduce erosive water velocities on stream banks to levels which allow vegetative recruitment.
Strategy 6.2. Install riparian buffers to filter sediments and nutrients before they can reach the stream.
Strategy 6.3. Install riparian fence corridor projects (riparian pasture or exclusion) where desirable.
Strategy 6.4. Assist land managers with grazing and farm management planning.
Strategy 6.5. Control noxious weed populations in riparian areas.
Strategy 6.6. Maintain partnerships to fund program implementation.

Objective 7. Continue to address upland restoration and enhancement.

Strategy 7.1. Promote the development of off-stream watering systems for livestock (often in conjunction with riparian fencing projects).
Strategy 7.2. Assist land managers with grazing and farm management planning.
Strategy 7.3. Promote the reseeding of areas affected by natural processes (e.g. mass wasting, rain on snow, forest fires) to accelerate the regeneration of ground cover to minimize the potential for erosion and noxious weed invasions.
Strategy 7.4. Control noxious weeds on range and forest lands.
Strategy 7.5. Maintain partnerships to fund program implementation.

Union Soil and Water Conservation District

Goals:

- Identify local conservation needs. Develop, implement, and evaluate programs to meet them.
- Educate and inform landowners and operators, general public and local, state, and federal legislators on conservation issues and programs.

- Participate in water management planning to advocate and sponsor watershed improvement projects in a coordinated effort with our partners.
- Supervise staff and volunteers working for the district, coordinate with other cooperating agency personnel.
- Coordinate assistance and funding from federal, state, and local government: Oregon Association of Conservation Districts (OACD), National Association of Conservation Districts (NACD), district associations and private groups.
- Assist the Oregon Department Agriculture (ODA) with the administration of their programs.

Objective 1. Agricultural Water Quality Management Plan

Strategy 1: Implementation of Senate Bill 1010
Strategy 1.1. Local Management Agency
Strategy 1.2. Public Awareness
Strategy 1.3. Program Evaluation and tracking
Strategy 1.4. On the ground projects to address Undesirable Conditions
Strategy 1.4.1. Waste Discharge.
Strategy 1.4.2. Soil Erosion.
Strategy 1.4.3. Nutrient application rates and timing not exceed specific crop requirements.
Strategy 1.4.4. No sediment delivery to waters of the state.
Strategy 1.4.5. Riparian Coverage.
Strategy 2: Educational Outreach
Strategy 2.1. Fairs
Strategy 2.2. Workshops
Strategy 2.3. Media Coverage
Strategy 3: Coordinated Resource Management Plan (CRMP)
Strategy 3.1. Encourage, promote and facilitate CRMP's
Strategy 4: Coordinated Water Quality Monitoring
Strategy 4.1 Continue collecting, compiling, and analyzing water quality data in the GRR basin focusing most activities on 303(d) listed segments and those parameters for which they are listed. The monitoring program is designed to provide data and analysis needed to evaluate water quality trends in the basin, assess the effectiveness of conservation/restoration efforts, and WQMP/TMDL implementation

Objective 2. Area Planning

Strategy 1: Area Planning
Strategy 1.1. Natural Resource Conservation Service (NRCS) - Sponsor and support NRCS technical service programs: CRP, CREP, EQIP, and WRP, WHIP.
Strategy 1.1.1. Provide technical assistance to projects.
Strategy 1.2. Coordinate and provide input into watershed activities – County Coordination meetings.
Strategy 1.3. Natural Resource and Watershed Enhancement Projects

Strategy 1.4. Head Cut Stabilization Project – Working with COE, Landowners, Ditch Companies, Union County, and City of La Grande to coordinate and implement this project.

Strategy 1.5. Provide technical assistance to landowner's and coordination with GRMWP on projects.

Strategy 1.6. Work with Farm Service Agency (FSA) to support Farm Bill programs including CRP, Continuous CRP, and CREP

Strategy 1.7. Continue to track projects, submit annual reports and monitoring.

Strategy 1.8. Work with our partners to fund restoration projects and technical support.

Objective 3. Education

Strategy 1: Provide assistance, materials, and funding to enhance natural resource conservation education.

Strategy 1.1. Programs conducted within the schools.

Strategy 1.2. Workshops and tours for the landowners, public, and agencies

Strategy 1.3. Recognition of teachers, EOU Ag student, landowners, and employees.

Objective 4. Noxious Weeds

Infestation of noxious weeds causes erosion, impacts water quality and wildlife habitat.

Strategy 1: Stress the importance of weed prevention and integrated management control.

Strategy 1.1. Conduct workshops for an awareness of noxious weeds.

Strategy 1.2. Noxious weed control a component of projects.

Strategy 1.3. Look for funding to help control weeds.

Grande Ronde Water Quality Committee

Goal:

- To meet the necessary load allocations and achieve the water quality standards primarily by implementing management measures that will improve stream temperature, dissolved oxygen and pH.Protect the beneficial uses of the waters of the subbasin by implementing management measures to protect existing high quality waters and to improve water quality of impaired waters to the point that state water quality standards are met.

Objective 1. Eliminate point source discharges of nutrients during the summer.

Objective 2. Reduce NPS pollution contributions from transportation sources.

Strategy: Indentify and inventory road related problems, prioritize them and implement solutions including use of Oregon Department of Transportation Habitat Guide.

Objective 3. Reduce NPS pollution contributions form residential and commercial sources.

Strategy: Review and revise relevant city and county ordinances and implement management measures.

Objective 4. Reduce NPS pollution contributions from forest sources.

Strategy: Implement PACFISH Riparian Conservation Areas and Standards and Guides for Key Watersheds on Public Lands. Continue to implement forest practice regulations on private lands and review for practices for adequacy to meet standards.

Objective 5. Reduce non-point pollution contributions from agricultural sources.

Strategy: Implement the Agricultural Water Quality Management Area Plan and review it for adequacy to meet water quality standards.

Asotin County Conservation District

The indigenous salmonid fish species most actively targeted for management in the Asotin Creek watershed are spring and fall chinook salmon, bull trout, and summer steelhead. The goal for these species is to restore sustainable, naturally producing populations to support tribal and non-tribal harvest and cultural and economic practices while protecting the biological integrity and genetic diversity of these species in the watershed.

Objective 1. Reduce pre-spawner adult mortality.

Strategy 1.1. Implement riparian planting projects for long-term LWD recruitment for shade.

Strategy 1.2. Increase habitat complexity by adding LWD into in-stream projects.

Strategy 1.3. Increase pool quantity and quality, decrease width/depth ratio by in-stream structures, and long-term natural floodplain and channel restoration.

Strategy 1.4. Increase sinuosity to return streams to natural form.

Objective 2. Increase incubation success.

Strategy 2.1. Continue upland cost-share for sediment reduction projects.

Strategy 2.2. Construct in-stream structures designed to scour and sort spawning gravels.

Strategy 2.3. Implement riparian plantings for streambank stabilization and LWD recruitment.

Strategy 2.4. Design riparian management plans for alternative water and fencing projects.

Strategy 2.5. Increase sinuosity to return streams to natural form.

Objective 3. Increase juvenile salmonid survival.

Strategy 3.1. Implement in-stream habitat restoration according to sound fluvial geomorphic principals.

Strategy 3.2. Increase pools w/LWD to improve over-winter survival of juveniles.

Strategy 3.3. Decrease width and increase stream depth.

Strategy 3.4. Identify cool water refugia and protect and restore in-stream and riparian habitat.

Strategy 3.5. Construct off-channel rearing areas from springs and add LWD component for habitat complexity.

Strategy 3.6. Implement riparian plantings for shade, cover, and LWD recruitment.

Strategy 3.7. Design riparian management plans with fencing and off-site watering.

Strategy 3.8. Increase sinuosity to return streams to natural form.

Asotin County Noxious Weed Board

The primary function of the Asotin County Noxious Weed Control Program is to provide technical assistance to the citizens of the county in developing effective control strategy's in dealing with their noxious weed problems and encourage people to be good land stewards.

Objective 1. Develop and maintain an accurate and comprehensive noxious weed inventory – with special emphasis toward locating and destroying new invading species.
Objective 2. Develop an effective educational program to be disseminated as required to schools and all user groups as necessary.
Objective 3. Weed control staff will strive to be current with the latest techniques in noxious weed control methods.
Objective 4. Weed control staff will maintain response to public need as the top priority.
Objective 5. Every effort will be made to facilitate landowners in achieving compliance with RCW 17.10.

Wallowa Resources

Goal:

- To catalyze and facilitate community based stewardship in Wallowa County.

Objective 1. Promote community, forest and watershed health.
Objective 2. Create and maintain family-wage job and business opportunities.
Objective 3. Broaden understanding of the links between community well-being and ecosystem health.

Research, Monitoring, and Evaluation Activities

Fisheries

Life History of Spring Chinook Salmon and Summer Steelhead in the Grande Ronde River (ODFW; **Project No. 9202604**)
The goal of this project is to investigate the critical habitat, abundance, migration patterns, survival, and alternate life history strategies exhibited by spring chinook salmon and summer steelhead juveniles from distinct populations in the Grande Ronde and Imnaha River basins. Findings to date indicate that a proportion of the Catherine Creek and upper Grande Ronde River spring chinook populations leave their upper rearing areas in fall and overwinter in the Grande Ronde valley where rearing habitat is significantly altered and degraded. Juvenile chinook were found to be most abundant in pool habitats during summer and winter, which other studies have shown to be in short supply in the Grande Ronde basin. Differences were found to exist between local populations and life history types in migration timing at Lower Granite Dam which demonstrate the need to manage the hydrosystem so as to maximize survival throughout the entire migratory period of Snake River spring/summer chinook salmon smolts.

Smolt Monitoring by Federal and Non-Federal Agencies (PSMFC, FPC, ODFW; **BPA Project No. 8712700**) – Grande Ronde Smolt Monitoring
The Smolt Monitoring Program (SMP) provides a long term, consistent database for fish passage management and mitigation decisions as described in the SMP Umbrella. The project is designed to 1) determine the spring and summer outmigration timing of salmonid smolts, 2) determine for PIT tagged smolts the outmigration timing of salmonid smolts, 3) provide a final report summarizing results of smolt monitoring activities, 4) provide smolt-

to-adult survival indices 5) comparative survival analysis of hatchery PIT tagged chinook and an evaluation of the smolt transportation program.

Comparative Survival Rate Study of Hatchery PIT-Tagged Chinook Salmon (PSMFC, FPC, ODFW: **BPA Project No. 8712702**) - PIT-Tag Marking Spring and Summer Chinook Salmon at Lookingglass Hatchery
The Comparative Survival Study is a long term PIT tag study to develop smolt-to-adult survival indices for spring and summer stream type chinook originating above Lower Granite Dam to evaluate smolt migration mitigation measures and actions (such as flow augmentation, spill, and transportation) for the recovery of listed salmon stocks.

Chinook Salmon Conventional Broodstock (ODFW, NPT, CTUIR, NMFS; **BPA Project Nos. 20556, 8805305, 9800702, 9800703**)
The goal of this project is to increase numbers of spring chinook salmon in the Grande Ronde River Basin through the use of conventional hatchery methods: collect returning adults, spawn them, rear their progeny and release them at smoltification. Weirs have been placed in Catherine Creek, Grande Ronde River and Lostine River to collect adults. So far, sufficient numbers of fish have been captured in Lostine River to support this program. In 2000, 91 fish were captured at the Lostine weir and 33 were kept for spawning at Lookingglass Fish Hatchery. In 2000, 24 chinook salmon were captured at the Catherine Creek weir: seven were kept, but later returned to the stream. At the Grande Ronde River weir, only 17 fish were caught and all were released above the weir to spawn naturally.

Chinook Salmon Captive Broodstock Evaluation (ODFW, NPT, CTUIR, NMFS; **BPA Project Nos. 20556, 9801001, 9703800, 9801066, 9800702, 9800703**)
The Captive Broodstock program was developed to rapidly increase numbers of spring chinook salmon in Catherine Creek, Grande Ronde River and Lostine River by improving parr-adult survival from approximately 0.1% to 50-60%. Up to 500 parr are collected from each of these streams, raised to adulthood in captivity and spawned. Their progeny are raised to smoltification and released into the natal streams of their parents to complete their life cycle in nature. So far, captive survival has exceeded expectations, which has offset fecundity which has been below that expected.
Bull Trout Life History, Genetics, Habitat Needs, and Limiting Factors in Central and Northeast Oregon (ODFW, CTWSRO; **BPA Project No. 199405400**)
The goal of this project is to obtain information that can be used to develop a recovery plan for bull trout. Findings to date have demonstrated the existence of fluvial bull trout in selected streams in the Grande Ronde River basin. Fluvial bull trout have been shown, in general, to overwinter in large rivers, ascend tributaries beginning in spring, spawn in September and October, then return to larger rivers to overwinter. Genetic analyses have identified three major lineages of bull trout in Oregon and have shown that genetic diversity within populations is low relative to that among populations.

Lower Snake River Compensation Plan Steelhead and Chinook Salmon Evaluations (ODFW, CTUIR, NPT)
This research project meets the needs for evaluation of steelhead and chinook salmon hatchery production in the Grande Ronde River subbasin. The LSRCP was designed to

establish and maintain artificial production programs for steelhead and chinook salmon to mitigate for fish losses associated with construction and operation of Lower Snake River Dams. A long-term evaluation and monitoring process is envisioned for the duration of operation of the hatcheries to develop and maintain fish runs which meet recovery and compensation goals at minimum costs. ODFW is conducting an ongoing comprehensive evaluation of LSRCP activities in Oregon that address the following general guidelines:

1. Develop and evaluate operational procedures that will meet recovery and compensation goals as well as management objectives by priority.
2. Monitor operational practices to document hatchery production capabilities and challenges.
3. Monitor fish-rearing activities and results to document accomplishment of goals.
4. Coordinate research and management programs with hatchery capabilities.
5. Recommend hatchery production strategies that are consistent with endangered species recovery efforts.
6. Develop knowledge and information to guide recovery actions and to monitor recovery in the Grande Ronde and Imnaha river basins.
7. Investigate characteristics of endemic stocks that may be influenced by hatchery production.

Statement of Fish and Wildlife Needs

The foregoing subbasin summary includes a great deal of information regarding the status and condition of fish and wildlife populations and habitat. In synthesizing this information, four general needs for restoration and recovery of fish and wildlife populations and habitat emerge:

- Monitoring - Monitoring the status of high priority populations and habitats is important to understanding recovery status and focusing recovery priorities and efforts. Current monitoring efforts should continue and in some cases be expanded to meet emerging information needs;
- Habitat Restoration - Cooperative efforts among landowners, resource managers and regulatory agencies to restore watershed function should continue. Restoring Columbia River function may be as important as Grande Ronde habitat to important populations like Grande Ronde salmon and steelhead;
- In-Lieu-Efforts - In cases where habitat restoration is impossible, or where fish and wildlife productivity is restricted to levels that do not meet reasonable social goals, artificial production efforts (e.g., hatcheries) should be instituted;
- Evaluation – Restoration and recovery measures implemented should be evaluated to document their success. An adaptive management approach to implementation should be used to insure activities to meet expectations.

The following provide specific immediate or critical needs developed and submitted by fish and wildlife resource managers and other interested parties within the Grande Ronde River subbasin. This list is not exhaustive as other specific needs may emerge as species and habitats become better understood. Needs have been defined to address limiting factors to fish and wildlife, ensure that gaps in current data or knowledge are addressed, enable continuation of existing programs critical to successful management of fish and wildlife resources, and to guide development of new programs to facilitate or enhance fish and wildlife management.

Needs have been grouped into three broad categories. Both aquatic and terrestrial needs have been identified, as well as general needs which apply equally to both aquatic and terrestrial resources. The order in which needs are listed in no way implies priority. It is important to note that aquatic and terrestrial needs are separated here for organizational purposes, and are not perceived to be mutually exclusive. Restoration efforts directed at either aquatic or terrestrial resources are likely to impact the ecosystem as a whole. The extent to which needs are addressed and goals and objectives are achieved is dependent upon available funding and timeliness of the permitting and consultation process.

General Needs

1. Coordinate implementation and M&E activities within the subbasin to maximize effectiveness and minimize redundancy. Look for ways to improve consistency among projects.
2. Ensure aquatic and terrestrial subbasin databases are compatible and accessible to all parties.
3. Continue and improve enforcement by state, federal and tribal entities of laws and codes related to protection of fish and wildlife and their habitats, including increased efforts for in and out-of-season poaching and in road closure areas.
4. Continue to educate the public and persons or agencies with resource protection obligations regarding natural resource laws, compliance and enforcement.
5. Development of Federal Recovery Plans for threatened and endangered species to provide recovery guidance for state, tribal and local entities.
6. Reduce the risk of catastrophic wildfire in the subbasin.
7. Promote the purchase, lease, exchange or seasonal rental of water rights for conversion to instream use in stream reaches where out-of-stream use causes low flow problems.
8. Review ability to enhance existing water storage facilities to improve instream flow augmentation and timing and implement if appropriate.
9. Consider the potential for new water storage facilities and, if appropriate, develop new facilities to improve instream flow augmentation and timing.

Aquatic Habitat

Enhancement

1. Replace culverts that present passage barriers and sediment sources based on a prioritized assessment of existing installations.
2. Implement restoration efforts designed to achieve the site potential shade and other temperature surrogates identified in the appropriate TMDLs for the subbasin.
3. Reduce nutrient pollution to achieve the percent reduction targets identified in the appropriate TMDLs for the subbasin.

4. Using existing assessments, seek out opportunities for cooperative habitat restoration and enhancement projects on public and private land.
5. Restore, protect, and create riparian, wetland, and floodplain areas within the subbasin and establish connectivity.
6. Restore in-stream habitat to natural conditions and protect as much as possible to provide suitable holding, spawning, and rearing areas for anadromous and resident fish.
7. Reduce stream temperature, sediment and embeddedness levels to levels meeting appropriate state standards.
8. Restore and augment streamflows at critical times using (but not limited to) water right leases, transfers, or purchases, and improved irrigation efficiency.
9. Reduce stream temperatures where appropriate and when feasible.
10. Consider additional gauging stations to monitor improvement in flows and temperatures as habitat improvement projects are completed.
11. Upgrade existing gauging stations to improve access to real-time streamflow and water temperature data.
12. Reduce sediment, fertilizer and pesticide loading from agricultural practices.
13. Reduce the impacts of confined animals with regard to waste and sediment production.
14. Reduce stormwater, road, and urban/suburban sewage impacts to aquatic resources.
15. Address streambank instability issues where they are defined or can be shown to be a potential problem.
16. Acquire water rights when opportunities arise to help restore more natural flows to streams within the subbasin.
17. Reduce road densities and their associated impacts to watershed functions by supporting planned road closures on public land and encouraging closure of other roads.
18. Implement management plans designed to meet established TMDLs and achieve water quality standards.

Monitoring

1. Periodically conduct longitudinal water temperature surveys such as with Forward Looking Infrared Radar (FLIR).
2. Continue long-term water temperature monitoring throughout the subbasin.
3. Continue compliance and effectiveness monitoring on federal and private land use activities (e.g., mining, grazing, logging, and pollution sources).
4. Improve understanding of the interaction between ground and surface water sources, especially as it pertains to switching irrigation from surface water to wells.
5. Need to characterize rearing and spawning habitats and monitor changes in amount and distribution.
6. Need to evaluate the improvements to adult and juvenile habitat capacity to evaluate success of fish habitat projects.

Planning

1. Continue to develop and update watershed assessments at multiple scales(i.e. transect, reach, watershed) to facilitate integrated resource management and

planning efforts. Ensure that databases used for the development of assessments are sufficiently maintained and available to relevant entities.

Summer Steelhead

Hatchery

1. Complete genetic profiling within the subbasin to determine population structure, gene flow and genetic similarity to support integration of hatchery recovery/conservation and harvest augmentation goals.
2. Continue gene conservation efforts (cryopreservation) for steelhead to preserve genetic diversity within the subbasin.
3. Redevelop hatchery broodstocks (using existing or endemic stocks) and programs as necessary to meet conservation, natural production and harvest augmentation goals.
4. Need to develop new methods to minimize the impact of hatchery production activities on endemic stocks.
5. Need to evaluate hatchery production programs to assure that they meet LSRCP compensation goals.
6. Need to develop Annual Operating Plans and write annual reports for all projects.

Monitoring & Evaluation

1. Continue and expand efforts to quantify juvenile abundance and smolt-to-adult return rates (SAR) of wild/natural and hatchery reared steelhead.
2. Continue and expand monitoring of hatchery supplementation and interactions with natural fish.
3. Need to determine genetic population structure to define steelhead sub-populations within the subbasin.
4. Use improved statistical sampling techniques to ensure current spawning ground surveys are an appropriate measure of productivity. Using these techniques, reassess escapement and spawner/recruitment goals.
5. Need to calculate returns per spawner from index surveys to determine if this relationship is improving as smolt passage facilities are modified at Columbia and Snake River dams. Consider alternative approaches to assess population status.
6. Need to determine life history and movement patterns of steelhead including assessment of adult holding areas, juvenile rearing areas, and juvenile migration patterns.
7. Need to determine smolt-to-adult survival and survival factors throughout the entire life cycle of summer steelhead, including separating freshwater from ocean survival.
8. Need to determine extent of hatchery straying within the subbasin to control potentially adverse genetic effects on the endemic population(s).
9. Need to monitor harvest of steelhead stocks.
10. Need to determine extent of summer steelhead distribution within the subbasin at various life history stages.
11. Need to monitor summer steelhead by examining drainage escapements and population trends.

12. Need to determine life history composition of *Oncorhynchus mykiss* including the role of resident and anadromous forms to basin-wide production.
13. Need to evaluate the success of artificial production programs for restoring fisheries and increasing natural spawning populations.

Chinook Salmon (Includes all races unless specifically noted)

Hatchery

1. Periodically conduct genetic profiling (i.e., population structure, gene flow and genetic similarity) to monitor influence of hatchery stocks on recovery/conservation of natural populations.
2. Continue gene conservation efforts (e.g., Captive Broodstock Program and cryopreservation) for spring and summer chinook salmon in the subbasin.
3. Develop and implement a plan to reintroduce naturally spawning spring chinook salmon to Lookingglass Creek. Initial step must include addition of water treatment capabilities at Lookingglass Hatchery. Co-managers will work together to develop a management plan to fulfill this need.
4. Need to continue implementation of Grande Ronde Conventional and Captive Broodstock Hatchery Programs. To support this effort, complete NEOH planning and implementation of facility and program needs in the Grande Ronde subbasin to meet production changes resulting from ESA listings and to meet basin goals.
5. Continue evaluation of feasibility and desirability of hatchery supplementation releases of fall chinook salmon in the lower Grande Ronde River.
6. Develop and implement, if appropriate, a plan to supplement fall chinook populations in the lower Grande Ronde River and reintroduce fall chinook into historic habitat.
7. Need to continue to participate in planning, consultation and ESA permitting activities pertaining to Grande Ronde Basin chinook salmon populations.
8. Need to collect sufficient numbers of parr and adults for the Grande Ronde Captive and Conventional Broodstock Programs, respectively.
9. Need to monitor health of chinook salmon in captivity and develop new treatments and preventative measures for bacterial kidney disease.
10. Need to develop Annual Operating Plans and write annual reports for all projects.
11. Need to develop adult collection weirs on the Lostine, upper Grande Ronde rivers and Catherine Creek that are effective across the entire potential hydrograph.
12. Need to improve existing acclimation facilities to meet program goals.
13. Need to modify existing and/or construct additional hatchery facilities to remove current facility limitations to meeting Grande Ronde hatchery production goals.

Monitoring & Evaluation

1. Continue and expand efforts to monitor the effectiveness of the chinook salmon captive broodstock and LSRCP and NEOH artificial production programs.
2. Quantify mortality rates and straying of adult chinook salmon from Lower Granite Dam to natural production areas.
3. Need to determine smolt-to-adult survival, survival factors, spawning escapement and life history characteristics of natural and hatchery origin spawning populations.

4. Need to monitor smolt and adult survival and migration characteristics and calculate number of returns per spawner to determine if productivity of natural and hatchery populations is affected by modifications of dams on Columbia and Snake rivers.
5. Need to monitor spring chinook salmon status by examining population trends and develop modeling and monitoring "tools" to determine stray rates and impacts of hatchery-produced chinook salmon to chinook salmon populations in Minam and Wenaha rivers.
6. Need to determine life history and movement patterns of spring chinook salmon within the Grande Ronde Subbasin, including assessment of adult holding areas, juvenile rearing areas, and juvenile migration patterns.
7. Need to evaluate effectiveness of experimental hatchery rearing and release treatments.
8. Need to evaluate the success of Captive and Conventional broodstock programs for restoring fisheries and increasing endemic stocks of spring chinook salmon in Catherine Creek, Lostine River and upper Grande Ronde River. Use continued spawning ground surveys, life history monitoring, fisheries monitoring and other techniques.
9. Need to monitor and determine success of restoring recreational and tribal fisheries in Grande Ronde Basin.
10. Need to determine relative reproductive success of hatchery fish spawning in nature.
11. Need to monitor spawning distribution and recolonization of vacant habitat.
12. Need to investigate the development of run size estimate models for harvest allocation decisions.
13. Need to continue to participate in planning, consultation and ESA permitting activities pertaining to Grande Ronde Basin chinook salmon populations.
14. Need to determine seasonal and reach specific survival of smolts in the subbasin.
15. Gather improved population status information for chinook salmon including adult spawner abundance, spawner to spawner ratios, spawner distribution and timing.
16. Monitor and compare life histories of hatchery and wild spring chinook salmon and their interactions (e.g., feeding, spawning).
17. Determine catch distribution and contribution of Grande Ronde subbasin spring chinook salmon to ocean and freshwater fisheries.

Coho Salmon

1. Develop and implement, if appropriate, a plan to reintroduce coho salmon to the Grande Ronde River subbasin.

Sockeye Salmon

1. Develop and implement, if appropriate, a plan to reintroduce sockeye salmon to the Grande Ronde River subbasin.

Bull Trout

1. Collect life history, distribution, and homing behavior information of bull trout within the subbasin and in relevant core areas.

2. Evaluate connectivity, the degree of interchange and gene flow between populations throughout the subbasin.
3. Monitor core populations to establish trends and measure population response to recovery and restoration activities.
4. Determine the extent, magnitude and nature of nonnative species interactions and hybridization to better define treatment options.
5. Continue presence/absence surveys to locate bull trout populations throughout the subbasin.
6. Assess the relationship between resident and migratory life history forms.
7. Evaluate ecological interactions between bull trout and anadromous salmonids.
8. Determine survival rates of bull trout between life stages and assess productivity
9. Determine water temperature associations of migratory bull trout.

Redband and Cutthroat Trout

1. Investigate potential existence of redband and westslope cutthroat trout in the subbasin.

Mountain Whitefish

1. Assess abundance, distribution, population dynamics, life history and genetic characteristics.
2. Evaluate ecological interactions between mountain whitefish and anadromous salmonids.
3. Determine water temperature associations of resident and migratory life history forms.

Lamprey (brook and Pacific)

1. Conduct presence/absence surveys for lamprey in the Grande Ronde subbasin
2. Develop and implement a plan to reintroduce lamprey to the Grande Ronde River subbasin.
   - Determine habitat requirements and limiting factors for Pacific lamprey production in the subbasin.
   - Assess the rehabilitation potential of Pacific lamprey in the subbasin.
   - Assess the rehabilitation process for Pacific lamprey in the subbasin.

Exotic Species

1. Determine distribution of non-native species and their effects on native species.
2. Assess overall predation on salmonids by exotic species.

Nutrient Cycling

1. Implement cooperative programs to reintroduce anadromous fish carcasses to the ecosystem.
2. Support cooperative efforts to benefit anadromous fish runs.

Wildlife / Terrestrial Needs

Habitat Diversity

1. Acquire lands with high priority habitat components (e.g., aspen stands) when opportunities arise for improved habitat protection, restoration, and connectivity

and for mitigation of lost wildlife habitat (land purchases, land trusts, conservation easements, landowner cooperative agreements, exchanges).
2. Implement and (where applicable) continue Integrated Pest Management programs to limit the spread of noxious weeds.
3. Assist landowners with management of land holdings and easements for restoration and enhancement of wildlife habitat.
4. Mitigate hydropower impacts on loss of wildlife and wildlife habitat and indirect impacts within the subbasin, based on species-specific habitat units.
5. Conduct inventories of rare plant communities in the subbasin.
6. Participate in threatened, endangered, and sensitive species recovery or conservation strategy efforts in the subbasin.

Riparian Communities

1. Acquire lands when opportunities arise for improved habitat protection, restoration, and connectivity for riparian communities and for mitigation of lost wildlife habitat for riparian associated species (land purchases, land trusts, conservation easements, landowner cooperative agreements, exchanges).
2. Protect, restore, and create wetland and riparian habitat, especially in lower elevation riparian areas.
3. Participate in cooperative stewardship programs to foster riparian community protection.
4. Strive to achieve site potential shade targets identified in TMDLs.

Ponderosa Pine Communities

1. Acquire lands when opportunities arise for improved habitat protection, restoration, and connectivity for ponderosa pine communities and for mitigation of lost wildlife habitat for ponderosa pine associated species (land purchases, land trusts, conservation easements, landowner cooperative agreements, exchanges).
2. Work with landowners and managers to restore ponderosa pine communities.
3. Create and maintain large diameter snags in ponderosa pine communities.
4. Participate in cooperative stewardship programs to foster protection of ponderosa pine communities.

Native Prairie Habitats

1. Acquire lands when opportunities arise for improved habitat protection, restoration, and connectivity for native prairie habitats and for mitigation of lost wildlife habitat for native prairie associated species (land purchases, land trusts, conservation easements, landowner cooperative agreements, exchanges).
2. Work with landowners and managers to restore native prairie grasslands.
   a) Support development of native plant nurseries for propagation and restoration.
   b) Support efforts to seed-bank native prairie species.
   c) Support continued restoration of native prairie fauna and flora such as sharp-tailed grouse and Spalding’s catchfly.
3. Develop conservation plans for federally listed plant species.

Noxious Weeds

1. Monitor spread of noxious weeds and evaluate effectiveness of noxious weed control programs.
2. Develop and use restoration techniques for noxious weed infested communities.

3. Continue control programs for noxious weeds to restore natural habitat conditions and communities for wildlife species.
4. Implement and (where applicable) continue Integrated Pest Management programs to limit the spread of noxious weeds.
5. Develop an information and education stewardship program for noxious weeds.

Late Seral Communities

1. Work with landowners and managers to retain late successional habitats on state and private lands (land exchanges, conservation easements, other financial incentives).
2. Develop and implement management prescriptions to restore and promote late successional habitats.
3. Develop an information and education stewardship program to foster late seral community protection.

Factors Associated With Roads

1. Reduce road densities through closures, obliteration, and reduced construction.
2. Support planned road closures on public land and encourage closure of other roads.
3. Improve enforcement of road closures.

Nutrient Cycling

1. Implement cooperative programs to reintroduce anadromous fish carcasses to the ecosystem.
2. Support cooperative efforts to benefit anadromous fish runs.
3. Reduce human-caused nutrient pollution which is disrupting the nutrient cycle by causing eutrophic conditions in identified stream segments.

Subbasin Recommendations

The following subbasin project proposals were reviewed by the Grande Ronde Subbasin Team and the Blue Mountain Province Budget Work Group for Bonneville Power Administration project funding for the next three years. Tables 40 (ongoing projects) and 41 (new proposals) summarize how each project relates to existing goals and objectives in the subbasin.

Projects and Budgets

Continuation of Ongoing Projects

Project: – 198402500 - Grande Ronde Basin Fish Habitat Enhancement Project

Sponsor: Oregon Department of Fish and Wildlife

Short Description:

Protect and enhance fish habitat in selected streams on private lands in the Grande Ronde Basin to improve instream and riparian habitat diversity, and increase natural production of wild salmonids.

Abbreviated Abstract:

Initiated by the Oregon Department of Fish and Wildlife (ODFW) in 1984, the "Grande Ronde Basin Fish Habitat Enhancement Project" protects and restores riparian and instream habitat for anadromous salmonids to improve natural fish production in the basin, thus contributing to the Northwest Power Planning council interim goal of five million fish returning to the Columbia Basin. This project implements measures of the Columbia River Basin Fish and Wildlife Program that call for coordinated efforts to protect and improve spawning and rearing habitat, improve fish passage, and provide offsite mitigation for mainstem fishery losses caused by the Columbia River hydroelectric system. Individual projects are coordinated with, and contribute toward ecosystem and basin-wide watershed restoration efforts that are underway by state, federal and tribal agencies, the Grande Ronde Model Watershed Program and other local watershed groups.

Protection of habitat on private lands is accomplished through long-term lease agreements, cooperative agreements or easements. Restoration of habitat is achieved using a combination of passive regeneration and/or active remediation techniques. Passive regeneration, using riparian exclosure fencing and off-site water developments are often the only management tools needed. In more severely degraded habitat, active remediation techniques using plantings, site-specific instream structures, soil bioengineering or whole channel alterations based on natural channel designs are also used where applicable. While the focus of this project is on endangered Snake River spring/summer chinook and threatened summer steelhead, resident fishes and many species of wildlife and plants also benefit.

Long-term maintenance is an ongoing and vital element of this program and ensures continued protection. Monitoring that has been conducted includes: year-around stream temperature data, habitat transects, physical and biological surveys, and photopoints. In FY 2002 we propose to treat 5.0 miles of stream and continue maintenance and monitoring of 40 existing projects.

Relationship to Other Projects

Project ID	Title	Nature of Relationship
198402100	John Day Basin Fish Habitat Enhancement (ODFW)	Shares funding and personnel to implement and maintain projects on Camas Creek. Information & technology transfer.
198702100	Umatilla Basin Fish Habitat Enhancement (ODFW)	Shares personnel and equipment to implement and maintain projects.
196608300	The CTUIR Grande Ronde Basin Watershed Restoration project	Work closely together to pool resources and personnel to implement and maintain the McCoy Meadows Restoration Project, the Meadow and McCoy Creek/Cunha Ranch projects, the Longley Meadows project and the Grande Ronde River mainstem Phase II project.
199402700	Grande Ronde Model Watershed Projects	Partially funded 4 projects. Technical Group reviews proposed projects.
199202604	The Spring Chinook Salmon Early Life History project	Helps identify critical habitat locations and specific spawning, rearing, and overwinter requirements of spring chinook salmon and summer steelhead.

Project ID	Title	Nature of Relationship
200005100	Research and Evaluate Restoration of Northeast Oregon Streams project	Research crews identified & gain permission to conduct work on our projects on fenced, unfenced and structured reaches on private lands. Research will compare riparian vegetation composition, fisheries and geomorphology under various treatments.

Relationship to Existing Goals, Objectives and Strategies

The 2000 Columbia River Basin Fish and Wildlife Program places a strong emphasis on habitat protection and restoration to accomplish program goals and objectives, and includes this in the “4 H’s” policy statement. A part of the vision for the fish and wildlife program states, “wherever possible, this program will be accomplished by protecting and restoring the natural ecological functions, habitats and biological diversity of the Columbia River Basin.” One of the policy judgments and planning assumptions states, “this is a habitat based program, rebuilding healthy, naturally producing fish and wildlife populations by protecting, mitigating and restoring habitats and the biological systems within them, including anadromous fish migration corridors.”

The Grande Ronde Basin Fish Habitat Enhancement project fits well within the framework of the 2000 Columbia River Basin Fish & Wildlife Program as described above. The Basinwide Salmon Recovery Strategy (Federal Caucus, 2000) also focuses on protecting and restoring native riparian habitat and restoring natural form, function and complexity of target streams in the Grande Ronde Subbasin. While the project targets spring chinook and summer steelhead, actual habitat improvements are implemented to restore overall physical and ecological functions.

This project establishes long term riparian, fish habitat and tributary passage improvements on private lands through riparian leases, cooperative agreements and easements. While our focus is on instream, riparian and the immediate upland areas, the individual projects contribute to ecosystem and basin wide watershed restoration and management efforts underway by state, federal and tribal agencies. This project is linked to the Oregon Plan for Salmon and Watersheds by addressing factors for the decline of wild summer steelhead in the Grande Ronde subbasin. Executive Order No. EO 99-01 states in paragraph 1 “The Oregon Plan first addressed coho salmon on the Oregon Coast, was then broadened to include steelhead trout on the coast and in the lower Columbia River, and is now expanding to all at-risk wild salmonids throughout the state. The Oregon Plan addresses all factors for the decline of these species, including watershed conditions and fisheries, to the extent those factors can be affected by the state.”

The Grande Ronde Basin Fish Habitat Enhancement project is an integral part of meeting biological objectives for spring chinook and summer steelhead in the Grande Ronde subbasin. Goals and objectives identified in the Grande Ronde Subbasin Summary are listed for the various state agencies, tribes, and local government or councils. A few of those that directly relate to this project include:

- Biological objectives for listed species in the Grande Ronde were 16,000 annually returning spring chinook and 27,000 summer steelhead (ODFW et al. 1990).
- Protect and enhance fish habitat of endemic stocks of resident and anadromous salmonids, and maximize natural fish production potential.

- Achieve sufficient spawner numbers and productivity of Grande Ronde Basin spring chinook salmon, by restoring and maintaining natural spawning populations, to allow delisting.
- Protect and restore spawning and rearing habitat.
- Improve in-stream habitat diversity for salmonid spawning and rearing.
- Enhance riparian condition (vegetation, function, etc.).
- Reduce stream sedimentation.
- Improve adult and juvenile salmonid fish passage.
- Increase juvenile salmonid survival.

The Grande Ronde Subbasin Summary summarizes the over-riding limiting factors within the basin as "Loss of quality habitat and a loss of connectedness…" Aquatic and riparian habitats were found to be lower than reference conditions with respect to stream shading, bank stability, fine sediment, pool frequency, and woody debris. Other habitat problems include low complexity, degraded riparian vegetation, stream channelization, irrigation withdrawal and runoff. Transportation problems including historic railroads as well as past and present road construction.

In the Statement of Fish and Wildlife Needs section of the Grande Ronde Subbasin Summary the following needs were identified that are specifically being addressed by this project:

- Replace culverts that present passage barriers and sediment sources based on a prioritized assessment of existing installations.
- Implement restoration efforts designed to achieve the site potential shade and other temperature surrogates identified in the appropriate TMDL's for the subbasin.
- Using existing assessments, seek out opportunities for cooperative habitat restoration and enhancement projects on public and private land.
- Restore, protect, and create riparian, wetland, and floodplain areas within the subbasin and establish connectivity.
- Restore in-stream habitat to natural conditions and protect as much as possible to provide suitable holding, spawning, and rearing areas for anadromous and resident fish.
- Reduce stream temperature, sediment and embeddedness levels to levels meeting appropriate state standards.
- Reduce stream temperatures where appropriate and when feasible.
- Address streambank instability issues where they are defined or can be shown to be a potential problem.

The National Marine Fisheries Service's draft Biological Opinion regarding Operation of the Federal Columbia River Power System (NMFS 2000); under its list of Reasonable and Prudent Alternatives, Section 9.6.2 "Habitat Actions" states that a Basinwide Recovery Strategy should focus immediate attention on priority subbasins with the potential for significant improvement in anadromous fish productive capacity as a result of habitat restoration. Previous habitat assessments (Noll 1988; Huntington 1993; Mobrand and Lestelle 1997) indicate that significant improvements could and should be made that will lead to increased fish production and improved water quality.

Action 150 of the NMFS Biological Opinion states, "In subbasins with listed salmon and steelhead, BPA shall fund protection of currently productive non-Federal habitat, especially if at risk of being degraded…" The Riparian leases developed by this project are used as a tool for protecting habitat as well as improving habitat. When high quality areas are adjacent to areas in need of improvement, those productive areas are sometimes included in the "leased" area.

Action 153 of the Biological Opinion states, BPA shall, working with the agricultural incentive programs, negotiate and fund long-term protection for 100 miles of riparian buffers per year. The proposed project will contribute toward meeting this annual goal, and will maintain and monitor past projects.

Through our iterative process of reevaluating our success/approach, we are maximizing the potential of this project toward meeting subbasin goals. Playing a significant role in meeting biological objectives for the Grande Ronde subbasin, this project contributes to the Northwest Power Planning Council's interim goal of five million fish returning to the Columbia Basin. Additionally, failure to fund maintenance of existing projects will lead to significant losses in recovery gained. This would occur mainly through livestock entering exclosure fences that are not maintained. Without maintenance cattle will enter these exclosures and rapidly destroy riparian vegetation that has been restored over the past 17 years. Accomplishment of maintenance activities by landowners would be variable.

After seventeen years of intensive efforts by this project a total of 62.2 miles of stream have been treated, benefiting endangered Snake River spring chinook, summer steelhead, residents fishes and wildlife. However, much work is yet to be done. With continued funding we anticipate protecting and enhancing an average of 2-5 miles of stream/year in 2002 and beyond, and providing continued protection, maintenance, and monitoring of 42 existing projects.

Review Comments

Project may address RPA 153 and 400. The reviewers questioned the lack of data analysis. The sponsors indicated the they have only had time/funding to collect, error check and store the majority of the data. Statements of Work and Budgets dating back to the early 1990's routinely included statements such as "These (M&E) tasks will be accomplished only if adequate time and funds are provided by BPA." Additional correspondence over the years with BPA contracting officers clearly indicated that monitoring and evaluation were a distant third in priority behind O&M and Implementation. The sponsors indicated that a more thorough, and preferably independent evaluation of the program is worthwhile; however, Oregon State law prevents the sponsors from making requests for new funds, or increase existing program funds without legislative approval. As a result, the sponsors have proposed to reallocate personnel funds in the proposed 2002 budget by shifting funds that would normally be dedicated to administrative activities such as program supervision and clerical assistance to allow for the development of a contract to compile, review, analyze and publish the results of their habitat restoration efforts. The sponsors have initiated efforts to identify an individual to perform the analysis. Reviewers indicated that in FY2000 project sponsors agreed to that any new work would go through the Grande Ronde Model Watershed Program rather than directly through

BPA. Potential cost savings if implementation activities are processed through the GRMWP.

Budget

FY02	FY03	FY04
$456,416 Category: High Priority Comments:	$479.236 Category: High Priority	$503,198 Category: High Priority

Project: – 198805301 – Northeast Oregon Hatchery Master Plan

Sponsor: Nez Perce Tribe

Short Description:

Plan and develop conservation production facilities in the Imnaha and Grande Ronde rivers necessary to implement salmon recovery programs for native, ESA listed, spring chinook and steelhead, and reintroduction of coho and sockeye salmon.

Abbreviated Abstract:

Co-managers are utilizing this project to plan and develop salmon conservation and recovery programs, and the facilities necessary for implementation, in the Imnaha and Grande Ronde River subbasins. These programs are aimed at preventing extinction, reintroducing and restoring anadromous salmonid species native to the subbasins. Actions authorizing and directing this project are found in the Columbia Basin Fish and Wildlife Program (NPPC 1994) Measure 7.4.

The Northwest Power Planning Council (NPPC) has implemented a Three-Step Review Process for restoration programs that utilize supplementation and are funded through the Fish and Wildlife Program. The Process involves: 1) development of a comprehensive master plan for artificial production, necessary facilities, monitoring and evaluation, harvest, and essentially all facets of a management plan, 2) preliminary design, cost estimation, and National Environmental Protection Act (NEPA) analysis, and 3) final design.

Through this project, the Grande Ronde and Imnaha Spring Chinook Master Plan (Ashe et al. 2000) was developed and submitted to the NPPC in April, 2000. The Master Plan received public and peer review and approval by the Independent Scientific Review Panel (ISRP 2000). In September 2000, the NPPC authorized proceeding with preliminary design and NEPA (Step 2) activities for spring chinook (Cassidy 2000). Preliminary design documents will be submitted for review in August, 2001 to coincide with the Blue Mountain Provincial Review. Completion of the NEPA process is expected by January 2002.

The Council also authorized development of a Grande Ronde coho salmon master plan for submittal in November 2001 and a Grande Ronde and Imnaha steelhead master plan for submittal in October 2002. Development of a master plan for Wallowa Lake sockeye is proposed for 2003.

This proposal identifies activities that will occur in each step of the planning process, for each species, should these plans successfully complete the Three-Step Review Process. Forward progress on planning and implementation will be dependent upon completion of the Step Process.

Relationship to Other Projects

Project ID	Title	Nature of Relationship
199801001	Grande Ronde Basin Captive Broodstock - ODFW - funds O&M and M&E of rearing captive brood adults in freshwater for Grande Ronde program at Lookingglass and Bonneville hatcheries.	The spring chinook facilities proposed for construction /modification through this project will provide incubation and rearing space needed to rear progeny of the captive broodstock.
199801006	Captive Broodstock Artificial Propagation - NPT M&E of captive broodstock project	The spring chinook facilities proposed for construction /modification through this project will provide incubation and rearing space needed to rear progeny of the captive broodstock.
199800702	Grande Ronde Supplementation - funds operation and maintenance and monitoring and evaluation of satellite facilities on the Lostine River for adult collection and juvenile acclimation and release of captive and conventionally produced spring chinook.	The proposed facilities will alleviate the burden at Lookingglass Hatchery allowing full production of these stocks. These facilities will act as satellites to the proposed facilities.
199800703	Grande Ronde Supplementation - funds operation and maintenance and monitoring and evaluation of satellite facilities on the Upper Grande Ronde River and Catherine Creek for adult collection and juvenile acclimation and release of captive and conventional.	The proposed facilities for spring chinook will alleviate the burden at Lookingglass Hatchery allowing full production of these stocks. These facilities will act as satellites to the proposed facilities.
199803800	Preserve Listed Salmonid Stock Gametes – funds the collection, cryopreservation, and storage of male chinook and steelhead semen collected from Imnaha and Grande Ronde fish both on the spawning grounds and in the hatchery.	Project 9803800 would continue to provide these activities for the program at the proposed facilities.
198805305	Northeast Oregon Hatcheries Planning and Implementation - funds ODFW participation in the master planning process and operation of Lookingglass Hatchery for captive and conventional chinook salmon produced in the Grande Ronde program.	The proposed facilities for spring chinook will alleviate the burden at Lookingglass and make it possible for production goals to be met. Provides co-manager coordination in development of restoration programs for steelhead, coho, and sockeye salmon.
199606700	Manchester Captive Broodstock - funds rearing of captive brood adults in saltwater for the Grande Ronde program.	The proposed facilities will provide the additional incubation and rearing space (with sufficient segregation capability for monitoring and evaluation and fish health requirements) needed to rear progeny of the captive broodstock.
199403300	Fish Passage Center's Smolt Monitoring Project - funded to monitor smolt migration timing.	Juvenile and natural salmon produced at the proposed facilities will provide information on in-river migration timing and survival.
199202604	Early Life History of Spring Chinook – funded to establish baseline life history information on Grande Ronde River	Juvenile trapping data from project 9202604 would be used to evaluate the success of the conservation program and production from the

Project ID	Title	Nature of Relationship
	spring chinook salmon and steelhead.	proposed facilities. Provides baseline information for development of steelhead master plan.
198712703	Imnaha River Smolt Monitoring Project - funded to monitor emigration survival, timing, and life history characteristics, and will intensively monitor emigration of hatchery and natural spring chinook salmon from the Imnaha River system.	Project 8712703 would also be used to evaluate the success of the conservation program and production from the proposed facilities.
198909600	Genetic Monitoring and Evaluation of Snake River Salmon and Steelhead - funds the collection, analysis and establishes a database of genetic data from salmon and steelhead stocks in the Snake River.	Juvenile hatchery and natural salmon produced as a result of the proposed facilities would provide information for this database.
199402700	Grande Ronde Model Watershed - funded for coordinating water quality monitoring and habitat enhancement projects in the Grande Ronde and Imnaha subbasins.	These efforts are expected to assist recovery actions of the conservation programs. In addition, juveniles produced by proposed facilities will provide information on habitat use in treatment areas.
199608300	Grande Ronde Habitat Enhancement - CTUIR funded to improve habitat in the Grande Ronde Subbasin.	These efforts are focused in the upper Grande Ronde watersheds of Union County. Improvement in habitat will increase likelihood of program success.
199403900	Wallowa Basin Project Planning - NPT funded to improve habitat in the Imnaha and Grande Ronde subbasins.	These efforts are focused in Wallowa County. Improvement in habitat will increase likelihood of program success.
199702500	Wallowa/Nez Perce Salmon Habitat - NPT funded to improve habitat in the Imnaha and Grande Ronde subbasins.	These efforts are focused in Wallowa County. Improvement in habitat will increase likelihood of program success.
198402500	Grande Ronde Habitat Enhancement - ODFW funded to improve habitat in the Grande Ronde Subbasin.	These efforts are focused in Union County. Improvement in habitat will increase likelihood of program success.

Relationship to Existing Goals, Objectives and Strategies

The focus of this project is to plan and develop conservation production facilities in the Imnaha and Grande Ronde rivers necessary to implement salmon recovery programs for native, ESA listed, spring chinook and steelhead, and reintroduction of coho and sockeye salmon. Many of the goals, objectives, needs, strategies and action items detailed in the Grande Ronde Subbasin Summary (Nowak et al. 2001) and the Imnaha River Subbasin Summary (Rabe et al. 2001) are addressed by this project. Fish hatchery and fisheries research needs outlined in the Summaries that relate specifically to activities proposed by this project are as follows:

Chinook Salmon (Grande Ronde and Imnaha Summaries)

3. Develop and implement a plan to reintroduce naturally spawning spring chinook salmon to Lookingglass Creek. Initial step must include addition of water treatment *capabilities at Lookingglass Hatchery. Co-managers will work together to develop a management plan to fulfill this need.*

4. Need to continue implementation of Grande Ronde Conventional and Captive Broodstock Hatchery Programs. To support this effort, complete NEOH planning and implementation of facility and program needs in the Grande Ronde and Imnaha subbasins to meet production changes resulting from ESA listings and to meet basin goals.

7. Need to continue to participate in planning, consultation and ESA permitting activities pertaining to Grande Ronde Basin chinook salmon populations.

11. Need to develop adult collection weirs on the Lostine, upper Grande Ronde rivers and Catherine Creek that are effective across the entire potential hydrograph.

12. Need to improve existing acclimation facilities to meet program goals.

13. Need to modify existing and/or construct additional hatchery facilities to remove current facility limitations to meeting Grande Ronde hatchery production goals.

Summer Steelhead (Grande Ronde and Imnaha Summaries)

1. Complete genetic profiling within the subbasin to determine population structure, gene flow and genetic similarity to support integration of hatchery recovery/conservation and harvest augmentation goals.

3. Redevelop hatchery broodstocks (using existing or endemic stocks) and programs as necessary to meet conservation, natural production and harvest augmentation goals.

4. Need to develop new methods to minimize the impact of hatchery production activities on endemic stocks.

Coho Salmon (Grande Ronde Summary)

1. Develop and implement, if appropriate, a plan to reintroduce coho salmon to the Grande Ronde River subbasin.

Sockeye Salmon (Grande Ronde Summary)

1. Develop and implement, if appropriate, a plan to reintroduce sockeye salmon to the Grande Ronde River subbasin.

Review Comments

The sponsors indicated that the M&E plan is still in development (will be completed in the third step of the Three-Step process). This project is considered BASE by NMFS.

The objectives describe in the 2002 proposal are for planning, not specifically for HGMP. If the Step process recommends proceeding to the next step the funds to develop HGMP or Master Plans further (which involve much of the same information) would proceed. This differs from the ongoing LSRCP tasks or responsibilities, which deal with existing production programs and NEOH deals with modified or expanded steelhead production that would require a new/different HGMP.

Budget

FY02	FY03	FY04
$2,714,740 Category: High Priority Comments:	$9,525,000 Category: High Priority	$11,993,000 Category: High Priority

Project: – 198805305 Northeast Oregon Hatcheries Implementation

Sponsor: Oregon Department of Fish and Wildlife

Short Description:

Work with comanagers to implement the Grande Ronde Endemic Spring Chinook Supplementation Program (GRESCSP).

Abbreviated Abstract

This project was initiated as one of the Northeast Oregon Hatchery Projects to improve fish production in the Hood, Umatilla, Imnaha, Grande Ronde and Walla Walla basins via hatchery and satellite facility development. Originally this project focused on contributing to the council's doubling goal. With the listing of Snake River chinook and steelhead under the federal Endangered Species Act, efforts in the Grande Ronde and Imnaha have been refocused on contributing to recovery. Specifically, the current objective is to contribute to an upward trend in spawning ground counts. This will be accomplished through increased outmigration of smolts using hatchery production while avoiding unintended changes to population structure, fitness and genetics. Without intervention, loss of biodiversity and inbreeding depression due to small population size may put these stocks further at risk. Long-term project implementation is expected to result in the return of increased numbers of wild adults, reducing those risks and hastening recovery. We expect recovery of these weak populations over the next 5+ generations (20+ years), to population sizes supporting ESA de-listing.

This project is responsible for integrating Northeast Hatchery Operations (NEOH) with the spring chinook master plan submitted by the Nez Perce Tribe (Ashe et al. 2000). The Draft Grande Ronde Subbasin Summary (Nowak 2001), Draft Imnaha Subbasin Summary (Saul et al. 2001), and NPT spring chinook master plan calls for development of new conservation facilities and modifications to Lookingglass Hatchery to implement salmon recovery programs in the Imnaha and Grande Ronde subbasins. This proposal covers Oregon Dept. of Fish and Wildlife implementation of the conventional supplementation component of the Grande Ronde Endemic Spring Chinook Supplementation Program (GRESCSP). The program is a cooperative effort among ODFW, USFWS, NPT, and CTUIR to develop endemic broodstocks. NPT is primarily responsible for operating adult trapping and smolt acclimation facilities on the Lostine

River. CTUIR is primarily responsible for operating adult trapping and smolt acclimation facilities on upper Grande Ronde River and Catherine Creek. This project is also responsible for integrating the GRESCSP with existing USFWS artificial propagation activities at Lookingglass Hatchery. Specially, this proposal is to supplement existing programs to implement the short-term goal of producing 360k endemic (conventional) smolt spring chinook (120k each for Catherine Creek, upper Grande Ronde, and Lostine River), monitor adult returns, and evaluate conventional to captive brood recovery approaches, and monitor fish health. The long-term goal for Lookingglass Hatchery is to return 5,800 adults by producing 900k endemic smolt spring chinook for Grande Ronde Subbasin.

Relationship to Other Projects

Project ID	Title	Nature of Relationship
199800702	Grande Ronde Supplementation: Lostine River O & M and M & E	Operate adult trapping and juvenile acclimation facilities and conduct monitoring and evaluation in the Lostine River to implement the Lostine component of the Grande Ronde Basin Endemic Spring Chinook Supplementation Program (GRESCSP).
199800703	Facility O & M and Program M & E for Grande Ronde Anadromous Salmonids	Operate adult trapping and juvenile acclimation facilities and conduct monitoring and evaluation in the upper Grande Ronde and Catherine Creek for spring chinook and steelhead and to implement the UGR and CC component of the GRESCSP.
199801001	Grande Ronde Basin Spring Chinook Captive Broodstock Program	Implement captive broodstock programs and associated research, monitoring, evaluation, and fish health for spring chinook salmon populations in Catherine Creek, upper Grande Ronde and Lostine rivers, to conserve genetic diversity and assist in recovery.
199801006	Captive Broodstock Artificial Propagation	Implements the captive broodstock project through the collection of juvenile salmon from the wild and maintaining them in captivity. The founding generation is spawned at maturity and the resulting F1 generation is released back to the parental stream.
199606700	Manchester Spring Chinook Broodstock Project	Rear Snake River spring/summer chinook salmon captive broodstocks from Idaho's Salmon River sub-basin and Oregon's Grande Ronde River sub-basin. Provide pre-spawning adults, eyed eggs, and juveniles to aid recovery of these ESA-listed stocks.
198805301	Northeast Oregon Hatchery Master Plan, NPT	Plan and develop conservation production facilities in the Imnaha and Grande Ronde rivers necessary to implement salmon recovery programs for native, ESA listed salmon.
199703800	Preserve Salmon Gametes	Preserve male salmonid gametes through cryogenic techniques in order to maintain genetic diversity in populations with low levels of abundance and at high risk of localized extinction.
199202604	Early Life History of Spring Chinook Salmon in the Grande Ronde Basin	We utilize migration timing information from this project to determine when to collect juveniles for captive broodstock. Life history information will also be used to access the success of supplementation programs and smolt migration success.
	Northeast Oregon Hatcheries Planning (planning 198805305)	Work with comanagers to develop endemic broodstocks for supplementation of spring chinook salmon in the

Project ID	Title	Nature of Relationship
		Grande Ronde basin and continue planning for additional anadromous salmonid enhancement programs in the Grande Ronde, and Imnaha subbasins.
0	Lower Snake River Compensation Plan	The captive broodstock project is providing embryos for use in the LSRCP supplementation program. Production and release of captive brood progeny is funded under the LSRCP.

Relationship to Existing Goals, Objectives and Strategies

The rationale of this proposal integrates two recovery approaches, captive brood supplementation and conventional enhancement, to LSRCP mitigation and is tied to recovery subbasin plans (Ashe et al. 2000; Nowak et al. 2001). The ODFW recent NEOH efforts have focused on planning and implementation of the Grande Ronde Endemic Spring Chinook Supplementation Project (GRESCSP) to support recovery of these populations as directed by the National Marine Fisheries Service (NMFS). The GRESCSP incorporates a number of components including setting aside the Wenaha and Minam basins as natural production reserves, supplementing Lostine, Catherine Creek and upper Grande Ronde chinook populations using captive and conventional hatchery broodstock techniques. The GRESCSP serves as the umbrella integrating existing programs (e.g. Lower Snake River Compensation Plan, NEOH, etc) to limit duplication.

In addition, the captive brood program was initiated in 1995 as a conservation measure in response to severely declining endemic stocks of chinook salmon in the Grande Ronde Subbasin. Our goals are to help prevent extinction of the three populations (Lostine, Catherine Creek and upper Grande Ronde) and to ensure a high probability of population persistence well into the future once the causes of basin wide population declines have been addressed. The program is designed to produce a minimum of 150 adults to the river of parent origin and to ensure threshold escapement levels are met. Management strategies for the Grande Ronde River subbasin incorporate objectives derived from recommendations made by the Columbia Basin Fish and Wildlife program, NMFS Draft Recovery Plan, Tribal Recovery Plan, Columbia River Fisheries Management Plan, as well as draft Imnaha Subbasin Summary and the draft Grande Ronde Subbasin Summary (Nowak et al. 20001).

This proposal also addresses the objectives outlined by ODFW in the draft Grande Ronde Subbasin Summary. Objectives include:

- Objective 1: Achieve a sufficient spawner numbers and productivity of Grande Ronde Basin spring chinook salmon, by restoring and maintaining natural spawning populations, to will allow de-listing.
- Objective 2: Reduce the demographic risks associated with the low productivity and decline of native spring chinook salmon populations in Catherine Creek, Lostine River and Grande Ronde River.
- Objective 3: Maintain artificial production programs for spring chinook salmon and steelhead, using locally-adapted broodstocks to meet recovery, conservation and harvest goals, and mitigate for fish losses associated with construction and operation of lower Snake River dams.
- Objective 4: Establish an annual supply of steelhead and spring chinook salmon brood fish capable of meeting annual production goals.

This proposal also addresses the objectives outlined by NPT in the draft Grande Ronde Subbasin Summary. Objectives include:

- Objective 1. Restore and recover historically present fish species.
- Objective 2. Provide for harvestable, self-sustaining populations of anadromous and resident fish species in their native habitat.
- Objective 3. Manage salmon and steelhead for long-term population persistence.
- Objective 11. Meet federal fisheries mitigation responsibilities for LSRCP program.
- Objective 12. Provide for Tribal hatchery production needs in federal and state managed facilities.
- Objective 14. Coordinate with the National Marine Fisheries Service and U.S. Fish and Wildlife Service to fund and implement actions identified in the Biological Opinions, and to implement other emergency actions that address imminent risk to listed salmon, steelhead, and bull trout populations.

This proposal also addresses the objective outlined by CTUIR in the draft Grande Ronde Subbasin Summary.

- Objective 1. Achieve and maintain an average run of 16,400 spring chinook to the Grand Ronde River mouth for purposes of natural production, fisheries, and broodstock.

Review Comments

M&E plan still in development (will be completed in the third step of the Three-Step process). This project is considered BASE by NMFS.

Budget

FY02	FY03	FY04
$79,376 Category: High Priority Comments:	$82,683 Category: High Priority	$86,128 Category: High Priority

Project: – 199202601 – Implement the Grande Ronde Model Watershed Program Administration and Habitat Restoration Projects

Sponsor: Grande Ronde Model Watershed Program

Short Description:

Continue the Grande Ronde Model Watershed Program Administration and Habitat Restoration. Develop and oversee coordinated, sustainable resource management in the Grande Ronde Subbasin. Plan, design and implement salmonid habitat restoration projects.

Abbreviated Abstract

This proposal requests continued funding for the comprehensive Grande Ronde Model Watershed Program (GRMWP). The Grande Ronde Basin was selected in 1992 by the Northwest Power Planning Council as the model watershed for Oregon. The GRMWP brings relevant interests together to address the needs of declining fish populations in the Grande Ronde Basin. The project focuses on ecosystem restoration, activity and program coordination, educational outreach and private landowner involvement to promote species recovery in the Grande Ronde subbasin. The GRMWP goal for habitat recovery is to take a total ecosystem approach, from ridge-top to ridge-top using a combination of active and passive restoration strategies.

The GRMWP strategy is to restore critical salmonid habitats in the Grande Ronde Basin. Specific measurable outcomes include:

- Increased riparian zone and floodplain function
- Restoration of in-channel and riparian habitats for fish and wildlife
- Improved spawning and rearing habitat for ESA listed fish
- Continuation of a basin-wide water quality and project effectiveness monitoring program
- Increased landowner and public involvement in habitat restoration activities
- An educational outreach program that reaches all basin residents

The GRMWP Board of Directors, representing the diversity found in the Basin, directs program activities. A Technical Committee reviews all habitat restoration actions.

The GRMWP will continue to direct BPA funds toward focus watersheds to provide optimal benefits to ESA listed species. The project specifically addresses RPA's 149 through 154 in the NMFS Biological Opinion.

Relationship to Other Projects

Project ID	Title	Nature of Relationship
199202604	Spring Chinook Early Life History	Provides critical life history information to focus restoration efforts in the Grande Ronde Basin.
199403900	Wallowa Basin Project Planner	Provides for technical support and coordination from the Nez Perce Tribe.
199702500	Wallowa County / Nez Perce Salmon Habitat Recovery Plan Implementation	Support Nez Perce Tribe Implementation of the Wallowa County / Nez Perce Tribe Salmon Habitat Recovery Plan
199403000	RASP in the Grande Ronde Basin	Grande Ronde Ecosystem Diagnosis and Treatment Project (GREDT) provided a science-based methodology for habitat restoration planning and implementation.
199608300	Grande Ronde Basin Watershed Restoration	CTUIR O & M of habitat restoration projects
20512	Grande Ronde River Basin Umbrella	Provides background to GRMWP proposal.

Relationship to Existing Goals, Objectives and Strategies

The GRMWP serves as a coordinating entity with agencies, tribes and landowners engaged in fish and wildlife management in the Grande Ronde Basin. The program also conducts a public involvement program emphasizing education and involvement of interested and affected parties (Objective 1 under GRMWP).

Many of the Goals and Objectives are duplicative for many of the proposals. GRMWP Goals and Objectives are compatible with Subbasin Summary Goals and Objectives relating primarily to habitat, and protection of listed and resident fish species.

Our activities generally do not directly involve species management policies or regulations, research, or supplementation and production programs.

The GRMWP species and habitat restoration program is centered on on-the-ground activities to protect high quality habitats or restore degraded habitats. The program takes the ridgetop-to-ridgetop approach working on upland as well as riparian and in-channel habitats. Restoration activities can cover the full range of potential work to address limiting factors, as identified in numerous assessment and planning documents. Projects can include activities to address stream flow, water quality, fish protection (irrigation ditch screening), riparian and upland habitat and in-channel habitat.

Review Comments

In an attempt to show that the money spent on habitat work has led to a positive fish population response, monitoring of fish population status/response is performed through 199202604. This project addresses RPA 400.

Budget

FY02	FY03	FY04
$1,376,000 Category: High Priority Comments:	$1,780,000 Category: High Priority	$1,932,000 Category: High Priority

Project: – 199202604 – Investigate Life History of Spring Chinook Salmon and Summer Steelhead in the Grande Ronde River Basin and Monitor Salmonid Populations and Habitat

Sponsor: Oregon Department of Fish and Wildlife

Short Description:

Investigate the abundance, migration patterns, survival, and life history strategies of spring chinook salmon and summer steelhead from distinct populations and implement fish population and habitat monitoring in the Grande Ronde and Imnaha River basins.

Abbreviated Abstract

The goal of this project is to investigate the critical habitat, abundance, migration patterns, survival, and alternate life history strategies exhibited by spring chinook salmon and summer steelhead juveniles from distinct populations in the Grande Ronde and Imnaha River subbasins. Our methods include collecting juveniles with migrant traps and passive seining techniques, and marking with PIT tags for migration timing and estimating survival indices. The project will provide information on abundance of spring chinook and steelhead parr and estimates for egg-to-parr and parr-to-smolt survival for spring chinook salmon and parr-to-smolt survival for steelhead. This study provides a means for long term monitoring of juvenile salmonid production in the Grande Ronde and Imnaha River subbasins that is essential for assessing the success of restoration and enhancement efforts including habitat improvement and hatchery supplementation. As hatchery supplementation of spring chinook salmon continues in the Grande Ronde subbasin, we will monitor abundance of migrants and survival to various life stages to determine the effectiveness of this management action. An additional objective to monitor habitat, juvenile salmonid populations, and steelhead spawners using methods employed by the

Oregon Plan for Salmon and Watersheds Monitoring Program (Nicholas 1997a, 1997b, and 1999) will be extended to Oregon's portion of the Blue Mountain Province (Grande Ronde and Imnaha Subbasins). This approach, successfully implemented in Oregon's coastal watersheds, applies a rigorous, Tier-2 sampling design to answer key monitoring questions, provides integration of sampling efforts, and will improve coordination among state, federal, and tribal governments, and local watershed groups.

Relationship to Other Projects

Project ID	Title	Nature of Relationship
198805305	Northeast Oregon Hatcheries Master Plan (ODFW)	Proposed project provides information on local populations that is crucial for planning, implementation and evaluation of supplementation in the Grande Ronde basin.
198805301	Northeast Oregon Hatcheries Master Plan (NPT)	Proposed project provides information on local populations that is crucial for planning and implementation of supplementation in the Grande Ronde Basin. Provide monitoring for evaluating impacts of this project on naturally reproducing populations.
199801001	Grande Ronde Basin Spring Chinook Captive Broodstock Program (ODFW)	Proposed project provides estimates of abundance of spring chinook to monitor the success of the captive program. Life history information will be used to evaluate captive program. Parr surveys will provide reconnaissance information for parr collection.
199800702	Grande Ronde Supplementation: Lostine River O & M and M & E (NPT)	Proposed project provides information on local populations that is crucial for planning and implementation of supplementation in the Grande Ronde Basin. Provide monitoring for evaluating impacts of this project on naturally reproducing populations.
199800703		Proposed project provides information on local populations that is crucial for planning and implementation of supplementation in the Grande Ronde Basin. Provide monitoring for evaluating impacts of this project on naturally reproducing populations.
199402700	Grande Ronde Model Watershed	Proposed project provides information on habitat utilization and juvenile production that is used to identify and prioritize habitat improvement projects.
198402500	Protect and Enhance Anadromous Fish	Proposed project monitors trends in natural production partly associated with habitat improvements
199608300	CTUIR Grande Ronde Basin Watershed Restoration	Proposed project monitors trends in natural production partly associated with habitat improvements
199405400	Bull Trout Life History, Genetics, Habitat Needs and Limiting Factors in Central and Northeastern Oregon	Proposed project captures bull trout incidentally in rotary screw traps and provides meristic and recapture data.
198712700	Fish Passage Center's Smolt Monitoring Program	Trap data is exchanged with the Lower Grande Ronde study to provide in-river information on migration timing.

Relationship to Existing Goals, Objectives and Strategies

Project 199202604, Investigate Life History of Spring Chinook Salmon and Summer Steelhead in the Grande Ronde River Basin and Monitor Salmonid Populations and Habitat, addresses goals, objectives, and strategies related to monitoring and evaluation of spring chinook salmon and summer steelhead populations and monitoring of salmonid habitat in the Oregon portion of the Blue Mountain Province. This project will provide life history and abundance information for spring chinook salmon and steelhead in the Grande Ronde River subbasin as called for by ODFW's Objectives for Steelhead and Spring Chinook Salmon: Objectives 6 and 8, and associated Strategies for Spring Chinook Salmon: Strategy 2 and Strategies for Steelhead: Strategy 2; NMFS's Research and Monitoring Goal: Objective 2; NPT's Research Monitoring and Evaluation: Objective 1: Strategies 2 and 3; and CTUIR's Strategy 12. The population status monitoring component of this project addresses Objective 5 of ODFW's Steelhead Plan, and NMFS's Research and Monitoring Goal: Objective 1.

A project to monitor and evaluate aquatic resources in Wallowa Lake for the conservation and reestablishment of native fishes was originally included in the Project Proposal 199202604, and later resubmitted as a separate project in the ISRP fix-it loop. This project will provide monitoring information called for under ODFW's Kokanee Plan Objective 1 and Strategies 1.1, 1.2, and 1.3.

Review Comments

This ongoing project addresses RPA 180 and 184. A significant new addition to this project involves EMAPing tasks under Objective 12. This new objective should be implemented as part of a comprehensive regional monitoring plan. Discussion of this monitoring plan is ongoing and coordination continuing with co-managers on the development of protocols for biological and habitat monitoring.

The Wallowa Lake component has been resubmitted as a stand-alone project.

Budget

FY02	FY03	FY04
$1,382,766 Category: High Priority Comments:	$1,401,173 Category: High Priority	$1,464,482 Category: High Priority

Sponsor: Nez Perce Tribe

Short Description:

Act as the liaison between the Nez Perce Tribe and Wallowa County. Help coordinate watershed restoration efforts in Wallowa County between the Tribe, County, Grande Ronde Model Watershed Program, local landowners, and state and federal agencies.

Abbreviated Abstract

The overall goals and objectives of this project are to show that resource use, healthy economies, and healthy eco-systems are compatible and to provide quality habitat for natural production of salmonids and other species of fish and wildlife.

The 1994 Fish and Wildlife Program (FWP) (NPPC 1994) objectives that the Watershed Restoration Planner project supports are: 1) a healthy Columbia Basin, 2) maintain biological diversity, and 3) provide needed habitat protection. The 1994 FWP (NPPC 1994) (Sections 7.6, 7.7, 7.8, 7.9C and 10.2C) emphasizes the need to seek cooperative habitat protection and improvement with private landowners while Section 7.0B emphasizes the need for long term planning and Section 7.0C emphasizes the need for developing and updating subbasin plans. The 2000 FWP (NPPC 2000) "directs significant attention to rebuilding healthy, naturally producing fish and wildlife populations by protecting and restoring habitats and the biological systems within them" and talks about restoring ecosystems rather then working with individual species. The Watershed Restoration Planner project takes a watershed approach, ignores political boundaries where feasible, and works cooperatively with private landowners to implement on-the-ground habitat projects.

Coordination is a key element in the successful accomplishment of the above objectives. The Watershed Restoration Planner project provides coordination through the following avenues:

1) works with the Grande Ronde Model Watershed Program through membership on its various committees and Board to provide coordination between Wallowa and Union counties,

2) coordinates within Wallowa County through:

- monthly coordination meetings between the State, Federal, Tribal, and local government management agencies,
- the Wallowa County Natural Resource Advisory Committee,
- Wallowa Resources (affiliated with Sustainable Northwest),
- Wallowa Soil and Water Conservation District, and
- landowner meetings.

The above efforts are expected to result in public education on habitat issues, habitat projects, action plans/comprehensive resource management plans, timber and grazing management plans, increased salmon returns, and removal of streams in Wallowa County from the State's 303d list. This process will take decades to complete but initial benefits of improving instream flows and eliminating passage problems will be immediate.

Although the individual employed as the Watershed Restoration Planner writes project proposals, NEPA compliance, and Biological Assessments, individual projects are run through the Wallowa Soil and Water Conservation District (SWCD) or the Wallowa County Public Works Department. The implementation of habitat restoration projects in Wallowa County has always been a cooperative process and this method of splitting responsibilities facilitates that cooperation. Also, administration costs per project only run from 5% to 10%, putting more money on the ground than if these projects were run through other entities or agencies. Construction/Implementation, Operation & Maintenance, and Monitoring & Evaluation are included in individual habitat project budgets. A watershed level monitoring plan is being developed through the Grande Ronde Model Watershed Program.

Relationship to Other Projects

Project ID	Title	Nature of Relationship
199202601	Grande Ronde Model Watershed Program	Implements project 199202601 in Wallowa County and shares other project information.
199702500	County Tribe Plan Implementation	Manages Project 199702500.
198805301	Northeast Oregon Hatchery Project	Provides technical advice and the habitat/natural production tie.
199604400	Grande Ronde Basin Spring Chinook Captive Broodstock Program	Provides technical advice and the habitat/natural production tie.

Relationship to Existing Goals, Objectives and Strategies

In the Existing Goals, Objectives, and Strategies section of the Grande Ronde Subbasin Summary (Nowak, et al 2001) the Tribes, organizations, and Federal and State agencies emphasized the need to work at the watershed level and across property lines to protect and/or restore habitat for native fish and wildlife through coordinated and cooperative means.

Because of the close coordination between the Watershed Restoration Planner position and the Nez Perce Tribe, the Grande Ronde Model Watershed Program, Wallowa County, the Wallowa Soil and Water Conservation District, the Asotin County Conservation District (lower Grande Ronde River in Washington), Wallowa Resources, the U.S. Bureau of Reclamation, the U.S. Forest Service, and the Oregon Department of Fish and Wildlife, it is not surprising that this project complements many of their goals, objectives, and strategies as listed in the Grande Ronde Subbasin Summary. Most of the ties are habitat and/or coordination related. Many of ODFW's wildlife goals and objectives will benefit from this project's emphasis on habitat restoration but because ODFW did not specify habitat issues they are not marked in Table 40 - Grande Ronde River Subbasin Summary FY 2002 - 2004 BPA Funding Proposal Matrix.

The implementation of other agencies' and organizations' goals, objectives, and strategies also will benefit from this project as noted in Table 40. Specifically, they are: the National Marine Fisheries Service, U.S. Fish and Wildlife Service, Confederated Tribes of the Umatilla Indian Reservation, Oregon Department of Agriculture, Oregon Department of Environmental Quality, and Oregon Department of Land Conservation and Development.

The Lower Snake River Compensation Plan hatchery program and the other agencies hatchery goals will also benefit from improved habitat conditions. This project, however, is not involved in producing fish and so those sections in Table 40 are only marked if there is a habitat component in the goal or strategy statement. Additionally, participation in spawning ground surveys relates to NMFS's Hatchery Goal, Objective 1.

Review Comments

This project addresses RPA 152. Although M&E does not exist in this proposal, M&E activities are performed through individual projects. Reviewers suggest that this project could possibly be combined with 199202601.

Budget

FY02	FY03	FY04
$64,289 Category: High Priority Comments:	$67,503 Category: High Priority	$70,878 Category: High Priority

Project: – 199405400 – Characterize the Migratory Patterns, Population Structure, Food Habits and Abundance of Bull Trout from Subbasins in the Blue Mountain Province

Sponsor: Oregon Department of Fish and Wildlife

Short Description:

To aid in conservation efforts for bull trout, describe their piscivorous nature, assess their population and age structure, explore methods to monitor their abundance, describe their migratory patterns, and monitor the status of populations.

Abbreviated Abstract

The goal of this project is to provide scientific information that will help develop a protection and recovery plan for threatened stocks of bull trout in the Columbia River Basin. Information about the scale at which populations are structured and a method to effectively monitor population abundance have been identified as keys to the recovery and persistence of bull trout populations (Howell and Buchanan 1992; Rieman and McIntyre 1993; Kostow 1995; Buchanan et al. 1997). In addition, a coordinated approach to the monitoring and evaluation of status and trends in bull trout populations is needed to support restoration efforts in the Oregon portion of the Blue Mountain Province. Currently, most research and monitoring activities do not have an overall framework for coordination of efforts or for interpretation and synthesis of results. We propose specific objectives to 1) evaluate the population structure of bull trout in the Grande Ronde River subbasin, 2) assess techniques and refine guidelines to measure the abundance of adult bull trout, 3) characterize piscivory and movement patterns of bull trout populations, and 4) systematically conduct redd surveys to monitor bull trout populations at provincial and subbasin scales. In addition, we propose to work cooperatively within the approach employed by the Oregon Plan for Salmon and Watersheds Monitoring Program (Nicholas, 1997a; 1997b; 1999) as adapted to bull trout in the Oregon portion of the Blue Mountain Province. Each objective is addressed using established techniques (e.g., probablistic sampling of streams and microsatellite DNA analysis). In addition, the approach applies a rigorous, Tier-2 sampling design to answer key monitoring questions. Data will be summarized and statistical analyses performed, when appropriate, to test specific hypotheses. These objectives were designed to complement ongoing work and, more specifically, to support other projects in the province and collaborative work proposed in other provinces. The NWPPC Fish and Wildlife Program and Subbasin Summaries, USFWS, and the Oregon Plan for Salmon and Watersheds have emphasized the need for this information to provide the real-time data to guide restoration and adaptive management in the region.

Relationship to Other Projects

Project ID	Title	Nature of Relationship
198200100	Inventory of Nez Perce Reservation Streams	Supportive. Bull trout surveys would add to Nez Perce inventory.
198400900	Joseph Creek and Grande Ronde River Habitat Work	GIS data base of juvenile rearing and redd distributions supports evaluations of various habitat improvement projects in the basin.
198402500	Joseph Creek and Grande Ronde River Habitat Work	GIS data base of juvenile rearing and redd distributions supports evaluations of various habitat improvement projects in the basin.
198805300	NE Oregon Spring Chinook Hatchery Planning	Supportive. Various life history characteristics and population dynamics of bull trout may be impacted by releases of hatchery fish. Hatchery programs also have ESA responsibilities associated with the take of bull trout.
198805301	NE Oregon Outplanting Facilities Plan – NPT	Supportive. Various life history characteristics and population dynamics of bull trout may be impacted by releases of hatchery fish. Hatchery programs also have ESA responsibilities associated with the take of bull trout.
198805305	NE Oregon Outplanting Facilities Plan – ODFW	Supportive. Various life history characteristics and population dynamics of bull trout may be impacted by releases of hatchery fish. Hatchery programs also have ESA responsibilities associated with the take of bull trout.
198909700	Evaluate Supplementing Imnaha Summer Steelhead	Supportive. Various life history characteristics and population dynamics of bull trout may be impacted by releases of hatchery fish. Hatchery programs also have ESA responsibilities associated with the take of bull trout.
199202601	Grande Ronde Model Watershed Development	Collaborative. Bull trout are an important component of the Grande Ronde River subbasin. The Model Watershed already supports radiotelemetry work on bull trout in the subbasin.
199202604	Life Studies of Spring Chinook Salmon – Grande Ronde River	Collaborative/Supportive. Bull trout and chinook share rearing and spawning habitat. Both projects work together to crosswalk on data collection and analysis.
199306600	Northeast Oregon Fish Screening and Passage Project	Supportive. The population structure of bull trout may be influenced by or reflect screening and passage issues.
199307000	Grande Ronde, Imnaha and John Day Telemetry Tracking	Bull trout telemetry work would be directly related to other telemetry work in these subbasins.
199402701	Catherine Creek Diversion Dam Replacement	Supportive. The population structure and migratory patterns of bull trout may be influenced by or reflect

Project ID	Title	Nature of Relationship
		screening and passage issues.
199402705	Upper Grande Ronde, large Woody Debris	GIS data base of juvenile rearing and redd distributions supports evaluations of various habitat improvement projects in the basin.
199403000	Technical Support – Grande Ronde Model Watershed	Collaborative. Bull trout are an important component of the Grande Ronde River subbasin. The Model Watershed already supports radiotelemetry work on bull trout in the subbasin.
199505300	Indian Creek Habitat Restoration	GIS data base of juvenile rearing and redd distributions supports evaluations of various habitat improvement projects in the basin.
199604800	Boise Cascade Riparian Fencing – Grande Ronde	GIS data base of juvenile rearing and redd distributions supports evaluations of various habitat improvement projects in the basin.
199607400	Bear Creek and Sheep Creek Habitat projects	GIS data base of juvenile rearing and redd distributions supports evaluations of various habitat improvement projects in the basin.
199609000	Chicken Creek Habitat Improvement – Grande Ronde	GIS data base of juvenile rearing and redd distributions supports evaluations of various habitat improvement projects in the basin.
199703300	Upper Grande Ronde River Riparian Fencing	GIS data base of juvenile rearing and redd distributions supports evaluations of various habitat improvement projects in the basin.
199707300	Upper Grande Ronde River Riparian Rehabilitation	GIS data base of juvenile rearing and redd distributions supports evaluations of various habitat improvement projects in the basin.
199707400	Upper Grande Ronde River Whole Tree Project	GIS data base of juvenile rearing and redd distributions supports evaluations of various habitat improvement projects in the basin.
199707800	Catherine Creek and Grande Ronde Irrigation and Stabilization	GIS data base of juvenile rearing and redd distributions supports evaluations of various habitat improvement projects in the basin.
200001270	Monitor and Evaluate the Natural Production, Distribution, Abundance and Genetics of Salmonids	Supportive. The proposed study would document and maintain a database on the abundance of bull trout in Lookingglass Creek.
	Little Sheep Creek Riparian Fencing	GIS data base of juvenile rearing and redd distributions supports evaluations of various habitat improvement projects in the basin.
	Little Sheep Creek Streambank Stabilization	GIS data base of juvenile rearing and redd distributions supports evaluations of various habitat improvement projects in the basin.
	Imnaha Riparian Enhancement	GIS data base of juvenile rearing and redd distributions supports evaluations of various habitat improvement projects in the basin.
	Imnaha Riparian Fencing	GIS data base of juvenile rearing and redd distributions supports evaluations of various habitat improvement projects in the basin.
	Lower Snake River Compensation Plan	Collaborative/Supportive. Bull trout and chinook share rearing and spawning habitat. The success of LSRCP programs is linked to the interactions between species. Hatchery programs also have ESA responsibilities associated with the take of bull trout.

Project ID	Title	Nature of Relationship
	Numerous completed and ongoing habitat projects	GIS data base of juvenile rearing and redd distributions supports evaluations of various habitat improvement projects in the basin.

Relationship to Existing Goals, Objectives and Strategies

Various measures directed under the Columbia River Basin Fish and Wildlife Management Plan (Plan) (Northwest Power Planning Council 1994; Northwest Power Planning Council 2000) address bull trout biology and management. An overall objective of the Plan is to achieve a Columbia River ecosystem that sustains an abundant, productive and diverse community of fish. The Plan calls for recovery issues identified by the Endangered Species Act to be addressed as well as for mitigation for losses of the numbers and diversity of native fishes, such as bull trout. In addition, the Plan requires a complete assessment of fish populations and directs that the purpose of research is to resolve key uncertainties. The Plan (Northwest Power Planning Council 1994) identifies specific measures. Measure 2.2A emphasizes work on native species in native habitat. Measure 3.2C.1 focuses on research that identifies key uncertainties that are most critical to the achievement of program goals. Measure 10.1A.1 is specific to the need for assessments of resident fish populations. Measure 10.2B.1 calls for the development of a plan to assist in conserving the genetic diversity of resident fish. Measure 10.2C.1 is associated with habitat improvement of resident fish. Measure 10.5 specifically addresses bull trout mitigation and measure 10.5A.2 focuses bull trout status, life history, habitat needs and limiting factors in the Grande Ronde River subbasin.

The Fish and Wildlife Program (Chapter 9) calls for monitoring and evaluation of biological and environmental conditions at the scale of provinces and subbasins. The two subbasin summaries this proposal addresses (Grande Ronde and Imnaha) all call for a framework for the coordination and integration of monitoring efforts, increased monitoring of the status trends in anadromous and resident fish populations and habitats, a process to prioritize how and where restoration and protection efforts are focused, and an increased law enforcement presence to ensure compliance with laws pertaining to fish, wildlife, and habitat in their respective “Fish and Wildlife Needs” sections. The proposed monitoring program will provide a framework for improved coordination and integration of monitoring efforts. ODFW will monitor and evaluate the status and trends in fish populations (abundance and distribution) and habitat (quantity and quality) at the province (Oregon Portion) and subbasin scales. The purpose of the monitoring and evaluation program is to assure that the effects of actions taken under sub-basin plans are measured, that these measurements are analyzed so that we have better knowledge of the effects of the action, and that this improved knowledge is used to choose future actions.

Recently the federal government published a Biological Opinion (Opinion) on the operation of the hydropower system in the Columbia River (NMFS 2000; USFWS 2000). Summaries from the Opinions indicate that bull trout in the Grande Ronde and Imnaha river subbasins are impacted by the federal hydropower system. The Opinions discuss the need for a better understanding of the population structure of bull trout. These Opinions contain sections on reasonable and prudent alternatives or measures. These sections discuss research, monitoring and evaluation plans and include a goal that the abundance of populations of fish affected by the hydropower system, which would include bull trout, be monitored in a scientifically sound manner. The reasonable and prudent measures published by USFWS (2000) specifically call for action agencies to implement monitoring and studies to provide critical information on bull trout distribution, timing, and usage of Lower Snake River dams and reservoir system.

Both the Grande Ronde River (Nowak et al. 2001), and Imnaha River (Bryson et al. 2001) subbasin plans address specific goals and objectives related to bull trout. The subbasin plans for the Grande Ronde River subbasin (GRRSBP) and Imnaha River subbasin (IRSBP) emphasize bull trout as a key species and indicate bull trout populations have limited ability to be connected. The GRRSBP and IRBP summarize the goals of various agencies with management responsibilities in the subbasin. In general, these goals include mitigating for damages resulting from the operation of the mainstem hydropower system; recovery of a species listed as threatened under the Endangered Species Act; evaluating the connectivity, the degree of interchange and gene flow between populations; responsible management of bull trout; protecting and enhancing bull trout populations, as well as coordinated management.

Relative to bull trout, both the GRRBP and IRSBP define specific goals and objectives. These include 1) ensure that projects are coordinated and consistent, 2) provide information to help develop federal recovery plans, 3) collect life history, distribution, and homing behavior information of bull trout within the subbasin and in relevant core areas, 4) evaluate connectivity, the degree of interchange and gene flow between populations throughout the subbasin, and 5) monitor core populations to establish trends and measure population response to recovery and restoration activities. Additional specific goals and objectives that this proposal addresses are to 1) assess the relationship between resident and migratory life history forms, 2) evaluate ecological interactions between bull trout and anadromous salmonids, 3) determine survival rates of bull trout between life stages and assess productivity, and 4) determine water temperature associations of migratory bull trout.

In June of 1998 the FWS listed bull trout under the Endangered Species Act (ESA) as a threatened species. Currently, a recovery plan for bull trout is being developed. Goals of the draft recovery plan, which include a better understanding of bull trout ecology, improved populations status and delisting criteria can be found in the subbasin summaries.

Under the Oregon Plan (Coastal Salmon Restoration Initiative, Steelhead Supplement, Executive Order No. EO 99-01) monitoring is one of the four essential elements to implement the plan. This monitoring proposal for the Columbia Plateau RFP is consistent and complementary to the program ODFW has implemented in coastal watersheds. This proposal also supports the implementation of the Oregon Plan statewide for all salmonids at-risk throughout the state. In addition, the ODEQ will likely propose water quality and biotic condition monitoring to BPA in a separate proposal that will integrate with ODFW's Fish and Habitat Monitoring in a similar manner as on-going cooperative monitoring in coastal watersheds.

The project we are proposing is significant because it begins to fill gaps in the description of bull trout biology in general and characteristics of specific populations. This project focuses on information that is critical to the CRFWMP's goals and objectives, subbasin plans and ESA issues. Results from this project will include information on bull trout abundance, evaluation and development of methods to assess bull trout abundance, as well as a genetic description of populations and their relationships to each other.

Information gathered will help fisheries managers assess the relative risks to populations, develop protection and recovery plans specific to each population, and prioritize resources to enable such protection or recovery. If this information is applied properly, the expected overall outcome is increased long-term persistence of bull trout populations. Some of the data we have collected previously have been incorporated into current recovery plans, and new data will help refine those plans. Knowledge of bull trout biology was limited at the start of this project, and work to date has considerably enhanced that knowledge. Efforts have also identified, and will continue to uncover, other critical areas that need further investigation.

Review Comments

Reviewers question when this project will sunset. The EMAP objective has been removed from this proposal (budget reflects action).

The RFC indicates that the proposal does not provide a review of all the diet studies conducted for bull trout in anadromous and non-anadromous waters within the Blue Mountain Province. The RFC proposes that revisions of the proposal should include a more thorough review of previous diet studies. The majority of the hypotheses may have been answered by previous studies.

The USFWS suggests that “this project would be complimentary to proposal 27017 and provide additional needed information in the Grande Ronde. The objectives will characterize the fine-scale population structuring of bull trout within the Grand Ronde River subbasin; investigate the seasonal movements of fluvial bull trout of the Lostine and Imnaha rivers and Catherine Creek; describe the diet of fluvial bull trout in streams with relatively few anadromous salmonids present; and employ EMAP protocols to monitor and evaluate the status and trends in bull trout populations. This project will help implement reasonable and prudent measure 10.A.3.1 and terms and conditions 1.1, 11.2, and 11.A.2.2.b in the FCRPS biological opinion. The USFWS recommends the funding of this proposal, particularly the EMAP protocols for monitoring and evaluating and seasonal movement component be funded. The USFW believes that Proposal 27017 and 199405400 are complimentary and will assist in assessing bull trout recovery and implementation of the Biological Opinion.”

Budget

FY02	FY03	FY04
$402,611 Category: High Priority Comments:	$495,674 Category: High Priority	$481,968 Category: High Priority

Project: – 199608000 – NE Oregon Wildlife Mitigation Project – “Precious Lands”

Sponsor: Nez Perce Tribe

Short Description:

Continue operation of the NE Oregon Wildlife Mitigation Project -- "Precious Lands" to protect, restore, and enhance canyon grassland habitats and associated riparian and forest communities to benefit fish and wildlife.

Abbreviated Abstract

This project has been designed to manage high quality canyon grassland habitats for the benefit of target wildlife species, i.e. mule deer, chukar, California quail, yellow warbler, song sparrow, beaver, black-capped chickadee, downy woodpecker, blue grouse, and western meadowlark. It serves as partial mitigation for the wildlife losses amended into the NPPC's Fish and Wildlife Program and attributed to the Lower Snake River complex of dams. Overall project goals include the protection, restoration and management of 16,500 acres of canyon grasslands and associated riparian, wetland, and forested habitats. Currently, 15,359 acres have been acquired through fee purchase and are being managed in perpetuity for wildlife and watershed benefits. All project lands lie within the lower Grande Ronde watershed. Native plant communities are being restored through a combination of passive and active restoration techniques including removal of domestic livestock, noxious weed control, and re-establishment of native species on disturbed sites. Habitat improvement projects utilize a holistic, natural approach to best meet the needs of local wildlife while keeping ongoing operation and maintenance (O&M) costs at a minimum.

This project is designed to benefit the target wildlife species noted above as well as ESA listed summer steelhead that inhabit Joseph, Buford, and Cottonwood Creeks. Habitat Evaluation Procedures (HEP) are used to assess baseline conditions and evaluate the effectiveness of habitat improvement projects. Specific techniques are also employed to monitor land bird populations, native plant communities, amphibians, and water quality.

Relationship to Other Projects

Project ID	Title	Nature of Relationship
199609400	WDF&W Habitat Unit Acquisitions (Chief Joseph Wildlife Area)	Compliments winter range and riparian management in lower Joseph Creek watershed.
200002000	Wenaha Wildlife Management Area Additions	Compliments winter range and riparian management in lower Jospeh Creek watershed.
200123094	Acquire 27,000 ac. Camp Creek Ranch at Zumwalt Prairie	Compliments management and restoration of prairie and canyon grassland ecosystems.
199403900	Watershed Restoration Planner	Help meet watershed improvement goals of this project
199702500	Implement the Wallowa County/Nez Perce Tribe Salmon Habitat Recovery Plan	Salmon recovery plan will be implemented on Precious Lands Area to help meet recovery goals.

Relationship to Existing Goals, Objectives and Strategies

This project has been designed for the management and operations of high quality canyon grassland habitats for the benefit of target wildlife species, i.e. mule deer, chukar, California quail, yellow warbler, song sparrow, beaver, black-capped chickadee, downy woodpecker, blue grouse, and western meadowlark. Overall project goals include the protection, restoration and management of 16,500 acres of canyon grasslands and associated riparian, wetland, and forested habitats. Currently, 15,359 acres have been acquired through fee purchase and are being managed in perpetuity for wildlife, fisheries and watershed benefits. All project lands lie within the lower Grande Ronde watershed. Native plant communities are being restored through a combination of passive and active restoration techniques including removal of domestic livestock, noxious weed control, and re-establishment of native species on disturbed sites. Habitat improvement projects utilize a holistic, natural approach to best meet the needs of local wildlife and fisheries. The acquisition of land provides many opportunities for management activities, which benefit a broad range of resources. Management activities, which will benefit fish, will be the protection and enhancement of riparian vegetation, removal of passage blockages, addition of large woody debris, management to reduce sedimentation problems (both point and non-point), access for monitoring purposes, and the maintenance and restoration of the watershed which can provide increased water storage for later release into the system and reduction of flash flooding due to poor vegetation management. The on-going management of the property is centered on managing for native flora and fauna species diversity, and the protection and restoration of watershed function and health. The Precious Land Project will benefit the widest possible range of resources fulfilling similar fish and wildlife habitat objectives outlined by every management agency and tribe in the sub-basin. Monitoring and evaluation procedures will be developed to track the success of project activities and their benefit to the resources. Land acquisition and management provides for the widest range of potential resources benefits.

Review Comments

Proposal addresses RPA 150 and 153. The Wildlife Committee rated the project as having significant wildlife benefits using the criteria of permanence, size, connectivity to other habitat, and juxtaposition to public lands. Expansion of this project has been submitted under Project Number 27023.

Budget

FY02	FY03	FY04
$439,803 Category: High Priority Comments:	$414,100 Category: High Priority	$426,000 Category: High Priority

Project: – 199608300 – CTUIR Grande Ronde Subbasin Restoration

Sponsor: Confederated Tribes of the Umatilla Indian Reservation

Short Description:

Protect, enhance, and restore riparian, floodplain, and instream habitat to benefit anadromous fish.

Abbreviated Abstract

The CTUIR Grande Ronde Subbasin Restoration Project, initiated by the Confederated Tribes of the Umatilla Indian Reservation in 1996, is an ongoing effort to protect, enhance, and restore riparian and instream habitat for natural production of anadromous salmonids in the Grande Ronde River subbasin. Project activities are focused on enhancing and restoring critical juvenile rearing habitat with emphasis on restoring natural channel morphology and floodplain function, cold water refuge, complex aquatic habitat.

Primary techniques include a combination of passive and active strategies to enhance and restore aquatic and riparian habitat, and water quality. Natural channel design (Rosgen 1996), large woody debris additions, road/railroad drainage improvement and obliteration/ decommissioning, riparian exclosure fencing, off-channel water developments, and revegetation/bioengineering (tree, shrub, and grass planting) are all restoration methods employed under this project and through project partnerships to improve watershed conditions.

Individual projects contribute to and compliment basin-wide watershed restoration efforts currently underway by federal, tribal, and state agencies, and the Grande Ronde Model Watershed Program. The focus of the project is to restore habitat for endangered Snake River spring/summer chinook and threatened summer steelhead, however other resident and migratory fish and wildlife benefit as well. Maintenance and monitoring and evaluation are integral components of the project and are necessary to maintain habitat improvements and evaluate the progress of habitat development. M&E efforts include: water temperature, habitat transects and vegetation plots, physical and biological surveys, and photopoints.

In Fiscal Years 2002-2006, the CTUIR propose to continue restoration efforts in the Subbasin with ongoing emphasis in the Meadow/McCoy and McIntyre Creek watersheds, Mainstem Grande Ronde, Bear Creek and Jordan Creek in the Longley Meadows Area,. Known project opportunities include: treatment on approx. 1 mile of Meadow Creek within the McCoy Meadows Project Area; Longley Meadows Restoration (part of the Mainstem GR Enhancement Project) involving channel restoration in the 1 mile channelized reach of Bear Creek, and enhancements on approx 4 miles of Jordan and upper Bear Creek; Phase 3 Mainstem GR Enhancement; and Phase 2 of the Upper McCoy Creek enhancement project on the Cuhna Ranch involving natural channel restoration, additional large wood placement and tree and shrub plantings on McCoy and Syrup Creek.

Relationship to Other Projects

Project ID	Title	Nature of Relationship
198710001	Umatilla River Basin Habitat Enhancement (CTUIR)	To reduce cost, projects share personnel, vehicles, and equipment.
199604601	Walla Walla River Basin Habitat Enhancement (CTUIR)	To reduce cost, projects share personnel, vehicles, and equipment
20003100	North Fork John Day River Basin Anadromous Fish Habitat Enhancement Project (CTUIR)	To reduce cost, projects share personnel, vehicles, and equipment
198402500	Protect and Enhance Anadromous Fish Habitat in Grande Ronde Basin Streams (ODFW)	Coordination between projects facilitates State-Tribal collaboration on habitat restoration efforts.
199202601	Grande Ronde Model Watershed Program	Project coordinates with GRMWP on restoration priorities and provides implementation funding through program for site-specific projects.

Relationship to Existing Goals, Objectives and Strategies

The 2000 Columbia River Basin Fish and Wildlife Program places a strong emphasis on habitat protection and restoration to accomplish program goals and objectives. Part of the overall vision for the Program states that "wherever possible, this program will be accomplished by protecting and restoring the natural ecological functions, habitats and biological diversity of the Columbia River Basin." One of the planning assumptions states, "this is a habitat based program, rebuilding healthy, naturally producing fish and wildlife populations by protecting, mitigating and restoring habitats and the biological systems within them, including anadromous fish migration corridors."

The CTUIR Grande Ronde Watershed Restoration Project fits well within the framework of the 2000 Columbia River Basin Fish & Wildlife Program as described above. This project focuses on restoring native vegetation and natural form and function of target streams in the Upper Grande Ronde watershed and is a logical component of ongoing watershed-wide efforts to restore aquatic habitat conditions and severely depressed salmon and steelhead populations. Habitat degradation caused by cultural practices has been affecting the Grande Ronde subbasin for well over a century. Loss of habitat productivity and other out-of-basin impacts have significantly reduced anadromous fish populations from historic levels. The impacts are cumulative and have had dramatic effects on the populations. Mobrand and Lestelle (1997) state that, "Life history pathways associated with spawning reaches in the upper Grande Ronde River show severe declines in potential salmon performance compared to historic levels. Restoration potential is significant for this subbasin.... groups of fish using these pathways appear to be at extremely high risk of extinction."

Treatment methodologies presented in Section b. are directly linked to Goals, Objectives, and Strategies listed in the Grande Ronde Subbasin Summary. This project is tied directly to the various habitat-related goals presented in the Summary. Because of the lack of integration of multi-agency goals, objectives, and strategies in the Subbasin Summary, we have summarized key habitat related elements below for simplicity. For additional detail, please see the Summary.

The primary habitat related goal in the Summary is to "protect, enhance and restore wild and natural populations of spring Chinook salmon, summer steelhead, bull trout, and other indigenous fish in the Grande Ronde River Basin.

In the "Statement of Fish & Wildlife Needs" section of the Grande Ronde Subbasin Summary, four primary needs are identified:

1. Monitoring – Monitoring the status of high priority populations and habitat is important to understanding recovery status and focusing recovery priorities and efforts. Current monitoring efforts should continue and in some case be expanded to meet emerging information needs.
2. Habitat Restoration – Cooperative efforts among landowners, resource mangers and regulatory agencies to restore watershed function should continue. Restoring Columbia River function may be as important as Grande Ronde habitat to important populations like Grande Ronde salmon and steelhead.
3. In-Lieu-Efforts – In cases where habitat restoration is impossible, or where fish and wildlife productivity is restricted to levels that do not meet reasonable social goals, artificial production efforts (e.g., hatcheries) should be instituted;

4. Evaluation – Restoration and recovery measures implemented should be evaluated to document their success. An adaptive management approach to implementation should be used to insure activities to meet expectations.

This project directly addresses 3 of the four primary needs in conjunction with other projects and programs within the subbasin through design and implementation of priority habitat restoration and enhancement projects, maintenance of the enhancements to ensure objectives are met and that resource conditions are maintained in an improving trend. The project also provides monitoring and evaluation of progress towards meeting biological objectives. In addition, this project is directly linked to the following specific needs:

General: 1, 2, 4, 5, 7,
- Aquatic Habitat (Enhancement): 1, 2, 4, 5, 6, 7, 9, 10, 15, 17, 18
  - (Monitoring): 2, 5, 6
- Planning: 1
- Wildlife/Terrestrial
  - Habitat Diversity: 1, 2, 3, 6
  - Riparian Communities: 1, 2, 3, 4
  - Noxious Weeds: 1, 2, 3, 4
- Factors Associated with Roads: 1

The National Marine Fisheries Service (NMFS) Biological Opinion regarding operation of the Columbia River Hydropower System, under "Habitat Actions" states that a Basinwide Recovery Strategy should focus immediate attention on priority subbasins with the potential for significant improvement in anadromous fish productive capacity as a result of habitat restoration. The Grande Ronde Subbasin, although not listed in NMFS Biological Opinion, is a priority subbasin to the CTUIR (CTUIR Salmon Policy, CTUIR 1995) with potential for significant improvement in anadromous fish productive capacity. Previous habitat assessments (Huntington 1993, Mobrand and Lestelle 1997) indicate that significant improvements could and should be made that will lead to increased fish production and improved water quality.

Action 150 of the NMFS Biological Opinion states, "In subbasins with listed salmon and steelhead, BPA shall fund protection of currently productive non-Federal habitat, especially if at risk of being degraded…" Conservation easements as well as other cooperative agreements with landowners and other agencies are a tool utilized under this project to protect and restore habitat.

Action 153 of the NMFS Biological Opinion states, "BPA shall, working with the agricultural incentive programs, negotiate and fund long-term protection for 100 miles of riparian buffers per year…" Our program works closely with the NRCS on site-specific projects involving a variety of federal conservation programs. Examples include the McCoy Meadows Restoration Project, where the interagency team successfully negotiated a perpetual conservation easement on about 450 acres of historic wetland meadow on McCoy Creek under the Wetland Reserve Program. Other ongoing examples of these cooperative efforts include the Longley Meadows Restoration Project where the CTUIR and ODFW are developing BPA funded riparian conservation easements on riparian corridors that do not qualify for the federal CREP program. Areas that will qualify under the CREP program would be enrolled and conserved through non-BPA methods. Under this project, BPA/GRMWP funds would be utilized to cost-share habitat enhancements including restoration channel development (on channelized Bear Creek), and instream enhancement on other stream reaches. Ultimately, this project will contribute to the annual goal associated with conservation easements.

The project contributes to the Northwest Power Planning anadromous fish spawning and rearing habitat as outlined in program measure 7.6 of the Council's interim goal of doubling anadromous fish runs in the Columbia River Basin by providing offsite mitigation for mainstem fisheries losses caused by the eight dams along the Columbia River hydroelectric system. This habitat restoration project is a necessary measure to accomplish natural productions goals as outlined in the Grande Ronde Basin Anadromous Fish Production Plan (ODFW and CTUIR, 1990). Failure to meet biological objectives in the Grande Ronde subbasin will impact the Northwest Power Planning Council in realizing its interim goal of doubling anadromous fish runs in the Columbia River basin by providing offsite mitigation for mainstem fisheries losses caused by the dams that constitute the Columbia River hydroelectric system. The biological objectives for these species in the Grande Ronde are 16,000 annually returning spring chinook and 27,000 summer steelhead (ODFW and CTUIR 1990).

Habitat restoration and enhancement accomplished under this project is expected to result in the following benefits: 1) increased availability of instream habitat (for projects involving new channel construction to replace channelized reaches); 2) restored wetland meadow complexes and associated water storage capacity (improved summer baseflow) 3) potential decreases in water temperature in individual stream reaches (with decreased width:depth ratios and reconnection of streams to groundwater sources; 4) increased diversity and sustainable native riparian plant communities; 5) stable streambanks; 6) increased shading; and 7) reduced erosion and sediment delivery to fish bearing streams. Benefits described above will contribute to basin-wide efforts to improve water quality and increasing natural production of fisheries habitat in the subbasin.

After five years of effort under the project, a total of 11 miles of anadromous fish habitat has been treated, providing direct and indirect benefits to threatened and endangered salmonid fishes as well as other resident and migratory fish and wildlife. Even with the extensive annual effort undertaken throughout the Grande Ronde subbasin, a tremendous amount of work remains to be completed. Funding through the NPPC Fish and Wildlife Program for the project will continue to provide the opportunity for the CTUIR participate directly in subbasin restoration efforts and continue coordinating and implementing projects through the GRMWP. During the FY2002-2004 period, we anticipate development and implementation of 3-5 projects annually, involving enhancement and restoration on an estimated 8-15 miles of critical aquatic habitat. Continued funding will also provide continued protection, maintenance, and monitoring of 4 existing projects (McCoy Meadows, Cuhna McCoy Creek, Mainstem Grande Ronde, and Longley Meadows Restoration Projects).

Review Comments

This project addresses RPA 150 and 400. In the past, M&E activities have focused on aquatic parameters. Sponsors indicated that they have coordinated with OSU to perform terrestrial M&E activities. Reviewers indicated that in FY2000 project sponsors agreed to that any new work would go through the Grande Ronde Model Watershed Program rather than directly through BPA. Potential cost savings if implementation activities are processed through the GRMWP.

Budget

FY02	FY03	FY04
$200,000 Category: High Priority Comments:	$195,000 Category: High Priority	$190,000 Category: High Priority

Project: – 199702500 – Implement the Wallowa County / Nez Perce Tribe Salmon Habitat Recovery Plan

Sponsor: Nez Perce Tribe

Short Description:

Maintenance and/or restoration of salmon habitat through cooperative and voluntary methods is a stated goal in the Wallowa County/Nez Perce Tribe Salmon Habitat Recovery Plan. Funding of this project will help to implement the Plan.

Abbreviated Abstract

The goal of this project is to help implement the Wallowa County Nez Perce Tribe Salmon Habitat Recovery Plan with Multi-Species Strategy (County/Tribe Plan). As such, there is close coordination between the Wallowa County Commissioners and the Nez Perce Tribe on prioritizing expenditures from this project. The County/Tribe Plan provides a countywide assessment of watershed conditions and will be used to identify potential project areas and projects.

There has been much discussion since the inception of this project (BPA #199702500) as to why it is not included in BPA project #199403900 (Watershed Restoration Planner). The reasons are two fold. BPA project #199702500 was written to help implement the County/Tribe Plan. As such, it made sense to have an employee from the Nez Perce Tribe handle the day-to-day affairs of the project while running the project through Wallowa County. This provides both entities access for co-management of the implementation project. Secondly, since the implementation project is a small project monetarily, the county’s administrative cost of five percent puts more of the money on the ground then the Nez Perce Tribe’s indirect rate of twenty plus percent.

The initial concept of this project was to provide funding for small watershed projects, the timing for which fell outside of the two project solicitation periods per year, one each for the Grande Ronde Model Watershed Program (GRMWP) and the Oregon Watershed Enhancement Board (OWEB). When this project was initiated in 1997 the funding cycle issue caused many projects not to be funded because by the time the opportunity to submit projects came around, the landowner had frequently found another need for their portion of the cost-share. In 2000 both the GRMWP and OWEB ran two solicitations each and in 2001 OWEB increased their solicitations to three even though the GRMWP dropped back to one. This has alleviated some of the funding cycle issues for landowners.

Although funding these small projects is still part of the basis of the Implementation of the County/Tribe Plan project, additional needs have arisen in the last few years. In 1999 funding from both the Bureau of Reclamation (BOR) and the U.S. Geological Service (USGS) ended for seven mainstem flow gages on Bear Creek, the Lostine River and the mid Wallowa River. These gages are essential for monitoring the effectiveness of irrigation efficiency efforts and the Lostine gages are used by the Nez Perce Tribe for determining when to trap and haul spring chinook adults past the low flow areas in the Lostine River. Money from this project has been used for the past three years to cost-share with OWEB and the GRMWP to continue operating the seven gages and the Northeast Oregon Hatchery Project is now cost-sharing on one Lostine gage.

Preliminary survey work and engineering is another need that has been identified. Project proposals cannot be written for habitat restoration projects without survey work, engineering drawings, and a preliminary budget. Money for this aspect is frequently lacking, especially for landowners and even for counties with the loss of revenues from Federal timber sales. Money from this project was used in 2000 and 2001 to provide longitudinal and x-section survey information for ¾ miles of Prairie Creek and for the initial engineering on the first part of a watershed restoration effort in this area of Prairie Creek. Also in 2001 money from this project was used to provide survey information and preliminary engineering for a project proposal that will be submitted to the GRMWP, OWEB, and Washington's Salmon Recovery Funding Board to replace three culverts in Grouse Creek (tributary to the lower Grande Ronde River). Grouse Creek is a summer steelhead stream and these culverts block adult passage at most flows and juvenile upstream movement at all flows.

Non-native noxious weeds are a major problem throughout the region. Money from this project was used in 2000 and 2001 to help fund a cooperative weed abatement project in the lower Grande Ronde River corridor with the USFS, BLM, Wallowa Resources, and private landowners.

The gauging study and weed abatement projects are on going and will continue to be funded by this project. Because of the limited nature of this project in terms of BPA funding we have decided to concentrate our efforts in a few areas for habitat projects and Prairie Creek will continue to be one of those focus areas (see Section b - Technical and/or scientific background). In conjunction with the work in Prairie Creek, three ISCO sediment samplers and three thermographs have been installed to monitor the effectiveness of the restoration effort in a one-mile stretch of the creek. Preliminary survey work and engineering will also continue to be a focus with more of Prairie Creek to be surveyed in the fall of 2001.

Education will also continue to be a focus of this project. For this reason a small amount of money has been targeted in the budget to purchase a watershed function and non-point source teaching aid to be shared by the schools in Wallowa County (e.g. something similar to and EnviroScape Non Point Source). With the increased focus on watershed restoration by National Marine Fisheries Service (NMFS) in their 2000 Federal Columbia River Power System BiOp (NMFS 2000) and the Environmental Protection Agency's (EPA) focus on the clean water Act (especially as it relates to animal feed operations in Wallowa County) this type of teaching aid will provide a means to teach students the reason for the focus and how their actions affect the watershed, individually and as a community.

Relationship to Other Projects

Project ID	Title	Nature of Relationship
199403900	Watershed Restoration Planner	Oversees project #199702500 (this project).
199202601	Grande Ronde Model Watershed Program	Uses information developed by the Model Watershed Program and keeps the Model Watershed Program informed of habitat projects implemented by this project.
198805301	Northeast Oregon Hatchery Project	Provides the habitat / natural production tie.
199604400	Grande Ronde Basin Spring Chinook Captive Broodstock Program	Provides the habitat/production tie in the Lostine River, the stream in Wallowa County included in the Captive Brood Program.

Relationship to Existing Goals, Objectives and Strategies

The Wallowa County-Nez Perce Tribe Salmon Habitat Recovery Plan with Multi-Species Strategy was developed cooperatively by the various agencies and entities in Wallowa County. It is not, therefore, surprising that this project compliments many of the goals, objectives, and strategies listed in the Grande Ronde Subbasin Summary that deal with habitat issues or restoration. These agencies and organizations, as noted in Table 40, are: the Nez Perce Tribe, Wallowa County, Wallowa Soil and Water Conservation District, U.S. Bureau of Reclamation, U.S. Forest Service, Oregon Department of Fish and Wildlife, and the Grande Ronde Model Watershed Program.

Activity also occurs in the lower Grande Ronde River in Washington and implements some of the Asotin County Conservation District’s and Washington Department of Fish and Wildlife Department’s goals, objectives, and strategies. Implementation of other agencies’ and organizations’ goals, objectives, and strategies will also benefit from this project. They are: National Marine Fisheries Service, U.S. Fish and Wildlife Service, Oregon Department of Agriculture, Oregon Department of Environmental Quality, and Oregon Department of Land Conservation and Development. All of these expected effects are also noted in Table 40.

Review Comments

This project addresses RPA 400. The NMFS expressed concern about the lack of biological monitoring activities to address fish population responses to habitat activities. Although there is a desire to have biological, fish related, monitoring variables to measure the impact of habitat improvements, it is very difficult to develop a statistical based sampling design that is able to accomplish that.

Budget

FY02	FY03	FY04
$45,675 Category: High Priority Comments:	$43,175 Category: High Priority	$43,175 Category: High Priority

Project: – 199800702 – Grande Ronde Supplementation: Lostine River O&M and M&E

Sponsor: Nez Perce Tribe

Short Description:

Operate adult trapping and juvenile acclimation facilities and conduct monitoring and evaluation in the Lostine River to implement the Lostine component of the Grande Ronde Basin Endemic Spring Chinook Supplementation Program (GRESP).

Abbreviated Abstract

Activities performed under this project involve the operation and maintenance of adult collection and juvenile acclimation and release facilities and the monitoring and evaluation of a supplementation program on the Lostine River (tributary to the Grande Ronde River) in Northeast Oregon. These activities are an integral component of the Grande Ronde Basin Endemic Spring Chinook Supplementation Program (GRESP) which is a cooperative project between the NPT, ODFW, CTUIR, and USFWS. This program was initiated in 1994 as a conservation measure in response to severely declining runs of chinook salmon in the Grande Ronde Subbasin. The GRESP utilizes supplementation with conventional and captive broodstock techniques to prevent extirpation and begin rebuilding of ESA listed spring chinook. This project is an integral part of achieving the overall goal of the GRESP, "to prevent extinction, provide a future basis to reverse the decline in stock abundance, and ensure a high probability of populations persistence." The Nez Perce Tribe is responsible for implementation, coordination, and facilitation of the Lostine River component of the GRESP.

We have operated the adult trapping facility since 1997 for the collection of broodstock and baseline data on adult escapement to the Lostine River prior to supplementation. In 1999, we released 12,000 conventionally produced smolts from the acclimation facility (the first artificially produced endemic Grande Ronde spring chinook). The first releases of captive broodstock progeny were 35,000 smolts in 2000 and 133,000 smolts in 2001.

Daily monitoring of the adult weir coincides with its operation along with the collection of environmental data. Juvenile in-hatchery performance and emigration from the acclimation facility is also monitored. In addition, the Nez Perce Tribe conducts spawning ground surveys with co-managers. Therefore, the performance of adult and juvenile hatchery fish can be evaluated against the standards set by natural production.

Relationship to Other Projects

Project ID	Title	Nature of Relationship
199801001	Grande Ronde Basin Captive Broodstock - ODFW funds O&M and M&E of rearing captive brood adults in freshwater for Grande Ronde program at Lookingglass and Bonneville hatcheries.	Progeny of captive broodstock are acclimated and released in Lostine River acclimation facility returning adults collected at adult weir and monitoring and evaluation program evaluates success of supplementation activities in the Lostine River.

Project ID	Title	Nature of Relationship
199801006	Captive Broodstock Artificial Propagation - NPTmonitoring and evaluation of captive broodstock project.	Progeny of captive broodstock are acclimated and released in Lostine River acclimation facility, returning adults collected at adult weir and monitoring and evaluation program evaluates success of supplementation activities in the Lostine River.
199800703	Grande Ronde Supplementation - CTUIR - funds operation and maintenance and monitoring and evaluation of satellite faciliteis on the Upper Grande Ronde River and Catherine Creek for adult collection and juvenile acclimation and release.	Sister project to 199800702 - operated by the CTUIR in the Upper Grande Ronde River and Catherine Creek.
199803800	Preserve Listed Salmonid Stock Gametes - funds the collection, cryopreservation, and storage of male chinook and steelhead semen collected from Imnaha and Grande Ronde fish both on the spawning grounds and in the hatchery.	Project 199703800 collects semen from adult chinook in the Lostine River and stores it in the regional gene repository located at the University of Idaho.
19805301	Northeast Oregon Hatchery - NPT - funds planning for new hatchery facilities and modifications to Lookingglass Hatchery necessary to fully implement the conservation program developed by co-managers for Grande Ronde spring chinook.	Facilities proposed through project 198805301 will alleviate the burden at Lookingglass Hatchery allowing full production of the Grande Ronde stocks. Facilities on the Lostine River will act as satellites to the proposed facilities.
198805305	Northeast Oregon Hatcheries Planning and Implementation - funds ODFW participation in the facility planning process and operation of Lookingglass Hatchery for captive and conventional chinook salmon produced in the Grande Ronde program.	Facilities proposed will alleviate the burden at Lookingglass Hatchery allowing full production of the Grande Ronde stocks. Facilities on the Lostine River act as satellites to Lookingglass Hatchery.
199606700	Manchester Captive Broodstock - funds rearing of captive brood adults in saltwater for the Grande Ronde program.	Progeny of captive broodstock are acclimated and released in Lostine River acclimation facility, returning adults collected at adult weir and monitoring and evaluation program evaluates success of supplementation activities in the Lostine River.
198712700	Grande Ronde Smolt Monitoring by non federal entities – funded to monitor smolt migration timing.	Depends on project 198712700 for smolt emigration information on the Grande Ronde.
199202604	Life History of Spring Chinook Salmon and Steelhead - ODFW - funded to establish baseline life history information and M&E of Grande Ronde spring chinook salmon and steelhead.	Depends on project 199202604 for smolt trapping assistance on the Lostine River.

Project ID	Title	Nature of Relationship
198909600	Genetic Monitoring and Evaluation of Snake River Salmon and Steelhead - funds the collecion, analysis, and establishes a database of genetic data from salmon and steelhead stocks in the Snake River.	Juvenile hatchery and natural salmon produced as a result of the Lostine Supplementation project provide information for this database.
199402700	Grande Ronde Model Watershed Habitat Projects (GRMWP)	Provides restoration and protection for habitat used by Lostine River spring chinook.
199702500	Wallowa County/NPT Salmon Habitat Recovery Plan (NPT)	Provides restoration and protection for habitat used by Lostine River spring chinook.
199403900	Wallowa Basin Project Planner (NPT)	Provides restoration and protection for habitat used by Lostine River spring chinook.
	Lower Snake River Compensation Plan	Depends on LSRCP for parr-to-smolt rearing at Lookingglass Hatchery.

Relationship to Existing Goals, Objectives and Strategies

The focus of this project is to operate adult trapping and juvenile acclimation facilities and conduct monitoring and evaluation in the Lostine River to implement the Lostine component of the Grande Ronde Basin Endemic Spring Chinook Supplementation Program (GRESP). Many of the goals, objectives, needs, strategies and action items detailed in the Grande Ronde Subbasin Summary (Nowak et al. 2001) are addressed by the Lostine component of GRESP. Fish hatchery and fisheries research needs outlined in the Summary that relate specifically to spring chinook populations in the basin are as follows:

Hatchery Needs

1. Need to continue implementation of Grande Ronde Conventional and Captive Broodstock Hatchery Programs.
2. Need to continue to participate in planning, consultation and ESA permitting activities pertaining to Grande Ronde Basin chinook salmon populations.
3. Need to develop Annual Operating Plans and write annual reports for all projects.
4. Need to develop adult collection weirs on the Lostine, upper Grande Ronde rivers and Catherine Creek that are effective across the entire potential hydrograph.

Monitoring and Evaluation Needs

1. Continue and expand efforts to monitor the effectiveness of the chinook salmon captive broodstock, LSRCP and NEOH artificial production programs.
2. Need to determine smolt-to-adult survival, survival factors, spawning escapement and life history characteristics of natural and hatchery origin spawning populations.
3. Need to evaluate the success of Captive and Conventional broodstock programs for restoring fisheries and increasing endemic stocks of spring chinook salmon in Catherine Creek, Lostine River, and upper Grande Ronde River.
4. Need to determine reproductive success of hatchery fish spawning in nature.

The Summary presents strategies and action items needed to meet these needs. The table below lists the strategies and actions identified in the Grande Ronde Subbasin Summary (Nowak et al. 2001) that are specifically addressed through this project.

Grande Ronde Subbasin Summary Strategy and Action Items
Strategy 1 Use artificial propagation to enhance natural production and fisheries in the Grande Ronde Subbasin Action 1.3 Collect returning adult spring chinook salmon at weirs on Catherine Creek, Lostine River and Grande Ronde River. Action 1.9 Acclimate juveniles at sites located on the home stream of each stock and release as smolts. Action 1.11 Develop Annual Operation Plans for captive and conventional broodstock programs Action 1.12 Evaluate programs at each life history stage: spawning, incubation, parr-smolt, smolt release and adult returns for captive and conventional broodstock programs; parr collection, post smolt rearing and maturation for the captive broodstock program. Action 1.13 Coordinate ESA permit activities and participate in program planning and oversight. Action 1.14 Summarize data and prepare and submit annual reports

Strategy 2 Implement monitoring and evaluation to assess health, status and productivity of natural populations. **Action 2.1 Conduct spawning ground surveys of streams within the Grande Ronde river Basin: Count number of redds, live and dead adult salmon, examine carcasses for marks and collect coded wire tags, collect scales, determine age of maturity, prespawn mortality, spawner distribution and hatchery:wild ratio.** Action 2.4 Monitor run size and develop run size estimate models based on previous years escapement, spawning ground information and other available data. Action 2.5 Evaluate ability to estimate escapement and straying and to characterize the spawning populations in the system. Action 2.8 Estimate and compare smolt detection rates at mainstem Columbia and Snake river dams for fall and spring migrating spring chinook salmon from tributary populations in the upper Grande Ronde river, Catherine Creek and the Lostine River. Action 2.9 Document the annual migration patterns for spring chinook salmon in the Grandse Ronde Subbasin
Strategy 3 Implement monitoring and evaluation to assess health, status and productivity of hatchery fish and effectiveness of hatcheries to accomplish objectives. Action 3.6 Evaluate effectiveness of captive and conventional broodstock programs to restore endemic stocks of spring chinook salmon in the upper Grande Ronde river, Catherine Creek and the Lostine River and maintain their genetic diversity. Examine various indices (e.g., egg-to-fry and fry-to-smolt survival, growth and health, fecundity, progeny:parent ratio) at specific life stages (incubation, fry-smolt rearing, post-smolt rearing and maturation) of all fish raised at hatcheries. Action 3.7 Develop and maintain a database for Captive and Conventional broodstock programs
Strategy 6 Use artificial propagation for supplementation and/or reintroduction of endemic stock spring chinook into the Grande Ronde subbasin tributaries to provide natural production and harvest.
Strategy 9 Monitor and evaluate hatchery programs to ensure they are successful and minimize

adverse effects on listed or other indigenous species.
Strategy 10 Implement artificial propagation practices to maintain the genetic and biological integrity of supplemented stocks.

Review Comments

This project is considered BASE by NMFS.

Budget

FY02	FY03	FY04
$609,302 Category: High Priority Comments:	$637,536 Category: High Priority	$655,833 Category: High Priority

Project: – 199800703 – Facility O&M and Program M&E for Grande Ronde Spring Chinook Salmon and Summer Steelhead

Sponsor: Confederated Tribes of the Umatilla Indian Reservation

Short Description:

Develop, implement, and evaluate integrated conventional and captive brood hatchery projects to prevent extinction and stabilize populations of threatened spring chinook salmon and summer steelhead populations in the Grande Ronde River.

Abbreviated Abstract

The medium-range goals of this project are to prevent extinction and rebuild populations of listed natural spring chinook salmon and summer steelhead populations "in-place, in-kind" as part of the Grande Ronde River Spring Chinook Salmon Program (Program) by supplementing natural production. The long-term goal is to rebuild populations of both species in the Grande Ronde River Basin sufficiently to allow for subsistence and sport fisheries, beginning in Lookingglass Creek and extending to other tributaries, as fish are available (ODFW 1990).

This Program is based upon the scientific principle that preservation of intra- and inter-population genetic variation is essential for long-term fitness and persistence of the Grande Ronde River metapopulation. Combined conventional and captive brood propagation techniques are being implemented as the most scientifically sound blend of techniques to achieve our goal for spring chinook salmon, and both components are essential to the success of the Program. The captive brood component was implemented to minimize the imminent demographic risk of extinction. The conventional component exists as a long-term strategy to balance the captive component and increase production while reducing the genetic risk of artificial selection. The Program is expected to produce substantial adult spring chinook returns to the target tributaries beginning in 2002. As returns increase, reliance on the captive component will diminish; as the demographic risk of extinction decreases, we will increase the conventional component until the captive brood component is phased out.

Objectives of this project are to: 1) increase populations of spring chinook salmon in Catherine Creek and the upper Grande Ronde River using conventional and captive broodstock supplementation, 2) develop short-range and long-range plans for Program components, 3) document accomplishments and needs to federal permitting agencies, co-managers, funding agencies and the scientific community, 4) monitor population status for adult spring chinook, summer steelhead, and incidentally-caught bull trout in the upper Grande Ronde River and Catherine Creek, and 5)monitor the success of facility operations and fish culture techniques for increasing populations and maintaining genetic diversity of spring chinook and summer steelhead in Catherine Creek and the upper Grande Ronde River.

Cooperative multi-agency, multi-project monitoring and evaluation of the effects of the Program on the salmon populations will be accomplished through yearly assessment of adult populations at weirs and on spawning grounds, and resulting juvenile production and juvenile migration performance. Success of conventional and captive components in providing spring chinook to augment natural production will be intensively monitored under criteria developed in the captive brood/conventional ESA permit as part of the comprehensive monitoring and evaluation plan developed by co-managers.

Relationship to Other Projects

Project ID	Title	Nature of Relationship
198402500	Protect and Enhance Anadromous Fish Habitat in Grande Ronde Basin Streams	Habitat improvement increases likelihood of program success.
198805301	Northeast Oregon Hatchery Master Plan	Plan and develop production facilities in Grande Ronde Basin for recovery of ESA-listed salmon.
198805305	Northeast Oregon Hatcheries Planning and Implementation	Operation, maintenance, monitoring and evaluation for ODFW; includes transportation and hatchery operations.
198909600	Monitor and Evaluate Genetic Characteristics of Supplemented Salmon and Steelhead	This project will monitor genetics of chinook salmon in the targeted tributaries.
199202604	Investigate Early Life History of Spring Chinook Salmon and Summer Steelhead in the Grande Ronde River Basin	Life history and trapping data from this project will be used to evaluate program success.
199403300	The Fish Passage Center (FPC)	Juvenile hatchery and natural salmon resulting from the Program will provide release and migration data.
199405400	Bull Trout Life History, Genetics, Habitat Needs and Limiting Factors in Central and Northeast Oregon	Bull trout are indicentally caught at broodstock collection weirs and provide fish for tagging and collection of demographic and recapture data.
199606700	Manchester Spring Chinook Broodstock Project	Rears captive broodstock to maturity
199608300	CTUIR Grande Ronde Basin Watershed Restoration	Habitat improvement increases likelihood of Program success.
199703800	Preserve Salmonid Gametes	Cryopreserve semen from chinook salmon for use in Grande Ronde Spring Chinook Salmon Program.
199800702	Grande Ronde Supplementation: Lostine River O&M and M&E	Operation, maintenance, monitoring and evaluation for conventional component of the Program for the Nez Perce Tribe.
199801001	Grande Ronde Basin Spring Chinook Captive Broodstock program	Captive brood component of Program. Embryos from the project become the responsibility of the Lower Snake River Compensation Plan and are acclimated at

Project ID	Title	Nature of Relationship
		the tributary of origin.
199801006	Captive Broodstock Artificial Propagation	NPT participation in 199801001.
199803100	Implement Wy-Kan-Ush-Mi Wa-Kish-Wit Watershed Assessment and Restoration plan Now	Habitat Improvement increases likelihood of Program success.
200001700	Recondition Wild Steelhead Kelts	Wild steelhead kelts will be collected for this project.

Relationship to Existing Goals, Objectives and Strategies

This project is an integral part of the Grande Ronde Endemic Spring Chinook Salmon Program (Figure 2). This Program is one of the first integrating two different approaches (supplementation using captive and conventional broodstocks) to prevent extinction of an anadromous salmonid species in the Columbia River basin. This Program is based upon the scientific principle that preservation of intra- and inter-population genetic variation is essential for long-term fitness and persistence of the Grande Ronde River metapopulation.

This project features "in-kind, in-place" supplementation, a salient aspect of the Program for the Grande Ronde River. To collect broodstock and document baseline and recovery data for returns of hatchery and natural adult salmon to target tributaries in the most efficient manner, we will operate the adult collection facilities in areas targeted for supplementation and monitor spawning areas. To ensure that the Program will return chinook salmon "in place", we will operate acclimation facilities in targeted tributaries. Cooperative monitoring and evaluation efforts of all co-managers will ensure that any artificial supplementation is being completed effectively and efficiently, and that it is contributing to a reduction in the probability of extinction.

Project proposal objectives fulfill a number of the following strategies, goals, or objectives listed for various organizations by Nowak (2001) in the Grande Ronde Subbasin Summary prepared for the Northwest Power Planning Council.

Current proposal objectives with corresponding objectives from Nowak (2001).

Current Proposal Objective	Organization	Goal, Objective, or Strategy
4	USFWS	Obj. 1, Strategies 1.1, 1.2
1	USFWS (LSRCP)	Obj. 1-5
1	NPT	Mgmt. Obj. 1-3
1		Res. & Monitor. Obj. 2
2,4,5		Res. & Monitor. Obj. 4,5
2		Art. Prod. Obj. 1,2
1-5	CTUIR	Obj. 1-3
4		Obj. 6
1-5	ODFW	Fish Obj. 1-4, 6,7
4,5		Fish Obj. 9
2,4,5		Fish Obj. 12,14
4		Steelhead Plan Obj. 5
1-5	CTUIR, NPT, ODFW	Spring Chinook Salmon, Summer Steelhead Objectives

ODFW = Oregon Department of Fish and Wildlife
NPT = Nez Perce Tribe

CTUIR = Confederated Tribes of the Umatilla Indian Reservation
LSRCP = Lower Snake River Compensation Plan

Program objectives are supported by recommendations from several additional strategic planning documents. Captive brood and conventional broodstock components are supported by the Snake River Recovery Team (Snake River Salmon Recovery Team 1994) and the National Marine Fisheries Service (1995). Objectives of this project proposal are consistent with the following objectives identified by the Northwest Power Planning Council Fish and Wildlife Program (Northwest Power Planning Council 1994).

Current Proposal Objective(s)	Northwest Power Planning Council (1994) Objectives
1	7.1B (conservation of genetic diversity)
5	7.2 (improvement of existing hatchery production)
1	7.3B (implementation of high priority supplementation projects
1,4,5	7.4A (evaluation and implementation of new production initiatives)
1	7.4D (implementation of captive broodstock programs)
1,5	7.4F (portable adult collection and juvenile acclimation facilities)

The National Marine Fisheries Service Proposed Recovery Plan for Snake River Salmon (1995) recommends the use of endemic captive broodstock and conventional supplementation programs for severely depressed populations, and specifically advocates their use for Grande Ronde spring chinook salmon and the use of Lookingglass Hatchery ***(Proposal Objective 1)***. Development of local broodstocks ***(Project Objective 1)*** was also recommended by an Independent Scientific Review Panel under the *U. S. v. Oregon* Grande Ronde Chinook Salmon dispute resolution in 1996 (Currens et al. 1996).

Sampling across the run and incorporating elements of more natural rearing and release regimes ***(Proposal Objective 1)*** are consistent with Scientific Principle 6 ("Biological diversity allows ecosystems to persist in the face of environmental variation.") of the 2000 Northwest Power Planning Council Fish and Wildlife Program (Northwest Power Planning Council 2000). The evaluation and changes resulting from adaptive management ***(Proposal Objective 2)*** are consistent with Scientific Principle 7 of this document ("Ecological management is adaptive and experimental.")

Discontinuing use of non-native summer steelhead stocks and replacement with endemic stocks was recommended by CRITFC (1995) and NMFS (1999) ***(Proposal Objectives 1, 4, 5)*.**

Proposed project objectives address the general Reasonable and Prudent Alternatives (RPAs) regarding Research, Monitoring and Evaluation of the Biological Opinion dated December 21, 2000 (NMFS 2000). These include:

- *Population Status Monitoring*: Spawning areas, assessment of adult population status (abundance, trend, run timing) **(Proposal Objective 1)**.
- *Effectiveness Monitoring:* Assessing effects of management actions relative to the intended effects and the responses of salmonid populations to those actions **(Proposal Objectives 4, 5)**.

The project proposal addresses the following specific RPA's:

- *Action 182: Population Status. Determine reproductive success of hatchery fish relative to wild fish.* This project proposal includes tasks to identify hatchery-reared adults vs. wild adults (spring chinook and summer steelhead) returning to the weirs.
- Action 184: Hatchery Effectiveness Monitoring. Assess numbers of spawning first-generation hatchery fish (i.e. hatchery escapement) and relative success, compared to wild spawners, monitor the size, age, health and run timing of hatchery fish, assess the genetic variability of populations and subpopulations. This project proposal includes tasks to provide information on origin, size, age, health, pre-spawning mortality, run timing, survival, hatchery-rearing regime and genetic variability of hatchery-reared and wild origin fish, eventually including their progeny.
- Action 189: Hydroelectric Passage Monitoring. Investigate causes of discrepancies in adult return rates for juvenile salmonids that have different passage histories through the hydrosystem. PIT-tagged smolts released from project acclimation facilities that return as adults can be detected at weirs and passage history checked against records at dams.

Work results derived from this project also provide information on new or innovative equipment or techniques of value in fish management and research. We are collaborating with Dr. Anna Cavinato of Eastern Oregon University and ODFW to evaluate near-infrared spectroscopy as a means of differentiating spring chinook by sex or maturity status. This may be of direct benefit to the captive broodstock component and possibly to the conventional broodstock program. Identifying sex of migrating spring chinook is difficult early in the run when most of the fish are caught. Adult collection facilities are participating in an evaluation of Aqui-S as a replacement for MS-222 as an anesthetic. We designed, constructed and are in the process of evaluating a low-cost PIT tag monitoring setup (estimated cost $12,000 vs. $60,000 for a permanent setup) to monitor volitional releases of smolts from acclimation facilities. Aspects of NATURES rearing are incorporated into acclimation procedures.

Review Comments

This project is considered BASE by NMFS. Some reviewers expressed concerns regarding handling and weir effects and suggested the steelhead trapping aspect of the proposal is not urgent work. A new budget has been submitted that does not include additional wiers.

The new budget numbers have not been entered into this table.

Budget

FY02	FY03	FY04
$683,398 Category: High Priority Comments:	$816,836 Category: High Priority	$874,015 Category: High Priority

Project: – 199800704 – Northeast Oregon Hatcheries Implementation (ODFW)

Sponsor: Oregon Department of Fish and Wildlife

Short Description:

Work with co-managers to implement the Grande Ronde Endemic Spring Chinook Supplementation Program (GRESCSP).

Abbreviated Abstract

This project was initiated as one of the Northeast Oregon Hatchery Projects to improve fish production in the Hood, Umatilla, Imnaha, Grande Ronde and Walla Walla basins via hatchery and satellite facility development. Originally this project focused on contributing to the council's doubling goal. With the listing of Snake River chinook and steelhead under the federal Endangered Species Act, efforts in the Grande Ronde and Imnaha have been refocused on contributing to recovery. Specially, the current objective is to contribute to an upward trend in spawning ground counts. This will be accomplished through increased outmigration of smolts using hatchery production while avoiding unintended changes to population structure, fitness and genetics. Without intervention, loss of biodiversity and inbreeding depression due to small population size may put these stocks further at risk. Long-term project implementation is expected to result in the return of increased numbers of wild adults, reducing those risks and hastening recovery. We expect recovery of these weak populations over the next 5+ generations (20+ years), to population sizes supporting ESA de-listing. This project is responsible for integrating Northeast Hatchery Operations (NEOH) with the spring chinook master plan submitted by the Nez Perce Tribe (Ashe et al. 2000). The Draft Grande Ronde Subbasin Summary (Nowak 2001), Draft Imnaha Subbasin Summary (Saul et al. 2001), and NPT spring chinook master plan calls for development of new conservation facilities and modifications to Lookingglass Hatchery to implement salmon recovery programs in the Imnaha and Grande Ronde subbasins. This proposal covers Oregon Dept. of Fish and Wildlife implementation of the conventional supplementation component of the Grande Ronde Endemic Spring Chinook Supplementation Program (GRESCSP). The program is a cooperative effort among ODFW, USFWS, NPT, and CTUIR to develop endemic broodstocks. NPT is primarily responsible for operating adult trapping and smolt acclimation facilities on the Lostine River. CTUIR is primarily responsible for operating adult trapping and smolt acclimation facilities on upper Grande Ronde River and Catherine Creek. This project is also responsible for integrating the GRESCSP with existing USFWS artificial propagation activities at Lookingglass Hatchery. Specifically, this proposal is to supplement existing programs to implement the short-term goal of producing 360k endemic (conventional) smolt spring chinook (120k each for Catherine Creek, upper Grande Ronde, and Lostine River), monitor adult returns, and evaluate conventional to captive brood recovery approaches, and monitor fish health. The long-term goal for Lookingglass Hatchery is to return 5,800 adults by producing 900k endemic smolt spring chinook for Grande Ronde Subbasin.

Relationship to Other Projects

Project ID	Title	Nature of Relationship
199800702	Grande Ronde Suplementation: Lostine River O&M and M&E	Operate adult trapping and juvenile acclimation facilities and conduct monitoring and evaluation in the Lostine River to implement the Lostine component of the Grande Ronde Basin Endemic Spring Chinook Supplementation Program (GRESCSP).
199800703	Facility O&M and Program M&E for Grande Ronde Anadromous Salmonids	Operate adult trapping and juvenile acclimation facilities and conduct monitoring and evaluation in the upper Grande Ronde and Catherine Creek for spring chinook and steelhead and to implement the UGR and CC component of the GRESCSP.
199801001	Grande Ronde Basin Spring Chinook Captive Broodstock Program	Implement captive broodstock programs and associated research, monitoring, evaluation, and fish health for spring chinook salmon populations in Catherine Creek, upper Grande Ronde and Lostine rivers, to conserve genetic diversity and assist in recovery.
199801006	Captive Broodstock Artificial Propagation	Implements the captive broodstock project through the collection of juvenile salmon from the wild and maintaining them in captivity. The founding generation is spawned at maturity and the resulting F1 generation is released back to the parental stream.
199606700	Manchester Spring Chinook Broodstock Project	Rear Snake River spring/summer chinook salmon captive broodstocks from Idaho's Salmon Rive sub-basin and Oregon's Grande Ronde River sub-basin. Provide pre-spawning adults, eyed eggs, and juveniles to aid recovery of these ESA-listed stocks.
198805301	Northeast Oregon Hatchery Master Plan, NPT	Plan and develop conservation production facilities in the Imnaha and Grande Ronde rivers necessary to implement salmon recovery programs for native, ESA listed salmon.
199703800	Preserve Salmonid Gametes	Preserve male salmonid gametes through cryogenic techniques in order to maintain genetic diversity in populations with low levels of abundance and at high risk of localized extinction.
199202604	Early Life History of Spring Chinook Salmon in the Grande Ronde Basin	We utilize migration timing information from this project to determine when to collect juveniles for captive broodstock. Life history information will also be used to access the success of supplementation programs and smolt migration success.
	Northeast Oregon Hatcheries Planning (planning 198805305)	Work with comanagers to develop endemic broodstocks for supplementation of spring chinook salmon in the Grande Ronde basin and continue planning for additional anadromous salmonid enhancement programs in the Grande

Project ID	Title	Nature of Relationship
		Ronde, and Imnaha subbasins.
	Lower Snake River Compensation Plan	The captive broodstock project is providing embryos for use in the LSRCP supplementation program. Production and release of captive brood progeny is funded under the LSRCP.

Relationship to Existing Goals, Objectives and Strategies

The rationale of this proposal integrates two recovery approaches, captive brood supplementation and conventional enhancement, to LSRCP mitigation and is tied to recovery subbasin plans (Ashe et al. 2000; Nowak et al. 2001). The ODFW recent NEOH efforts have focused on planning and implementation of the Grande Ronde Endemic Spring Chinook Supplementation Project (GRESCSP) to support recovery of these populations as directed by the National Marine Fisheries Service (NMFS). The GRESCSP incorporates a number of components including setting aside the Wenaha and Minam basins as natural production reserves, supplementing Lostine, Catherine Creek and upper Grande Ronde chinook populations using captive and conventional hatchery broodstock techniques. The GRESCSP serves as the umbrella integrating existing programs (e.g. Lower Snake River Compensation Plan, NEOH, etc) to limit duplication.

In addition, the captive brood program was initiated in 1995 as a conservation measure in response to severely declining endemic stocks of chinook salmon in the Grande Ronde Subbasin. Our goals are to help prevent extinction of the three populations (Lostine, Catherine Creek and upper Grande Ronde) and to ensure a high probability of population persistence well into the future once the causes of basin wide population declines have been addressed. The program is designed to produce a minimum of 150 adults to the river of parent origin and to ensure threshold escapement levels are met. Management strategies for the Grande Ronde River subbasin incorporate objectives derived from recommendations made by the Columbia Basin Fish and Wildlife program, NMFS Draft Recovery Plan, Tribal Recovery Plan, Columbia River Fisheries Management Plan, as well as draft Imnaha Subbasin Summary and the draft Grande Ronde Subbasin Summary (Nowak et al. 20001).

This proposal also addresses the objectives outlined by ODFW in the draft Grande Ronde Subbasin Summary. Objectives include:

- Objective 1: Achieve a sufficient spawner numbers and productivity of Grande Ronde Basin spring chinook salmon, by restoring and maintaining natural spawning populations, to will allow de-listing.
- Objective 2: Reduce the demographic risks associated with the low productivity and decline of native spring chinook salmon populations in Catherine Creek, Lostine River and Grande Ronde River.
- Objective 3: Maintain artificial production programs for spring chinook salmon and steelhead, using locally-adapted broodstocks to meet recovery, conservation and harvest goals, and mitigate for fish losses associated with construction and operation of lower Snake River dams.
- Objective 4: Establish an annual supply of steelhead and spring chinook salmon brood fish capable of meeting annual production goals.

This proposal also addresses the objectives outlined by NPT in the draft Grande Ronde Subbasin Summary. Objectives include:

- Objective 1. Restore and recover historically present fish species.
- Objective 2. Provide for harvestable, self-sustaining populations of anadromous and resident fish species in their native habitat.
- Objective 3. Manage salmon and steelhead for long-term population persistence.
- Objective 11. Meet federal fisheries mitigation responsibilities for LSRCP program.
- Objective 12. Provide for Tribal hatchery production needs in federal and state managed facilities.
- Objective 14. Coordinate with the National Marine Fisheries Service and U.S. Fish and Wildlife Service to fund and implement actions identified in the Biological Opinions, and to implement other emergency actions that address imminent risk to listed salmon, steelhead, and bull trout populations.

This proposal also addresses the objective outlined by CTUIR in the draft Grande Ronde Subbasin Summary.

- Objective 1. Achieve and maintain an average run of 16,400 spring chinook to the Grand Ronde River mouth for purposes of natural production, fisheries, and broodstock.

Review Comments

M&E is performed through LSRCP. This project is considered BASE by NMFS.

Budget

FY02	FY03	FY04
$206,048 Category: High Priority Comments:	$209,215 Category: High Priority	$217,934 Category: High Priority

Project: – 199801001 – Grande Ronde Basin Spring Chinook Captive Broodstock Program

Sponsor: Oregon Department of Fish and Wildlife

Short Description:

Rapidly increase numbers of chinook salmon in the Grande Ronde Basin while protecting genetic diversity, and develop and evaluate methodologies for captive broodstock programs.

Abbreviated Abstract

This program was initiated as a conservation measure in response to severely declining runs of chinook salmon in the Grande Ronde Basin. Our goals are to prevent extinction of the three populations; provide a future basis to reverse the decline in stock abundance of Grande Ronde River chinook salmon; and develop methods that will ensure a high probability of population persistence well into the future once the causes of basin wide population declines have been addressed. Associated objectives include: 1) to reduce the demographic risk associated with the decline of native wild chinook populations in the

Lostine River (LR), upper Grande Ronde River (GR) and Catherine Creek (CC), 2) maintain genetic diversity of indigenous artificially propagated chinook populations, 3) maintain genetic diversity in wild chinook populations, 4) assess the effectiveness of captive broodstock for use in recovery of chinook salmon, and 5) determine most effective methodologies for captive broodstock programs. A comprehensive monitoring and evaluation program is underway to assess the performance of freshwater and saltwater treatments and determine the success of achieving management objectives.

We have collected naturally-produced parr for six years (1995-2000) and plan to continue collecting juveniles on an annual basis. These juveniles are reared to the smolt stage at Lookingglass Fish Hatchery (LFH). Two-thirds of these smolts are transferred to Bonneville Fish Hatchery (BOH) and reared in freshwater and one-third to NMFS Manchester Marine Laboratory (MML) and reared in saltwater. At maturity, saltwater adults are transported from MML to BOH where all fish are spawned. Fish have been spawned in 1998, 1999 and 2000 and production is beginning to exceed expectations. Embryos are transferred to the LSRCP program for eventual release into the natal streams of their parents. Captive broodstock progeny are reared to the smolt stage at LFH and the first smolt release occurred in 2000. The return of jacks in 2001 demonstrates smolt-to-adult survival and is an encouraging sign of success of the program. When the program is at full production, a minimum of 150 adults should return to the river of parent origin, to ensure that threshold escapement levels are met.

Relationship to Other Projects

Project ID	Title	Nature of Relationship
199202604	Early Life History of Spring Chinook Salmon in the Grande Ronde Basin	We utilize migration timing information from this project to determine when to collect juveniles for captive broodstock. Life history information will also be used to access the success of supplementation programs and smolt migration success.
198805301	NE Oregon Hatcheries – ODFW< CTUIR and NPT	Captive broodstock program will be directly integrated into the NE Oregon Hatcheries program as it will be providing the broodstock and eggs that will be utilized for NEOH.
198905302	NE Oregon Hatcheries – ODFW, CTUIR and NPT	Captive broodstock program will be directly integrated into the NE Oregon Hatcheries program as it will be providing the broodstock and eggs that will be utilitzed for NEOH.
5520700	Captive Broodstock Artificial Propagation	This is the NPT funding for cooperative evaluation of the Grande Ronde Spring Chinook Captive Broodstock Program.
198909600	Genetic Monitoring and Evaluation of Snake River Salmon and Steelhead	This project provides samples for the genetics monitoring program.
	Fish Passage Center Smolt Monitoring Program – Migration Characteristics	During the summer, we PIT-tag parr in Catherine Creek, and the Lostine and Grande Ronde rivers. We collect parr for the captive broodstock when parr PIT-tagging occurs. This project also provides personnel and information to improve efficiencies.
199606700	Captive Broodstock Program – Manchester Marine Lab	This is a NMFS project that rears Grande Ronde Captive Broodstock as a part of the program.

Project ID	Title	Nature of Relationship
	Spring Chinook Endemic Broodstock Development	This captive broodstock program is integrated with the Grande Ronde Endemic program and will utilize the adult collection facilities to monitor returns and survival of captive broodstock produced returns.
	Lower Snake River Compensation Plan	The captive broodstock project is providing embryos for use in the LSRCP supplementation program. Production, release and monitoring and evaluation of captive brood progeny is funded under the LSRCP.
	Idaho Captive Broodstock Program	The Idaho and Oregon Captive Broodstock Programs have followed divergent methodologies to reach the same goal. We meet every two months through a Technical Oversight Committee to update and discuss each program.
176	Hatchery RPA	The Captive Broodstock Program is an integral part of the Grande Ronde Safety Net program and program personnel will participate extensively.
169	Hatchery RPA	Much of the data needed for the Grande Ronde chinook salmon HGMP are provided by the Captive Broodstock Program and program personnel will assist in writing the HGMP's.
170	Hatchery RPA	Improvements are proposed for hatcheries used in the Captive Broodstock Program and we will assist in development of hatchery modification plans and designs.
182	RME RPA	Progeny from the Captive Broodstock Program will be used for the studies comparing reproductive success of hatchery vs. wild chinook salmon outlined by this RPA.
185	RME RPA	Progeny from the Captive Broodstock Program will be used for studies of juvenile migrant survival for both transported and nontransported migrants and adult returns outlined by this RPA.

Relationship to Existing Goals, Objectives and Strategies

Captive broodstock projects for Snake River spring/summer chinook salmon are supported by recommendations in the Snake River Recovery Team's report (SRSRT 1994), NMFS draft recovery plan (NMFS 1995) and the Northwest Power Planning Council's Fish and Wildlife Program (NPPC 1994) and many objectives listed in the Grande Ronde Subbasin Summary.

This project addresses numerous objectives identified in the 1994 Fish and Wildlife Program including: 7.1B which addresses conservation of genetic diversity; 7.2 which identifies the need for improvement of existing hatchery production; 7.3B which directs implementation of high priority supplementation projects; 7.4A which specifies the need to evaluate and implement new production initiatives; and 7.4D which directs implementation of captive broodstock programs.

NMFS draft recovery plan states "captive broodstock and supplementation programs should be initiated and/or continued for populations identified as being at imminent risk of extinction, facing severe inbreeding depression, or facing demographic risks". The recovery plan also states, "considering the critical low abundance of the Grande Ronde spring/summer chinook salmon, impacts to listed fish should be avoided and LFH should be operated to prevent extinction of local populations. Consequently, indigenous broodstock should be immediately transferred to LFH (natural fish collected in 1995), and production should be maximized to supplement natural populations." Our goal is to help prevent extinction of the three populations and provide a future basis to reverse the decline in stock abundance and ensure a high probability of population persistence.

Use of non-local broodstock is inconsistent with sound conservation principles and, in 1996, an Independent Scientific Review Panel under U.S. v. Oregon Grande Ronde chinook salmon dispute resolution recommended development of local broodstocks. This project is directed by the conceptual premise that identifies maintenance within and between population variations in genetic and life history characteristics as essential for long term fitness and persistence. It is an integral part of the LSRCP in-kind and in-place mitigation program.

The Grande Ronde Subbasin Summary contains at least 36 objectives of agencies such as the U.S. Fish and Wildlife Service (and LSRCP), Nez Perce Tribe, Confederated Tribes of the Umatilla Indian Reservation and Oregon Department of Fish and Wildlife that support the captive broodstock project. The pertinent objectives pertain to increasing spring chinook salmon populations in the Grande Ronde Basin, particularly Lostine River, upper Grande Ronde River and Catherine Creek, meeting tribal trust responsibilities, restoration of recreational fisheries, maintaining the genetic integrity and diversity of these stocks and complying with the Endangered Species Act.

The National Marine Fisheries (NMFS) Biological Opinion (2001) concludes that the proposed actions by Bonneville Power Administration (BPA), the BOR and US Army Corps of Engineers (Corps) are unlikely to sufficiently improve conditions for Snake River spring/summer chinook salmon and “are likely to jeopardize the continued existence of this ESU”. NMFS states that “other measures for survival and recovery that affect other life stages are required to ensure a high likelihood of survival and a moderate-to-high likelihood of recovery.” The Grande Ronde Basin Captive Broodstock Program is designed to rapidly increase numbers of smolts and returning adults, while maintaining genetic diversity in the stocks. This is a safety net program to maintain sufficient numbers of genetically diverse, locally adapted fish that can later be used to restore self-sustaining runs when habitat problems are resolved. The Captive Broodstock Program addresses several Reasonable and Prudent Alternatives of the Biological Opinion. The Captive Broodstock Program is the spring/summer chinook salmon safety net program for the Grande Ronde Basin called for by Hatchery RPA 176. Much of the data needed for the Grande Ronde chinook salmon HGMP are provided by the Captive Broodstock Program and program personnel will assist in writing the HGMP's called for under Hatchery RPA 169. Hatchery RPA 170 calls for modifications to hatcheries identified as necessary under the HGMP’s. Some of these modifications will be made at facilities used by the Captive Broodstock Program. Progeny of the Captive Broodstock Program will be used for evaluations of reproductive success of hatchery fish relative to wild fish called for under RME RPA 182. Captive Broodstock progeny will also be used for studies to define downstream migration survival for transported and nontransported migrants and smolt-to-adult survival rates, as called for under RME RPA 1985

Review Comments

This project is considered BASE by NMFS.

Budget

FY02	FY03	FY04
$739,096 Category: High Priority Comments:	$776,047 Category: High Priority	$814,851 Category: High Priority

Project: – 199801006 – Captive Broodstock Artificial Propagation

Sponsor: Nez Perce Tribe

Short Description:

Implement and evaluate the captive broodstock project through the collection of juvenile salmon from the wild and maintaining them in captivity. The founding generation is spawned and the resulting F1 generation is released back to the parental stream.

Abbreviated Abstract

In 1995 a spring chinook salmon captive broodstock program was initiated in the Grande Ronde River subbasin in an effort to restore spring chinook salmon populations in the basin. Today it has become an important component in the conservation approach and strategy of co-managers. The Nez Perce Tribe (NPT), Oregon Department of Fish and Wildlife (ODFW) and the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) work cooperatively as patrons of the Grande Ronde River subbasin captive broodstock program.

Five hundred wild chinook salmon parr from each tributary are collected every summer from the Lostine River, Catherine Creek and upper Grande Ronde River. Fish are reared at Lookingglass Fish Hatchery until the smolt stage and then were transferred to facilities at Bonneville Hatchery and Manchester Marine Laboratory. When mature, the captive broodstock are brought together at Bonneville Hatchery and spawned. Semen from any excess captive males is cryopreserved. Half of these preserved gametes are stored on site for potential use in spawning and half are stored off site as a back-up repository. The F1 generation is reared at Lookingglass Hatchery, acclimated at satellite facilities on the respective natal streams and then volitionally released.

The intent of the Grande Ronde captive broodstock program is to prevent imminent extirpation and enhance the chinook salmon population without a phenotypic or genetic change to the original population. Specific expected research outcomes of the program include an evaluation of saltwater and freshwater adult rearing. Within the freshwater strategy, accelerated and normal growth regimes are also compared. These rearing treatments are evaluated in terms of size, survival, disease, fecundity, fertility, sperm motility, egg size, egg survival. The F1 juvenile and adult performances are evaluated against the standards set by their wild counterparts.

Relationship to Other Projects

Project ID	Title	Nature of Relationship
199801001	Grande Ronde Basin Spring Chinook Captive Broodstock Program	Depends on project 199801001 to rear smolt-to-adult at Bonneville Hatchery (freshwater strategy).
199606700	Manchester Captive Brood O&M	Depends on project 199606700 to rear smolt-to-adult at Manchester Marine Laboratory (saltwater strategy).
199305600	Assessment of Captive Broodstock Technology	Depends on project 199305600 for NMFS assessment of captive broodstock technology.
199703800	Listed Stock Chinook Salmon Gamete Preservation	Depends on project 199703800 for the use of the regional gene repository located at the University of Idaho.
199800702	Grane Ronde Supplementation Project O&M/M&E	Is integrated with the activities of project 199800702. The Lostine component monitors conventional production.
198805301	Northeast Oregon Hatcheries	Will be integrated with the activities of project 198805301. NEOH will provide a coordinated umbrella to all supplementation projects in northeast Oregon.
198712700	Grande Ronde Smolt Monitoring	Depends on project 198712700 for smolt trapping assistance on the Lostine River. Will provide natural survival performance standards.
	Lower Snake River Compensation Plan	Depends on LSRCP for parr-to-smolt rearing at Lookingglass Hatchery.

Relationship to Existing Goals, Objectives and Strategies

The intent of the Grande Ronde captive broodstock program is to prevent imminent extirpation and enhance the chinook salmon population without a phenotypic or genetic change to the original population. Specific expected research outcomes of the program include an evaluation of saltwater and freshwater adult rearing. Within the freshwater strategy, accelerated and normal growth regimes are also compared. These rearing treatments are evaluated in terms of size, survival, disease, fecundity, fertility, sperm motility, egg size, egg survival. The F1 juvenile and adult performances are evaluated against the standards set by their wild counterparts.

Many of the goals, objectives, needs, strategies and action items detailed in the Grande Ronde Subbasin Summary (Nowak et al. 2001) are addressed by the Captive Broodstock Program. Fish hatchery and fisheries research needs outlined in the subbasin summary that relate specifically to spring chinook populations in the basin are as follows:

Hatchery Needs

1. Continue gene conservation efforts for spring chinook in the subbasin (e.g., Captive Broodstock and Cryopreservation Programs).
2. Continue implementation of Grande Ronde Conventional and Captive Broodstock Hatchery Programs.
3. Need to collect sufficient numbers of parr and adults for the Grande Ronde Captive and Conventional Broodstock Programs respectively.

Monitoring and Evaluation Needs

1. Continue and expand efforts to monitor the effectiveness of the chinook salmon captive broodstock, LSRCP and NEOH artificial production programs.
2. Need to determine smolt-to-adult survival, survival factors, spawning escapement and life history characteristics of natural and hatchery origin spawning populations.
3. Need to evaluate the success of Captive and Conventional broodstock programs for restoring fisheries and increasing endemic stocks of spring chinook salmon in Catherine Creek, Lostine River, and upper Grande Ronde River.
4. Need to determine reproductive success of hatchery fish spawning in nature.

The Summary presents strategies and action items needed to meet these needs. The table below lists the proposed captive broodstock objectives and tasks associated with the strategies and actions identified in the Grande Ronde Subbasin Summary (Nowak et al. 2001) and specific to spring chinook salmon.

Grande Ronde Subbasin Summary Strategy and Action Items	**Associated Captive Broodstock Objectives and Tasks**
Strategy 1 Use artificial propagation to enhance natural production and fisheries in the Grande Ronde Subbasin	
Action 1.4 Collect 500 parr from each of Catherine Creek, Lostine River and Grande Ronde River for Captive Broodstock Program	Subobjective 2.1, task 2.1.1
Action 1.5 Rear captive broodstock program fish under one of two pre-smolt (natural vs. accelerated) and one of two post-smolt (freshwater vs. saltwater) treatment regimes.	Subobj 2.1, task 2.1.2-6 Subobj 2.2, task 2.2.2-13
Action 1.7 Spawn fish within stocks and treatments (captive broodstock program) using matrices to maximize genetic diversity of offspring	Subobj 2.2, task 2.2.6
Action 1.9 Acclimate juveniles at sites located on the home stream of each stock and release as smolts.	Subobj 3.1, task 3.1.4
Action 1.11 Develop Annual Operation Plans for captive and conventional broodstock programs	Objective 1, task 1.1
Action 1.12 Evaluate programs at each life history stage: spawning, incubation, parr-smolt, smolt release and adult returns for captive and conventional broodstock programs; parr collection, post smolt rearing and maturation for the captive broodstock program.	Subobj 2.1, tasks 2.1.1-6 Subobj 2.2, tasks 2.2.1-13 Subobj 3.1, tasks 3.1.1-6 Subobj 3.2, tasks 3.2.1-7
Action 1.13 Coordinate ESA permit activities and participate in program planning and oversight.	Objective 1, task 1.1-3
Action 1.14 Summarize data and prepare and submit annual reports	Objective 4.2
Strategy 2 Implement monitoring and evaluation to assess health, status and productivity of natural populations.	
Action 2.1 Conduct spawning ground surveys of streams within the Grande Ronde river Basin: Count number of redds, live and dead adult salmon, examine carcasses for marks and collect coded wire tags, collect scales, determine age of maturity, prespawn mortality, spawner distribution and hatchery:wild ratio.	Subobj. 3.2, task 3.2.6
Action 2.8 Estimate and compare smolt detection rates at mainstem Columbia and Snake river dams for fall and spring migrating spring chinook salmon from tributary populations in the upper Grande Ronde river, Catherine Creek and the Lostine River.	Subobj. 3.1, task 3.26
Strategy 3 Implement monitoring and evaluation to assess health, status and productivity of hatchery fish and effectiveness of hatcheries to accomplish	

Grande Ronde Subbasin Summary Strategy and Action Items	Associated Captive Broodstock Objectives and Tasks
objectives. *Action 3.6 Evaluate effectiveness of captive and conventional broodstock programs to restore endemic stocks of spring chinook salmon in the upper Grande Ronde river, Catherine Creek and the Lostine River and maintain their genetic diversity. Examine various indices (e.g., egg-to-fry and fry-to-smolt survival, growth and health, fecundity, progeny:parent ratio) at specific life stages (incubation, fry-smolt rearing, post-smolt rearing and maturation) of all fish raised at hatcheries.* *Action 3.7 Develop and maintain a database for Captive and Conventional broodstock programs*	Subobj 3.1, tasks 3.1.1-6 Subobj 3.2, tasks 3.2.1-7 Objective 1, task 1.4
Strategy 6 Use artificial propagation for supplementation and/or reintroduction of endemic stock spring chinook into the Grande Ronde subbasin tributaries to provide natural production and harvest.	Objectives 1-4, all subobjectives and all tasks
Strategy 9 Monitor and evaluate hatchery programs to ensure they are successful and minimize adverse effects on listed or other indigenous species.	Subobj 2.1, tasks 2.1.1-6 Subobj 2.2, tasks 2.2.1-14 Subobj 3.1, tasks 3.1.1-6 Subobj 3.2, tasks 3.2.1-7
Strategy 10 Implement artificial propagation practices to maintain the genetic and biological integrity of supplemented stocks	Subobj 2.2.6 , 2.2.9, 2.2.14 Subobj 3.1.5-6 and 3.2.4-6
Strategies 1 through **6** under **Objective 2** are almost identical to the objectives in this captive broodstock proposal.	Objectives 1-4, all subobjectives and all tasks

Review Comments

This project is considered BASE by NMFS.

Budget

FY02	FY03	FY04
$170,177 Category: High Priority Comments:	$175,282 Category: High Priority	$180,541 Category: High Priority

Project: – 200002100 – Securing Wildlife Mitigations Sites – Oregon, Ladd Marsh WMA Additions

Sponsor: Oregon Department of Fish and Wildlife

Short Description:

Protect and restore wetland and riparian habitats on parcels acquired and added to the Ladd Marsh Wildlife Area.

Abbreviated Abstract

The overall intent of this on-going project is to restore wetland and riparian habitats on and near the Oregon Department of Fish and Wildlife (ODFW) Ladd Marsh Wildlife Area. The project is located within the Grande Ronde River subbasin and provides mitigation for fish and wildlife losses in Oregon resulting from the construction and operation of the

Federal Columbia River Hydropower System. The project involves many cost-sharing partners for habitat protection and restoration.

To date, about 940 acres have been acquired and added to the Ladd Marsh Wildlife Area. Wetland and riparian channel restoration work in planned on much of this acreage in FY 01. The objectives for FY 2002 include additional restoration work on about 240 acres of the 940 acres (i.e., the Simonis parcel), pre-restoration work on 480 acres owned by the City of La Grande (i.e., the Becker Property), and pre-conservation easement activities for an additional 180 acres of wetland and riparian habitat (i.e., the Hot Lake and Wallender #2 parcels). Wetland areas will be restored by constructing a series of dikes and water delivery systems. Riparian areas will be restored by removing stream-side dikes and replanting with native vegetation. Out-year activities include restoration of the 480-acre Becker parcel, easement and restoration of the 20-acre Wallender #2 and the 160-acre Hot Lake parcels, maintenance of protected and created habitat values on previously acquired lands, and pursuit of other lands through purchase, easement or long-term lease. Restoration activities seek to restore the historic Tule Lake wetland complex, that, from the late 1880s up until 1948 was reduced from over 20,000 acres to 500 acres. This project will benefit numerous fish and wildlife species by recreating wetlands and improving riparian conditions in the Middle Fork Ladd Creek and Barney Creek, tributaries to Catherine Creek. Ladd Creek is home to steelhead and resident rainbow trout and Catherine Creek supports Chinook salmon, bull trout and steelhead. Increased wildlife habitat values will be monitored using Habitat Evaluation Procedures. Changes in vegetation composition, site hydrology, and stream conditions will be monitored to ensure that site restoration goals are being achieved. Fish and wildlife population trend monitoring will also occur.

Relationship to Other Projects

Project ID	Title	Nature of Relationship
	Status Review of Wildlife Mitigation at Columbia Basin Hydroelectric Projects, Col. Mainstem and Lower Snake Facilities (BPA 1984)	Reviewed past, present and proposed future wildlife planning and mitigation programs at BPA's hydrofacilities. Called for quantitative and qualitative assessment of wildlife losses attributable to the dams and implementation of mitigation plans.
	Special Report: Lower Snake River Fish and Wildlife Compensation; Wildlife Habitat Compensation Evaluation for the Lower Snake River Project (ACOE 1991)	Quantified and described wildlife habitat conditions pre- and post- hydroproject construction/inundation, evaluated contribution of Habitat Mgmt. Units to current conditions, defined compensation goals in terms of habitat.
199208400	Oregon Trust Agreement Planning Project	A mitigation planning tool that includes methods for assembling a trust agreement and a list of potential mitigation projects. The LMWA was identified as a priority site.
199506500	Assessing Oregon Trust Agreement Planning Project Using Gap Analysis	A mitigation planning tool used to analyze and rank potential mitigation projects within the basin. The LMWA was identified as a priority site.
199705900	Securing Wildlife Mitigation Sites - Oregon	Programmatic project; explains intent for mitigation planning, coordination and implementation by Oregon wildlife managers within Oregon. Served as the project

Project ID	Title	Nature of Relationship
		through which Ladd Marsh acquisitions were originally identified, proposed and funded.

Relationship to Existing Goals, Objectives and Strategies

The Ladd Marsh Wildlife Area Additions project is consistent with the overall goal for the Grande Ronde subbasin of restoring the health and function of the ecosystem to ensure continued viability of these important populations (Nowak 2001). Ladd Marsh wetland and riparian habitat protection and restoration actions will also help fulfill many of the more specific goals and objectives of the various federal, state, tribal, county and other local resource management entities within the subbasin. The specific goals, objectives, and strategies for each entity are too numerous to list below. General goals that this project will help achieve include:

- Protect high quality aquatic, riparian and upland habitats
- Restore degraded aquatic, riparian and upland habitats and connect to other functioning habitats
- Prevent further habitat degradation
- Protect, restore, and enhance native anadromous and resident fish and wildlife populations
- Restore, maintain and enhance the quality of Oregon’s air, water and land.
- Increase the information needed to protect, restore and manage fish and wildlife and their habitats
- Provide and protect outstanding natural, scenic, cultural, historic, and recreational sites for the enjoyment and education of present and future generations.

Fish and Wildlife Needs

The Ladd Marsh Wildlife Area Additions project addresses many of the fish and wildlife needs identified in the Grande Ronde Subbasin Summary (Nowak 2001) including:

Aquatic Habitat Enhancement

1. Implement restoration efforts designed to achieve the site potential shade and other temperature surrogates identified in the appropriate TMDLs for the subbasin.
2. Reduce nutrient pollution to achieve the percent reduction targets identified in the appropriate TMDLs for the subbasin.
3. Using existing assessments, seek out opportunities for cooperative habitat restoration and enhancement projects on public and private land.
4. Restore, protect, and create riparian, wetland, and floodplain areas within the subbasin and establish connectivity.
5. Restore in-stream habitat to natural conditions and protect as much as possible to provide suitable holding, spawning, and rearing areas for anadromous and resident fish.
6. Reduce stream temperature, sediment and embeddedness levels to levels meeting appropriate state standards.
7. Restore and augment streamflows at critical times using (but not limited to) water right leases, transfers, or purchases, and improved irrigation efficiency.
8. Reduce stream temperatures where appropriate and when feasible.
9. Reduce sediment, fertilizer and pesticide loading from agricultural practices.

10. Reduce the impacts of confined animals with regard to waste and sediment production.
11. Acquire water rights when opportunities arise to help restore more natural flows to streams within the subbasin

Wildlife / Terrestrial Needs
Habitat Diversity
1. Acquire lands with high priority habitat components (e.g., aspen stands) when opportunities arise for improved habitat protection, restoration, and connectivity and for mitigation of lost wildlife habitat (land purchases, land trusts, conservation easements, landowner cooperative agreements, exchanges).
2. Assist landowners with management of land holdings and easements for restoration and enhancement of wildlife habitat.
3. Mitigate hydropower impacts on loss of wildlife and wildlife habitat and indirect impacts within the subbasin, based on species-specific habitat units.

Riparian Communities
1. Acquire lands when opportunities arise for improved habitat protection, restoration, and connectivity for riparian communities and for mitigation of lost wildlife habitat for riparian associated species (land purchases, land trusts, conservation easements, landowner cooperative agreements, exchanges).
2. Protect, restore, and create wetland and riparian habitat, especially in lower elevation riparian areas.
3. Participate in cooperative stewardship programs to foster riparian community protection.
4. Strive to achieve site potential shade targets identified in TMDLs.

Noxious Weeds
1. Monitor spread of noxious weeds and evaluate effectiveness of noxious weed control programs.
2. Develop and use restoration techniques for noxious weed infested communities.
3. Continue control programs for noxious weeds to restore natural habitat conditions and communities for wildlife species.
4. Implement and (where applicable) continue Integrated Pest Management programs to limit the spread of noxious weeds.

NWPPC 2000 FWP
The Ladd Marsh Wildlife Area Additions project directly mitigates for the losses identified in the NWPPC's FWP (NWPPC 2000) resulting from the construction/ inundation and operation of the Federal Columbia River Hydropower System. Specifically, the project will replace wetland, riparian/riverine, and native grasslands and shrub habitat types that were lost and will provide wildlife mitigation credits (Habitat Units) for song sparrow, yellow warbler, California quail, ring-necked pheasant, and Canada goose.

NMFS Biological Opinion

The Ladd Marsh Wildlife Area Additions project addressed the following NMFS (2000) Reasonable and Prudent Alternatives (RPAs):

- Action 150 – This project protects currently productive non-Federal habitat through fee-title acquisition in a subbasin with listed salmon and steelhead. Both Ladd Creek and Barney Creek flow into Catherine Creek, which supports Chinook salmon, steelhead, and bull trout. Ladd Creek supports steelhead. Additional protection of lands through purchase, easement and/or long-term lease is proposed
- Action 151 – This project increases tributary flows to the Grande Ronde River through the purchase of lands with water rights and by cooperating with the City of La Grande who will provide reclaimed water from nearby water treatment facilities to the Ladd Marsh Wildlife Area.

Review Comments

Although a large amount of wetland habitat has been lost in this area, the reviewers are unsure whether the proposed work is urgent. The Wildlife Committee rated the project as having significant wildlife benefits using the criteria of permanence, size, connectivity to other habitat, and juxtaposition to public lands. ODFW will gain support from appropriate co-managers (Tribes and States) for proposed use of Lower Snake River dam wildlife losses to support Ladd Marsh Project prior to NWPPC funding decisions in January.

Budget

FY02	FY03	FY04
$193,185 Category: High Priority Comments:	$374,500 Category: High Priority	$91,000 Category: High Priority

New Projects

Project: – 27003 – Characterize and Assess Wildlife Habitat Types and Structural Conditions for Subbasins within the Blue Mountain Province

Sponsor: Northwest Habitat Institute

Short Description:

Fine-scale wildlife habitat assessment for the Blue Mountain Province will provide critical baseline data for planning and monitoring efforts that is consistent with the NWPPC 's Subbasin Planning process.

Abbreviated Abstract

As ecological assessments of the Columbia River Basin step down in geographic scale to the sub-basin level, the need for fine-scale wildlife habitat depiction and assessment rises markedly. The Northwest Habitat Institute, working with the Northwest Power Planning Council’s Framework Process for Subbasin Planning, developed 32 wildlife-habitat types and an associated wildlife-habitat relationships data set to depict the current conditions of the Columbia River Basin. We are proposing that the same mapping methodology and wildlife-habitat types be reviewed and mapped at a finer level of resolution (4 ha minimum mapping unit, (mmu) (10 acres)) for all sub-basins within the Blue Mountain Province.

The Blue Mountain Province covers about 392,000 acres in the Columbia Basin. Current Landsat Thematic Mapper imagery will form the basis for map analysis and interpretation. Supporting this finer level of mapping will help resource managers, scientists, and policy makers make better decisions, predictions, plans, and models for the Blue Mountain Province. This is because these new wildlife-habitat maps will depict not only the composition of the habitat but also give a user and idea of the current structural condition(s) of the habitat. And, there is a specific call for a detail wildlife-habitat mapping in the Draft Snake Hells Canyon Subbasin Summary [p.152-153] and there are stated needs for a consistent database and to establish new habitat baseline conditions which are viewed as "critical to evaluating the effectiveness of projects in improving habitat, watershed health….and to develop watershed assessments at multiple scales to facilitate integrated resources management and planning efforts." [Combine Aquatic and Terrestrial Needs, Points 5, 7, and 10, p.147]. Also, specific goals and objectives support the need for mapping (IDFG's Goal #3, Strategy 3.1; Idaho Conservation Data Center Goal #1, Objective 2, Strategy 1; ODFW's Wildlife Diversity Plan, Objective 1, Strategy 1.2). In addition, most all sub-basin plans call for assessing or identifying wildlife-habitat(s) for conservation purposes, like protection or enhancement (e.g. Draft Grande Ronde Subbasin Summary, Statement of Fish and Wildlife Needs for Wildlife Habitats (p. 161 – Planning; p.165 – Habitat Diversity; p.166 – Riparian Communities, Ponderosa Pine Communities, and Native Prairie Habitats; Late Seral Communities); Draft Imnaha Subbasin Summary, Statement of Fish and Wildlife Needs for Wildlife (p. 155 – Planning; p.158 – Wildlife/Terrestrial Needs; p.159 – Ponderosa Pine, Native Prairie, Wetland Habitats, and Loss of legacy Resources); Draft Asotin Creek Subbasin Summary, Statement of Fish and Wildlife Needs for Habitat (p. 99 – Combined Aquatic and Terrestrial Needs; p. 102 – Habitat). Further, this project directly supports all the subbasins with their Objectives and/or Fish and Wildlife Needs. For example, Idaho's Department of Fish and Game Goal #1, Objective #1, Strategy 1.1.1 (p.121) and eight Wildlife/Terrestrial Needs (p.152-153) for the Draft Snake Hells Canyon Subbasin Summary. To be successful with conservation actions, strategies, habitat restoration and mitigation projects having the ability to predict species associations, map wildlife-habitat types and structural conditions and putting that information into context with existing landscapes, will allow for a more comprehensive assessment of individual sub-basins and successful design

Our proposal plans to 1) map the wildlife-habitat types at a refined resolution (4 ha mmu); 2) map the wildlife habitat structural conditions (4 ha mmu); 3) validate the mapping effort by field visits; and 4) assess the current conditions for wildlife using the wildlife-habitat relationships data set in conjunction with the wildlife-habitat types and structural conditions mapping information. The subbasin maps and assessment results will be post on the web, as well as written up in a report format so that the findings are available to wide audience and potential users.

Relationship to Other Projects

Project ID	Title	Nature of Relationship

Project ID	Title	Nature of Relationship
2000742	Establishing Baseline Key Ecological Functions of Fish and Wildlife for Subbasin Planning	An ecoprovince fine-scale habitat map would depict with greater accuracy areas where key ecological functions are increasing or decreasing. Baseline key ecological functions are an important component of NWPPC's Subbasin Planning Process.
21005	Characterize and Assess Wildlife Habitat Types and Structural Conditions for Subbasins within the Columbia Gorge Ecoprovince	This project is for refined mapping at a sub-basin level and when completed will give a fine scale ecoprovince map. This ecoprovince map can then be compared with the Blue Mountain map when it is done and eventually can build into a basin perspective.
21006	Characterize and Assess Wildlife Habitat Types and Structural Conditions for Subbasins within the Inter Mountain Ecoprovince	This project is for refined mapping at a sub-basin level and when completed will give a fine scale ecoprovince map. This ecoprovince map can then be compared with the Blue Mountain map when it is done and eventually can build into a basin perspective.
24007	Characterize and Assess Wildlife Habitat Types and Structural Conditions for Subbasins within the Mountain Columbia Ecoprovince	This project is for refined mapping at a sub-basin level and when completed will give a fine scale ecoprovince map. This ecoprovince map can then be compared with the Blue Mountain map when it is done and eventually can build into a basin perspective.
25098	Characterize and Assess Wildlife Habitat Types and Structural Conditions for Subbasins within the Columbia Plateau Ecoprovince	This project is for refined mapping at a sub-basin level and when completed will give a fine scale ecoprovince map. This ecoprovince map can then be compared with the Blue Mountain map when it is done and eventually can build into a basin perspective.

Relationship to Existing Goals, Objectives and Strategies

A key principle that is identified from the Northwest Power Act is that in developing the Columbia River Basin Fish and Wildlife Program, the council must deal with the Columbia River and its tributaries as a system and use the best scientific knowledge available (in 2000 Fish and Wildlife Program, Key Principles, Technical Appendix 2). Further, the draft Scientific Foundation for the Fish and Wildlife Program (NWPPC 2000) lists 8 principles that describe the relationship between species and their ecosystems. Principle 3 states, biological systems operate on various spatial and time scales that can be organized hierarchically. The definition of hierarchy usually depends on the question asked (Levin 1992). But, the Council has elected to address the hierarchy question by defining the various levels of regional planning which are: basin or Columbia River Bio-physical region, Province, subbasin, 6th order HUC, and site specific areas. Each of these levels of planning varies in amounts of area that are considered. For example, basin level typically addresses 100,000s of square miles, Provinces- 1,000s of square miles, sub-basins, -100s of square miles, 6th HUC – 10s of square miles, and specific sites – 1 to10 square miles. Also, at each level there are different features that are described.

Next, the Northwest Power Planning Council on October 19, 2000 adopted a Program that relies on multi-species sub-basin assessments and planning, including adoption of the Multi-species Framework process. A part of the Framework process is a basin-wide depiction of wildlife-habitats for current and normative (historic) conditions. By moving a portion of the Framework to a spatial depictions, allows resource mangers and the public to see findings and outcomes illustrated across the landscape, and for the initial case it was the basin. A primary reason, we think this is a valuable tool is because maps allow diverse and complicate data to be display in a common format, they can focus a discussion, and they are readily understood. We believe that there is a regional need for these maps and they are based on the Council direction to a) acknowledging the Columbia River Basin as a system and to use the best available science when making a decision(s), b) understanding that biological systems operate on various spatial scales that can be organized hierarchically, and c) adopting the Multi-species Framework process that includes map development and addressing questions at various hierarchical levels, like at the sub-basins or 6th HUC. Our proposal also addresses the coordination aspects of the Northwest Power Planning Council's Fish and Wildlife Program [see section 3.3]. In that, it builds towards a coordinated set of information that is deemed as "essential" for this program.

Local resource managers listed within each Subbasin Summary Report, which was written for each subbasin in the Blue Mountain Province, their conservation objectives and needs for fish and wildlife. And, there is a specific call for a detail wildlife-habitat mapping in the Draft Snake Hells Canyon Subbasin Summary [p.152-153] and there are stated needs for a consistent database and to establish new habitat baseline conditions which are viewed as "critical to evaluating the effectiveness of projects in improving habitat, watershed health….and to develop watershed assessments at multiple scales to facilitate integrated resources management and planning efforts." [Combine Aquatic and Terrestrial Needs, Points 5, 7, and 10, p.147]. Also, specific goals and objectives support these needs (IDFG's Goal #3, Strategy 3.1; Idaho Conservation Data Center Goal #1, Objective 2, Strategy 1; ODFW's Wildlife Diversity Plan, Objective 1, Strategy 1.2). In addition, most all subbasin plans call for assessing or identifying wildlife-habitat(s) for conservation purposes, like protection or enhancement (e.g. Draft Grande Ronde Subbasin Summary, Statement of Fish and Wildlife Needs for Wildlife Habitats (p. 161 – Planning; p.165 – Habitat Diversity; p.166 – Riparian Communities, Ponderosa Pine Communities, and Native Prairie Habitats; Late Seral Communities); Draft Imnaha Subbasin Summary, Statement of Fish and Wildlife Needs for Wildlife (p. 155 – Planning; p.158 – Wildlife/Terrestrial Needs; p.159 – Ponderosa Pine, Native Prairie, Wetland Habitats, and Loss of legacy Resources); Draft Asotin Creek Subbasin Summary, Statement of Fish and Wildlife Needs for Habitat (p. 99 – Combined Aquatic and Terrestrial Needs; p. 102 – Habitat). Further, this project directly supports all the subbasins with their Objectives and/or Fish and Wildlife Needs. For example, Idaho's Department of Fish and Game Goal #1, Objective #1, Strategy 1.1.1 (p.121) and eight Wildlife/Terrestrial Needs (p.152-153) for the Draft Snake Hells Canyon Subbasin Summary. To be successful with conservation actions, strategies, habitat restoration and mitigation projects having the ability to predict species associations, map wildlife-habitat types and structural conditions and putting that information into context with existing landscapes, will allow for a more comprehensive assessment of individual sub-basins and successful design. Several examples of products that could be developed for a sub-basin using the wildlife habitat maps are: current ecological condition, individual wildlife species distributions, rare, unique or priority habitats, land use/land cover patterns, juxtaposition of specific habitats of interest, habitat of specific species that perform 1 or several key ecological functions, habitats that lie within urban growth boundaries.

Review Comments

This activity is currently being funded under the Ecosystem Diagnosis and Treatment project at NWPPC. The need for expansion of this project to produce finer resolution within each province should be determined through the EDT assessment process. If that process determines that finer resolution is necessary for regional planning, then funding for expansion should be provided through the NWPPC subbasin assessment effort. This should be reviewed by the Regional Assessment Advisory Committee.

Budget

FY02	FY03
$201,175 Category: Recommended Action Comments:	$110,970 Category: Recommended Action

Project: – 27004 – Grande Ronde and Imnaha Stream Channel Complexity and Fish Passage Barrier Inventory, Prioritization and Remediation

Sponsor: Oregon Watershed Enhancement Board

Short Description:

This project will complete an inventory of the channel simplification of the Grande Ronde and Imnaha stream channels and inventory each fish passage barrier in each basin. The data will be used to develop restoration priorities and early implementation.

Abbreviated Abstract

The reconnection of isolated portions of anadromous fish habitat isolated by barriers has been identified as a high priority technique to address depressed stock recovery (Roni et. al., in press). A primary recovery strategy for spring Chinook salmon should include a systematic reconnection of habitat isolated by human activities. This project will result in a complete inventory of barriers to fish passage, identification of habitat simplification, and development of a systematic prioritization scheme for reconnecting isolated off-channel habitat and eliminating barriers to tributary streams. The project anticipates implementation of removal and reconnection of priority barriers following completion of the inventory and prioritization.

Relationship to Other Projects

Project ID	Title	Nature of Relationship
199202601	Grande Ronde Model Watershed Program	The GRMWP will be the primary forum for public outreach with results and other public involvement.
199702500	Implement the Wallowa County / Nez Perce Tribe Salmon Habitat Recovery Plan	This project will provide passage specific watershed restoration project implementation.

Relationship to Existing Goals, Objectives and Strategies

The Grande Ronde was one of the first basins to apply EDT (Mobrand and Lestelle, 1997) as an analytical tool. The identification of obstructions as a limitation for spring Chinook production is listed for the Lostine, Wallowa Rivers and Catherine Creek. Habitat Diversity as a limiting factor is noted for nearly all streams in the basin. The Wallowa County-Nez Perce Tribe Salmon Recovery Plan with Multi Species Habitat Strategy (1999) identifies physical barriers in Big Sheep Creek, Lostine River, Bear Creek, Minam and Wenaha Rivers, Hurricane Creek, and Prairie Creek. Each basin scale analysis has identified barriers and habitat simplification as a factor limiting spring Chinook populations. Establishing priorities for remediation of habitat simplification and barrier removal will provide the Grande Ronde Model Watershed and their partners with a clear direction for implementation.

Review Comments

Although the proposal presented a potentially good concept, it was incomplete and as a result the reviewers could not evaluate the technical and management merits. The reviewers identified a need for coordination between this proposal and Proposal 27022 and suggested that a funding decision should be deferred until the subbasin planning process is completed. In addition, the reviewers indicate that an inventory of fish passage barriers is not warranted since barriers to fish passage have already been identified. The managers indicated that there has been a lack of coordination with the management agencies.

Budget

FY02	FY03	FY04
$191,580 Category: Do Not Fund Comments:	$280,980 Category: Do Not Fund	$280,980 Category: Do Not Fund

Project: – 27005 – Increase CREP Enrollment and Enhance Riparian protections in the Grande Ronde and Imnaha Basins

Sponsor: Oregon Watershed Enhancement Board

Short Description:

This project will increase enrollment in the CREP program and improve the program to add permanent protection to the restored riparian areas.

Abbreviated Abstract

This proposal will increase riparian restoration implementation and develop tools for long term protection of restored areas.

Relationship to Other Projects

Not Applicable

Relationship to Existing Goals, Objectives and Strategies

While common recognition of the need to improve riparian areas is found throughout the basin, improvement of existing protection opportunities is needed. The Conservation Reserve Enhancement Program (CREP) is a program developed between the USDA and the state of Oregon. The Oregon Watershed Enhancement Board is a cost share partner in the program with the Farm Service Agency. There are currently approximately 50 CREP contracts in the Wallowa and Union County area. The contracts vary from less than one acre to more than 75 acres. Riparian buffers under the program average 100 feet in width. This project would create a program to add permanent protection to the riparian areas being enrolled for 10 or 15 year contracts. The program could also assist in addressing winter cattle feeding areas in the basin in some instances.

Review Comments

Proposed work would address RPA 153 if it involves CREP. Although the proposal presented a potentially good concept, the proposal was not developed well enough to assess the technical and management merits. The reviewers suggest the project needs to be implemented consistent with limiting factors and problem locations identified in subbasin summaries and eventually subbasin planning to ensure fisheries benefits to target species.

Budget

FY02	FY03	FY04
$170,880 Category: Do Not Fund Comments:	$175,420 Category: Do Not Fund	$175,420 Category: Do Not Fund

Project: – 27006 – Establishing Baseline Key Ecological Functions of Fish and Wildlife for Subbasin Planning

Sponsor: Northwest Habitat Institute and Washington Department of Wildlife

Short Description:

This project will develop key ecological function information and species range maps for 133 resident fish and 474 wildlife species that occur within the Columbia River Basin.

Abbreviated Abstract

As we strive to manage the Columbia River Basin for its sustainable, productive, and diverse ecosystems, we are, in fact, managing these systems to provide an a array of ecological functions upon which these systems are based. These ecological functions avail themselves as an important tool with which to assess our historical and current habitat conditions, as well as proposed future or ideal conditions under differing management scenarios. So what are key ecological functions (KEFs) and which ones are involved? Key ecological functions refer to the major ecological roles played by an organism in its ecosystem that can affect environmental conditions for themselves or other species, or that directly influences other organisms (Marcot and Vander Heyden 2001). Currently, 111 KEFs (Table 1-found at the end of this form) are identified for fish and wildlife species in phase 1 of this project. However, phase 1 only addressed a subset of KEFs (58 of them) that were associated with the lotic systems and 7 - anadromous, 15 - co-occurring resident fish, and 137 - wildlife species that are linked to salmon. Work outlined under this proposal will continue to build the function profiles for each species that was started for the lotic system which means complete the remaining fish and wildlife species (133 and 474 species, respectively) that occur within the Columbia River Basin.

Since the basin has not be systematically surveyed for each fish and wildlife species, baseline conditions for each KEF will be determined by developing a basin-wide species range maps using the following information: wildlife-habitat type associations, county and physiographic occurrences, literature (such as individual state atlases), and expert peer review. This approach will produce a set of species range maps that depict a species potential for occurrence given the current or historic conditions. It is this potential occurrence that will serve as a baseline condition to determine the key ecological functions. The results will offer a framework and a set of baseline assessments that can be done with existing databases. Thus, allowing resource managers the ability to assess future management activities against this norm and guide their activities in prioritizing inventory, monitoring, and mitigation efforts with ecosystem-based management.

When this project is concluded individual fish and wildlife species functional profiles will be completed and this information will be used to construct and assess a functional analysis for each of the 62 subbasins. The analysis will compare functional changes from historic to current conditions across the Columbia River Basin and address community functional patterns, geographic functional patterns, and species functional roles. Products from this effort will include: 1) current distribution maps for fish and wildlife species (including winter range maps for birds); 2) historic distribution maps for native fish and wildlife species; 3) list of KEFs for each anadromous, resident fish, and wildlife species (species functional profiles); 4) KEF assessment of community and geographic functional patterns for each of the 62 subbasins in the Columbia River Basin; and 5) guidance to users on how to utilize KEF analysis as a tool in subbasin assessments, planning, monitoring, and related efforts. Work under this project is an enhancement of related ongoing work that was supported by the CBFWA and Northwest Power Planning Council. Supporting information for this project can be found in Columbia River Basin Fish and Wildlife Program 2000, Vision Statement (p.12) and Scientific Foundation and Principles (p.15); National Marine Fisheries Service 2000 FCRPS Biological Opinion, Reasonable & Prudent Alternatives Summary (from Section 9) Actions 105 and 154; Draft Grande Ronde Subbasin Summary, Statement of Fish and Wildlife Needs "Habitat Restoration – Cooperative efforts (are needed)…. to restore watershed functions… Restoring Columbia River functions may be as important as Grande Ronde habitat (is) to important populations….." (p.159), Planning (p.161). Draft Asotin Creek Subbasin Summary, Combined Aquatic and Terrestrial Needs (p.99); Draft Imnaha Subbasin Summary, Statement of Fish and Wildlife Needs for Planning (p,155); Draft Snake Hells Canyon Subbasin Summary, Combined Aquatic and Terrestrial Needs (p.147), Fisheries/Aquatic Needs – Habitat/Passage (p.148), Wildlife/Terrestrial Needs (p.152). Additionally, most all-federal and state agencies in the Columbia River Basin (like Forest Service, Bureau of Land Management, National Marine Fisheries Service, US Fish and Wildlife Service, Oregon Department of Fish and Wildlife, etc.) have either a mission statement or strategy to address ecosystem-based management (see Congressional Research Service, Report for Congress, Ecosystem Management: Federal Agency Activities, April 19, 1994; ODFW 1994).

Relationship to Other Projects

Project ID	Title	Nature of Relationship
1525	Establishing Baseline Key Ecological Functions of Fish and Wildlife for Subbasin Planning	Phase 1 of this project.

Relationship to Existing Goals, Objectives and Strategies

A key principle that is identified from the Northwest Power Act is that in developing the Columbia River Basin Fish and Wildlife Program, the council must deal with the Columbia River and its tributaries as a system and use the best scientific knowledge available (in 2000 Fish and Wildlife Program, Key Principles, Technical Appendix 2). Further, the draft Scientific Foundation for the Fish and Wildlife Program (NWPPC 2000) lists 8 principles that describe the relationship between species and their ecosystems. Principle 1 states, the abundance, productivity and diversity of organisms are integrally linked to the characteristics. Principle 4 states, habitats develop and are maintained by physical and biological processes. And, Principal 5 states, species play key roles in developing and maintaining ecological conditions. The Council has also elected to address the planning process in a hierarchical manner by defining the various levels of regional planning which are: basin or Columbia River Bio-physical region, Province, sub-basin, 5th order HUC, and site specific areas. Each of these levels of planning varies in amounts of area that are considered. For example, basin level typically addresses 100,000s of square miles, Provinces- 1,000s of square miles, sub-basins, -100s of square miles, 5th HUC – 10s of square miles, and specific sites – 1 to10 square miles. Also, at each level there are different features that are described.

Next, the Northwest Power Planning Council on October 19, 2000 adopted a Program that relies on multi-species sub-basin assessments and planning, including adoption of the Multi-species Framework process. A part of the Framework process is assessing ecological functions. We think this is a valuable tool is because it can begin to give insight into how species functions and what a functioning ecosystem might look like. Also, the method described above can depict how management activities may affect those functions. We believe that there is a regional need for functional assessments and evaluations because of the Council's direction to a) acknowledging the Columbia River Basin as a system and to use the best available science when making a decision(s), b) understanding that biological systems operate on various spatial scales that can be organized hierarchically, and c) adopting the Multi-species Framework process that includes map development and addressing questions at various hierarchical levels, like at the sub-basins or 5th HUC. Our proposal also addresses the coordination aspects of the Northwest Power Planning Council's Fish and Wildlife Program [see section 3.3]. In that, it builds towards a coordinated set of information that is deemed as "essential" for this program.

Work under this project is an enhancement of related ongoing work that was supported by the CBFWA and Northwest Power Planning Council. Supporting information for this project can be found in Columbia River Basin Fish and Wildlife Program 2000, Vision Statement (p.12) and Scientific Foundation and Principles (p.15); National Marine Fisheries Service 2000 FCRPS Biological Opinion, Reasonable & Prudent Alternatives Summary (from Section 9) Actions 105 and 154.

Review Comments

Although the reviewers suggest that the knowledge of species functions in ecosystems is important and has potential management implications, the reviewers question whether the information that would be developed could be used for management purposes. The managers expressed a concern about the lack of coordination. It may be appropriate for the Regional Assessment Advisory Committee to review this proposal.

Budget

FY02	FY03
$153,500 Category: Do Not Fund Comments:	$149,500 Category: Do Not Fund

Project: – 27007 – Assessment of Spring/Summer Chinook Salmon Habitat within the Grande Ronde Subbasin

Sponsor: USDA Forest Service, USDI Bureau of Land Management, US Geological Survey, Utah State University

Short Description:

Evaluate and compare attributes of streams utilized and not utilized by chinook salmon within the subbasin. Evaluated habitat characteristics would describe low gradient stream segments, which foster chinook salmon production.

Abbreviated Abstract

Habitat data will be collected throughout watersheds and subwatersheds within the Grande Ronde Subbasin that are currently both occupied and unoccupied by chinook salmon. These data will be used to establish stream habitat characteristics that sustain chinook populations within the Grand Ronde and the Columbia River Basin. The objective of this project would be a model that discriminates between habitat occupied and unoccupied by chinook salmon at the subwatershed (e.g., within drainages of the Catherine Creek), watersheds (e.g., Catherine Creek vs. Minam Creek watershed), and subbasins (Grande Ronde Subbasin vs. Imnaha Subbasin) scale.

Relationship to Other Projects

Project ID	Title	Nature of Relationship
199800702	Grande Ronde Supplementation	We will use generated data to determine the relationship between habitat and chinook numbers/presence.
198402500	Protect and Enhance Anadromous Fish Habitat in Grande Ronde Streams	We will use generated data to determine the relationship between habitat and chinook numbers/presence.
199202604	Life History of Spring Chinook Salmon and Summer Steelhead	We will use generated data to determine the relationship between habitat and chinook numbers/presence.
199703400	Monitoring Fine Sediment Grande Ronde and John Day Rivers	We will use generated data to determine the relationship between habitat and chinook numbers/presence.
20102	Research / Evaluate Restoration of NE Oregon Streams and	We will use generated data to determine the relationship between habitat and chinook numbers/presence.

Project ID	Title	Nature of Relationship
	Develop Management Guidelines	
20512	Grande Ronde River Basin Umbrella	We will use generated data to determine the relationship between habitat and chinook numbers/presence.

Relationship to Existing Goals, Objectives and Strategies

In 1998 an interagency group representing the Forest Service (FS), Bureau of Land Management (BLM), National Marine Fisheries Service (NMFS), Fish and Wildlife Service (FWS), and Environmental Protection Agency (EPA) began developing a long-term aquatic and riparian effectiveness monitoring program for FS and BLM lands within the Upper Columbia River Basin. The goal is to ensure effectiveness of standards identified in earlier consultation efforts related to land management activities conducted by federal agencies (NMFS 1998). The goal of this effort is to insure FS and BLM land management standards are effective at protecting stream habitats of listed species.

This monitoring project fits within the three overarching objectives from the Basinwide Recovery Strategy (RPA 9.6.2) and the direction for environmental status monitoring, effectiveness monitoring, and quality of regional database sub-sections of RPA 9.6.5.

This is the only basin wide program that uses standardized methods and sampling design to collect aquatic habitat data that evaluates whether mitigation measures effectively protects stream habitat. Information on macroinvertebrates, riparian vegetation, and quantified descriptors of land management activities are collected within each sub-watershed. The program is managed by the Fish and Aquatic Ecology Unit of the Forest Service, has sampled approximately 400 sites throughout the Basin, and will sample 300 sites annually in the future – regardless of additional funding through the BPA.

The current program provides a basin-wide assessment of habitat conditions but does not specifically describe the relationships between habitat conditions and the spawning and rearing success of any specific fish species. This proposal will allow us to describe habitat conditions at the reach, sub-watershed, watershed, and sub-basin scale for streams that are either utilized or not utilized by chinook salmon. Existing information on spawning, survival, growth, and escapement will be combined with the habitat data to determine which habitat conditions result in the highest productivity. The strength of this proposal is that it incorporates existing region-wide habitat assessment procedures with population level information collected by numerous state and federal agencies, tribes, and academia. Results will be relevant to chinook salmon at a variety of spatial scales ranging from the reach to sub-basin, and to a lesser extent will describe habitat conditions for steelhead and bull trout.

The primary significance of this project within the Snake River spring/summer chinook salmon ESU it that it may serve as a canary. Reach scale metrics are not likely to change within the time-scale of interest for the BIOP (5-10 years). In addition, variance associated with l will make it difficult to state with certainty if it exceeds or falls below 1. Stream habitat attributes (especially macroinvertebrates – see Hawkins et al. 2000), however, will give a good indication of the current conditions of riparian and upland environment.

The BIOP hypothesized that current condition of stream habitat is degraded. By collecting the data within this proposal and comparing it to data previously collected in minimally disturbed sites within the subbasin, we can test this hypothesis. To insure proper allocation of resources used in the restoration of chinook salmon populations within this ESU, a test of this hypothesis seems a necessary step.

Collection of this data will also address two needs stated within the Grande Ronde Subbasin Summary (Draft 6/1/01). This subbasin summary acknowledges the need to have consistent monitoring and evaluation efforts. This project will not only ensure consistency in monitoring and evaluation efforts within the Grande Ronde Subbasin but throughout the rest of the Columbia River Basin.

Review Comments

Merged with Mountain Snake Project 28005

Budget

FY02	FY03
$205,000 Category: Comments:	$30,000 Category:

Project: – 27008 – Grande Ronde River Riparian Restoration

Sponsor: Bureau of Land Management

Short Description:

Enhance and restore riparian and native vegetation along the Wallowa and Grande Ronde Rivers to reduce sedimentation and improve riparian and instream habitat. Map of general project area is included under the narrative.

Abbreviated Abstract

The area of focus for this project is BLM managed land along the Wallowa and the lower Grande Ronde Rivers in Wallowa County, Oregon and Asotin County, Washington. Along the Wallowa River, the focus is on the reach from Minam downstream to the confluence with the Grande Ronde River near Rondowa. The focus on the Grande Ronde River is from Rondowa downstream to the confluence with the Snake River.

Since 1993, the Vale District Bureau of Land Management (BLM) has acquired a significant amount of acreage and river frontage along the Wallowa and Grande Ronde River. In addition to the land that was already managed by the BLM, over 7400 acres of acquired land is now managed by the BLM. This additional land also includes approximately 6.1 miles of river frontage along the Wallowa River and approximately 11.3 miles of river frontage along the lower Grande Ronde River. Much of this acreage is old homestead areas with historic grazing and/or agricultural use. The goal of the BLM is to restore these areas, as well as other areas in the vicinity that the BLM manages, with native tree, brush, and grass species. This can be accomplished by eradication of noxious weeds, planting and seeding of native species, and exclusion of livestock grazing in the riparian areas of the rivers and their tributaries. Restoration of the riparian areas will reduce the amount of bare streambanks which are currently contributing sediment to the rivers, provide a source of future large woody debris, and increase shade along the rivers and tributaries. In addition, the BLM would implement a stream restoration project in Little Courtney and Courtney creek, tributaries to the Grande Ronde. Large woody debris placement in Little Courtney creek, and seeding of the riparian areas of Little Courtney and Courtney creek with native grasses and sedges would occur.

Relationship to Other Projects

Project ID	Title	Nature of Relationship
	Grande Ronde Model Watershed Program	BLM participates in coordination meetings with the model watershed and is a partner this year in the Grouse Creek stream restoration.

Relationship to Existing Goals, Objectives and Strategies

Restoring riparian vegetation and controlling noxious weeds along the Wallowa and Grande Ronde rivers and tributaries in the project area will result in beneficial cumulative impacts of decreased sedimentation, increased shade, improved riparian and in-stream habitat, and provide a source of future large woody debris.

This project's goals are related to numerous objectives listed in the Draft Grande Ronde Subbasin Summary under general riparian area management and watershed and habitat restoration. Existing goals, objectives, and strategies outlined in the subbasin summary that are addressed by this project are included under multiple subbasin cooperator headings. Goals, objectives, and strategies listed for federal agencies are many times the same as those listed by state, tribal, and private or non-profit agencies. Examples of objectives and strategies outlined in the subbasin summary that are related to this project include: 1. Enhance riparian condition (vegetation, function) by re-vegetating streambanks and riparian zones, and construction of riparian livestock fencing, 2. Improve in-stream habitat diversity for salmonid spawning and rearing by adding large woody component to mainstem streams and tributaries, and implementing riparian tree planting, 3. Reduce stream sedimentation by revegetating streambanks, 4. Improve upland watershed condition and function by treating and containing noxious weeds, and enhance vegetative cover by seeding (GRSS, 2001).

This project also addresses some water quality problems that have been identified by the State of Oregon. As stated above, both the Wallowa river and the Grande Ronde river are listed on Oregon's 1998 303 (d) List of Water Quality Limited Water Bodies (DEQ, 1998). The project proposal and design of establishing riparian vegetation will decrease sediment from streambanks over what is currently occurring, as well as increase shade and prevent increases in the width/depth ratio of the streams, which can lead to loss of pool habitat. Conifer planting will help provide for future large woody debris. Treatment of noxious weeds will help to re-establish native vegetation in the riparian areas as well as uplands. While these treatments may not cause the rivers to be removed from the 303(d) list, they should provide for beneficial cumulative impacts of increasing shade, reducing sedimentation, increasing large woody debris, and improving instream and riparian habitat; all of which are reasons that the Wallowa and Grande Ronde rivers are currently listed as water quality limited (DEQ, 1998).

The objectives and strategies of this project also correspond to those listed in the Wallowa County – Nez Perce Tribe plan (Wallowa County, 1999). For the Grande Ronde River, one of the plan goals is to provide riparian shading by planting new shrubs and trees, as well as protecting existing shade to deal with stream temperature concerns. Fencing of riparian areas is one strategy listed to deal with the sediment concern, which is a high priority in the plan (Wallowa County, 1999). Also listed as strategies for dealing with identified problems are: 1) adding and preserving large woody debris; 2) establish a good riparian plant community to provide a source of future large woody debris; and 3) plant/protect conifers in riparian areas to keep thermal cover in winter and plant deciduous trees and shrubs to provide habitat diversity (Wallowa County, 1999).

Review Comments

Although an M&E plan was absent from the proposal, the sponsor indicated that efforts would be undertaken to develop such a plan following the completion of NEPA activities. Reviewers suggest the work, which will occur entirely on BLM property, would not provide benefits in the mainstem; however, significant results could be realized in Courtney Creek. Reviewers suggest that this work could be implemented/coordinated through Project 199202601. The NMFS indicated that they would like to see an attempt to evaluate the effectiveness of these activities relative to the abundance/status of fish populations. This project may address RPA 400.

Budget

FY02	FY03	FY04
$307,730 Category: Recommended Action Comments:	$242,645 Category: Recommended Action	$217,645 Category: Recommended Action

Project: – 27011 – Lookingglass Creek Land Purchase for Watershed Protection (spawning and rearing habitat continuity and water quality at Lookingglass Hatchery)

Sponsor: Confederated Tribes of the Umatilla Indian Reservation

Short Description:

Protect 2.5 miles of stream and riparian areas in Lookingglass Creek to improve water quality and provide continuity of spawning and rearing areas for spring chinook, summer steelhead, and bulltrout.

Abbreviated Abstract

The Lookingglass Creek subbasin is one of the most pristine non-wilderness areas in the Grande Ronde River Basin. There are federally listed natural populations of bulltrout and summer steelhead that occur in Lookingglass Creek as well as a hatchery that is the production hub for four stocks of listed spring chinook salmon from the upper Grande Ronde, Lostine, and Imnaha rivers and Catherine Creek. Lookingglass Creek had a large endemic population of spring chinook salmon that was extirpated with the construction of Lookingglass Hatchery.

The largest portion of ownership of the stream portion of the watershed is the United States Forest Service (USFS)(upper basin) and Boise Cascade Corporation (BC)(lower basin)(Figure 1). There is approximately 2.5 miles of the stream that is in private ownership (Figure 1). This area is one mile above the hatchery and contains a large portion of the spawning and rearing habitat on the stream (Burck 1993). Past land use practices on this parcel of land have lead to high silt loads at the hatchery, logging of the hillsides, heavy grazing, and limited access for fish population surveys. There are also spring-fed ponds on the property that contain brook trout the landowner is unwilling to eradicate at the request of the Oregon Department of Fish and Wildlife (ODFW).

Because this area is above the hatchery, which uses a large portion of the creek for production, co-managers agree the area needs to be protected due to the listed stocks held in the hatchery. Continuity of land ownership in the basin would be a positive aspect of the land acquisition. Currently the USFS and BC are cooperators in basin management as well as another small landowner directly above the proposed acquisition area. Continuity of ownership would allow for complete monitoring of steelhead and bulltrout populations and the eventual endemic stock of spring chinook salmon being developed as well as improvement and protection of the habitat present in this area. This project would be implemented as more of a hands-off management strategy, as most of the habitat on the property needs to be protected rather than restored. There will probably be some areas in the property that may need some help getting started.

Relationship to Other Projects

Project ID	Title	Nature of Relationship
198805301	Northeast Oregon Hatchery Master Plan – NPT	Lookingglass Creek is the water supply for Lookingglass Hatchery, the only spring chinook production facility in NE Oregon, which houses threatened spring chinook stocks (Lostine River, Catherine Creek, and Upper Grande Ronde River).
199800704	Northeast Oregon hatchery Master Plan – PDFW	Lookingglass Creek is the water supply for Lookingglass Hatchery, the only spring chinook production facility in NE Oregon, which houses threatened spring chinook stocks (Lostine River, Catherine Creek, and Upper Grande Ronde River).
199801001	Grande Ronde Basin Spring Chinook Captive Broodstock program – ODFW	Lookingglass Creek is the water supply for Lookingglass Hatchery, the only spring chinook production facility in NE Oregon, which houses threatened spring chinook stocks (Lostine River, Catherine Creek, and Upper Grande Ronde River).
199703800	Captive Broodstock Artificial propagation – NPT	Lookingglass Creek is the water supply for Lookingglass Hatchery, the only spring chinook production facility in NE Oregon, which houses threatened spring chinook stocks (Lostine River, Catherine Creek, and Upper Grande Ronde River).
199800701	Grande Ronde Supplementation – CTUIR	Lookingglass Creek is the water supply for Lookingglass Hatchery, the only spring chinook production facility in NE Oregon, which houses threatened spring chinook stocks (Lostine River, Catherine Creek, and Upper Grande Ronde River).
199800702	Grande Ronde Supplementation –O&M / M&E - NPT	Lookingglass Creek is the water supply for Lookingglass Hatchery, the only spring chinook production facility in NE Oregon, which houses threatened spring chinook stocks (Lostine River, Catherine Creek, and Upper Grande Ronde River).

Project ID	Title	Nature of Relationship
199405400	Bull Trout Life History, Genetics, Habitat Needs, and Limiting Factors in Central and Northeast Oregon	Protects habitat needed for the recovery of bull trout in the Grande Ronde River basin, also allows for the monitoring of the fish throughout their habitat range in Lookingglass Creek.

Relationship to Existing Goals, Objectives and Strategies

The Lookingglass Creek watershed needs to be protected because it is one of the last pristine non-wilderness watersheds in the Grande Ronde River basin. Lookingglass Creek also contains vital spawning and rearing habitat for threatened salmon, steelhead, and bulltrout that needs to be preserved in the Grande Ronde River basin. Another important reason for watershed protection on Lookingglass Creek is the fact that it is the site of the only spring chinook conservation hatchery in the Grande Ronde River basin and because the hatchery does not have an adequate well, it gets most of its water supply from the creek.

The goals and objectives within the Grande Ronde Basin Summary state that "Many of the natural resources of the Grande Ronde subbasin are managed for the benefit of the people of the entire Nation by way of the large amount of federal land. The overall goal for the Grande Ronde subbasin is to restore the health and function of the ecosystem to ensure continued viability of these important populations."

The 2000 Fish and Wildlife program states recommendations regarding habitat objectives and funding sources:

- Build from Strength
- Efforts to improve the status of fish and wildlife populations in the basin should protect habitat that supports existing populations that are relatively healthy and productive.
- Next, we should expand adjacent habitats that have been historically productive or have a likelihood of sustaining healthy populations by reconnecting or improving habitat. In a similar manner, this strategy applies to the restoration of weak stocks: the restoration should focus first on the habitat where portions of that population are doing relatively well, and then extend to adjacent habitats.

The National Marine Fisheries Service and Federal Caucus state that, in the Grande Ronde subbasin, the goal is to achieve the recovery of the salmon resource. This requires the development of watershed-wide properly functioning habitat conditions and a population level that is viable according to standards and criteria identified by NMFS in two key documents [Matrix of Pathways and Indicators (1996); Viable Salmonid Populations (2000)]. The habitat goals of the same agency state that the existence of high quality habitats that are protected, degraded habitats that are restored and connected to other functioning habitats, and a system where further degradation of tributary and estuary habitat and water quality is prevented.

Strategy 2. BPA funds protection of currently productive non-federal habitat, especially if at risk of being degraded.

The US Fish and Wildlife Service goals as stated in the subbasin summary are to protect, restore, and enhance native anadromous and resident fish populations in the Grande Ronde River Basin.

Objective 1. Reverse declining trends of bull trout populations in the Grande Ronde River basin.

Strategy 1.1. Monitor population size and trends.

Strategy 1.2. Determine bull trout distribution in the Grande Ronde River basin.

Strategy 1.3. Identify and implement habitat improvement projects.

Strategy 1.4. Eradicate and control non-native char populations in the Grande Ronde River Basin.

The Nez Perce Tribe goals in the subbasin summary for habitat include reducing stream sedimentation.

Strategy 4.4. Determine the source of the problem (e.g., land use, changed hydrograph) and correct if possible.

The CTUIR goals for the Grande Ronde basin as stated in the subbasin summary include:

Strategy 2. Protect, enhance or restore water quality to improve the survival, abundance and distribution of indigenous resident and anadromous fish.

Strategy 3. Protect, enhance and restore instream and riparian habitat to improve the survival, abundance and distribution of indigenous resident and anadromous fish.

Strategy 4. Protect, enhance and restore instream flows to improve passage conditions and increase rearing habitat for anadromous and resident fishes.

ODFW steelhead plan objectives in the subbasin summary include:

Objective 1. Protect and restore spawning and rearing habitat.

Lookingglass Creek is listed on the 303d for habitat modification, water temps, and sedimentation. Rational for listing includes Snake R Chinook are listed under ESA, Summer Steelhead are a stock of concern. High width:depth ratio and lack of large woody debris have been identified as below desired feature conditions (Upper/Middle GR River Basin Assessment, Bach, 1995). GR Action Plan (1994); Upper/Middle GR River Basin Assessment (DEQ, 1995); NPS Assessment - segment 337: moderate, observation (DEQ, 1988) USFS Data - Bull Trout Habitat; NPS Assessment - segment 337: moderate, observation (DEQ, 1988) USFS Data (5 Sites): 7 day moving average of daily maximums above Eagle Creek for 1992/93/94/95/96 were 53.8/51/52/53/52; at Forest Service Boundary for 1992/93/94/95/96 was 55.4/54.4/56.3/56/56°F Exceeded Bull Trout temperature standard (50) below Luger Springs to mouth.

The main emphasis for all of these agencies cooperating in the Grande Ronde River basin is to protect and enhance salmonid water and habitat. Lookingglass Creek unlike other subbasins is currently home to 4 stocks of listed spring chinook salmon where water quality is very important for the rearing of these fish before release back into their natal waters. Adult returns of up to 125 summer steelhead have been enumerated on Lookingglass Creek from 1964- 1974, and from 1997 to 2001 (McLean and Lofy 2001

(Draft)). Lookingglass Creek also has a large population of fluvial bulltrout that return to the subbasin year to year based on PIT tag interrogations at the hatchery trap.

Review Comments

This project is consistent with RPAs 150 and 400. This proposal will allow for the protection and enhancement of property that is contributing sediment to the system which is inhabited by bull trout, steelhead and chinook. Based on their experience with the land owner, the sponsors indicate that if the property is not purchased by a fish and wildlife manager the property will be available for purchase by others. The existing conditions have resulted in a 303d listing. The reviewers expressed concern because sponsors did not indicate intentions relative to habitat rehabilitation and that there has been a lack of coordination with local managers. The Wildlife Committee rated the project as having significant wildlife benefits using the criteria of permanence, size, connectivity to other habitat, and juxtaposition to public lands.

Budget

FY02	FY03	FY04
$2,263,400 Category: High Priority Comments:	$5,500 Category: High Priority	$5,500 Category: High Priority

Project: – 27012 – Restore and Enhance Grande Ronde Valley Deciduous Riparian Habitat

Sponsor: Oregon Department of Fish and Wildlife

Short Description:

Protect, restore and enhance deciduous riparian habitat adjacent to the Grande Ronde River and its tributaries in the Grande Ronde Valley

Abbreviated Abstract

Protection and enhancement of deciduous riparian vegetation would be accomplished through cooperative partnerships with land-owning entities adjacent to the Grande Ronde River and tributaries in the Grande Ronde valley. Long-term easements and/or cooperative agreements would be negotiated to secure priority river reaches. Active restoration would include riparian fencing, vegetation plantings, and re-connecting existing oxbows with the active river channel. Emphasis would be placed on maintaining or improving habitat for neo-tropical migrant and resident passerine birds, other wildlife species that use riparian habitats, and over-wintering juvenile Snake River Spring/Summer Chinook salmon and Snake River Steelhead.

Relationship to Other Projects

Project ID	Title	Nature of Relationship
	NMFS Biological Opinion RPA Action #150	Proposed project would protect important Spring Chinook winter habitat.
	NMFS Biological Opinion RPA Action #153	Proposed project would achieve BPA/NMFS goal of protecting riparian buffers in agricultural areas.

Project ID	Title	Nature of Relationship
198402500	Grande Ronde Basin Fish Habitat Enhancement	Proposed project would compliment this project; emphasis on low elevation, riparian, deciduous habitat in the Grande Ronde Valley.
199202604	Investigate Life History of Spring Chinook and Summer Steelhead in the Grande Ronde Basin	Proposed project will utilize findings from this project to protect and enhance riparian habitat in river reaches utilized as winter habitat by Snake River Spring/Summer Chinook Salmon and Snake River Steelhead.
	Status Review of Wildlife Mitigation at Columbia Basin Hydroelectric Projects, Col. Mainstem and Lower Snake Facilities (BPA 1984)	Reviewed past, present and proposed future wildlife planning and mitigation programs at BPA's hydrofacilities. Called for quantitative and qualitative assessment of wildlife losses attributable to the dams and implementation of mitigation plans.
	Special Report: Lower Snake River Fish and Wildlife Compensation; Wildlife Habitat Compensation Evaluation for the Lower Snake River Project (ACOE 1991)	Quantified and described wildlife habitat conditions pre- and post-hydroproject construction/inundation, evaluated contribution of Habitat Mgmt. Units to current conditions, defined compensation goals in terms of habitat.
199208400	Oregon Trust Agreement PlanningProject (BPA 1993)	A mitigation planning tool that includes methods for assembling a trust agreement and a list of potential mitigation projects. The Grande Ronde River Valley was identified as a priority site.
199506500	Assessing Oregon Trust Agreement Planning Project using Gap Analysis (ODFW 1997)	A mitigation planning tool used to analyze and rank potential mitigation projects within the basin. The Grande Ronde River Valley was identified as a priority site.
199705900	Securing Wildlife Mitigation Sites – Oregon	Programmatic project; explains overall intent for mitigation planning, coordination and implementation by Oregon wildlife managers within Oregon.
200002100	Securing Wildlife Mitigation Sites – Oregon, Ladd Marsh Wildlife Area Additions	On-going project within the Grande Ronde subbasin that will be complemented by the proposed project's intent to protect and restore riparian habitats.

Relationship to Existing Goals, Objectives and Strategies

The project is needed to reverse the current trend of fragmentation and direct loss of riparian vegetation along the mainstem Grande Ronde River and tributaries in the Grande Ronde Valley. The proposed actions would benefit neo-tropical migrant and resident passerine bird populations and populations of over-wintering juvenile Snake River Spring/Summer Chinook salmon and Snake River Steelhead.

Grande Ronde Subbasin Summary

Goals and Objectives

The proposed project is consistent with the overall goal for the Grande Ronde subbasin of restoring the health and function of the ecosystem to ensure continued viability of these important populations (Nowak 2001). General goals that this project will help achieve include:

- Protect high quality aquatic, riparian and upland habitats
- Restore degraded aquatic, riparian and upland habitats and connect to other functioning habitats
- Prevent further habitat degradation
- Protect, restore, and enhance native anadromous and resident fish and wildlife populations
- Restore, maintain and enhance the quality of Oregon's air, water and land.
- Increase the information needed to protect, restore and manage fish and wildlife and their habitats
- Provide and protect outstanding natural, scenic, cultural, historic, and recreational sites for the enjoyment and education of present and future generations.

The proposal will help fulfill many of the more specific goals and objectives of the various federal, state, tribal, county and other local resource management entities within the subbasin and meet all of the objectives for riparian communities (see page 170).

<u>Fish and Wildlife Needs</u>
The proposed project addresses many of the fish and wildlife needs identified in the Grande Ronde Subbasin Summary (Nowak 2001) including:

Aquatic - Habitat Enhancement

1. Implement restoration efforts designed to achieve the site potential shade and other temperature surrogates identified in the appropriate TMDLs for the subbasin.
2. Using existing assessments, seek out opportunities for cooperative habitat restoration and enhancement projects on public and private land.
3. Restore, protect, and create riparian, wetland, and floodplain areas within the subbasin and establish connectivity.
4. Restore in-stream habitat to natural conditions and protect as much as possible to provide suitable holding, spawning, and rearing areas for anadromous and resident fish.
5. Reduce stream temperature, sediment and embeddedness levels to levels meeting appropriate state standards.
6. Restore and augment streamflows at critical times using (but not limited to) water right leases, transfers, or purchases, and improved irrigation efficiency.
7. Reduce stream temperatures where appropriate and when feasible.
8. Reduce sediment, fertilizer and pesticide loading from agricultural practices.
9. Reduce the impacts of confined animals with regard to waste and sediment production.
10. Acquire water rights when opportunities arise to help restore more natural flows to streams within the subbasin

Wildlife /Terrestrial Needs - Habitat Diversity

1. Acquire lands with high priority habitat components (e.g., aspen stands) when opportunities arise for improved habitat protection, restoration, and connectivity and for mitigation of lost wildlife habitat (land purchases, land trusts, conservation easements, landowner cooperative agreements, exchanges).
2. Assist landowners with management of land holdings and easements for restoration and enhancement of wildlife habitat.
3. Mitigate hydropower impacts on loss of wildlife and wildlife habitat and indirect impacts within the subbasin, based on species-specific habitat units.

Riparian Communities

1. Acquire lands when opportunities arise for improved habitat protection, restoration, and connectivity for riparian communities and for mitigation of lost wildlife habitat for riparian associated species (land purchases, land trusts, conservation easements, landowner cooperative agreements, exchanges).
2. Protect, restore, and create wetland and riparian habitat, especially in lower elevation riparian areas.
3. Participate in cooperative stewardship programs to foster riparian community protection.
4. Strive to achieve site potential shade targets identified in TMDLs.

Noxious Weeds

1. Monitor spread of noxious weeds and evaluate effectiveness of noxious weed control programs.
2. Develop and use restoration techniques for noxious weed infested communities.
3. Continue control programs for noxious weeds to restore natural habitat conditions and communities for wildlife species.
4. Implement and (where applicable) continue Integrated Pest Management programs to limit the spread of noxious weeds.

<u>NWPPC 2000 FWP</u>

The proposed project meets objectives for riparian habitat protection and enhancement outlined in the 2000 Fish and Wildlife Program. The project would directly mitigate for the losses identified in the NWPPC's FWP (NWPPC 2000) resulting from the construction/ inundation and operation of the Federal Columbia River Hydropower System. Specifically, the project will replace riparian/riverine habitats that were lost and will provide wildlife mitigation credits (Habitat Units) for song sparrow, yellow warbler, California quail, ring-necked pheasant, and Canada goose.

<u>ODFW Diversity Plan</u>

The project proposal also meets objectives and strategies of the Oregon Wildlife Diversity Plan (ODFW1993) regarding preservation, restoration and enhancement of habitat needed to maintain the diversity of wildlife in Oregon.

<u>NMFS Biological Opinion</u>

The proposed project addresses the following NMFS (2000) Reasonable and Prudent Alternatives (RPAs):

- Action 150 – This project would protect currently productive non-Federal habitat through conservation easement in a subbasin with listed salmon and steelhead. The Grande Ronde River and many of its tributaries support Snake River Spring/Summer Chinook salmon, Snake River steelhead, and bull trout.
- Action 153 – This project would result in the permanent and long-term protection of riparian buffers in the Grande Ronde subbasin. Many of these riparian buffers would occur in agricultural areas. Opportunities to coordinate with agricultural incentive programs will be pursued.

Significance to other Regional Programs, Assessments and Planning Efforts
The proposed project is consistent with the findings and recommendations of many watershed assessments and projects described in the Grande Ronde Subbasin Summary.

Review Comments

This project addresses RPAs 150 and 400. Reviewers questioned why the proposed work was not added to Project 198402500. By combining the proposed work with Project 198402500, a potential cost savings could be realized. The reviewers suggest that the proposal does not illustrate coordination with other entities and other on-going work. In addition, NMFS questions how the restoration efforts will affect the status of fish populations. The reviewers suggest the sponsors consider alternative funding options (e.g., OWEB and the Grand Ronde Model Watershed Program). The Wildlife Committee rated the project as having significant wildlife benefits using the criteria of permanence, size, connectivity to other habitat, and juxtaposition to public lands.

Budget

FY02	FY03	FY04
$156,000 Category: Recommended Action Comments:	$167,000 Category: Recommended Action	$228,000 Category: Recommended Action

Project: – 27013 – Grande Ronde River Stream Restoration – La Grande, Oregon

Sponsor: Union County and Union Soil and Water Conservation District

Short Description:

Improve fish passage and habitat through the replacement of the headgate structure, establish rock cross vane structures, rock weirs, fill and stabilize scour pool improving habitat, stream bank stabilization and large woody debris placement.

Abbreviated Abstract

The Grande Ronde River Restoration, La Grande, Oregon Project proposes to develop stream improvements for a 4,700 foot reach of the river beginning at Spruce Street Bridge just north of the city limits of La Grande and extending downstream. The project is divided into two sections including headcut stabilization/fish passage improvements and a downstream section including channel and bank restoration and stabilization improvements.

The U.S. Army Corp of Engineers and local sponsors (Union Soil & Water Conservation District & Union County) have completed a Feasibility Study, Environmental Restoration Report/Environmental Assessment, and will complete a Design and Specifications document within the next two months for the proposed project.

Proposed stream restoration features include nontraditional stream stabilization features such as large rock weirs, rock cross-vane weirs, J-hook structures, rock-vane structures, bank protection revetment and native plantings.

The headcut stabilization and fish passage structures will include 12 large rock weirs and an upstream buried concrete structure including concrete irrigation intake channel and stop-log irrigation diversion flow control. The downstream restoration features will include channel grade control features such as rock cross-vane weirs and bank stabilization treatments including J-hook structures, rock vanes, bank protection units, bank shaping and native plantings.

The proposed project is planned for the summer 2002 construction season and would be 75% funded through the Section 1135-1986 Water Resources Development Act implemented by the U.S. Army Corp of Engineers. The proposed project funding represents the local sponsors 25% obligation under the Section 1135 requirements.

Relationship to Other Projects

Project ID	Title	Nature of Relationship
	Phase II – Grande Ronde River Restoration	Next mile downstream to Island City, Oregon Highway 82 bridge.
9732	Nestle Ditch Irrigation Reorganization Project	Located directly upstream from Grande Ronde River Restoration Project. Project created an infiltration gallery.
9656	Nestle Ditch Erosion Control Project	Located upstream from Grande Ronde River Restoration Project.
9778	Grande Ronde River Gooderham / Rynearson Improvement Project	Located upstream from Grande Ronde River Restoration Project. Project instituted streambank protection measures.
	RPA 149	The proposed project will construct headgate diversion facility for the Grande Ronde Ditch and May Park Ditch Companies (one diversion), improve fish passage at the diversion, maintain ditch screening and has been coordinated with NMFS, FWS and ODFW.
	RPA 150	The headcut at Spruce Street bridge (upstream project start point) is at risk because the rubble diversion is subject to failure during high flows and would result in headward channel degredation causing salmon and steelhead migration and habitat impacts.

Relationship to Existing Goals, Objectives and Strategies

The Grande Ronde River Restoration, La Grande, Oregon Project proposes to develop stream improvements for a 4,700 foot reach of the river beginning at Spruce Street Bridge just north of the city limits of La Grande and extending downstream. The project is divided into two sections including headcut stabilization/fish passage improvements and a downstream section including channel and bank restoration and stabilization improvements. The project proposes to:

1. Increase and improve pool frequency, fish passage, channel complexity, bank and headcut stability and channel grade through the establishment of cross veins, channel weirs, J hooks and root wads.
2. Improve riparian habitat, stream shade, aesthetics and decrease erosion through the establishment of native riparian plantings.

Goals specifically applying to this project can be found in the subbasin summary under the following: Oregon Department of Fish and Wildlife's "Steelhead Plan" and "Other General Habitat Goals, Objectives and Strategies that might be applicable"; Grande Ronde Mode Watershed's objectives 2, 3, 4, 7 and 8; Union Soil and Water Conservation District's objective 1 and 2.

Review Comments

The proposed work will allow for the stabilization of a stream bed that will subsequently prevent a bridge from collapsing. The reviewers expressed a concern that there was no mention of arrangements with the landowners to allow for continued protection. The managers suggest the proposed work, which is not designed as a fish and wildlife project, would not remedy the problems of the cause. The trajectory of the fish population would not benefit from the project. This project addresses RPAs 400 and 500.

Budget

FY02	FY03	FY04
$816,080 Category: Recommended Action Comments:	$5,000 Category: Recommended Action	$20,000 Category: Recommended Action

Project: – 27018 – Oregon Plan Blue Mountain Province Fish Screening/Fish Passage

Sponsor: Oregon Department of Fish and Wildlife

Short Description:

Protect all species of fish by replacing 6 screening systems that do not meet the NMFS design criteria.

Abbreviated Abstract

The project provides immediate and long-term protection for anadromous and resident fish species in the Grande Ronde River Watershed Basin by replacing fish screening systems that do not meet the NMFS criteria. These outdated facilities can be an important source of fish loss, especially at the fry and sub-yearling life stages. This project follows the previous Columbia Basin Fish and Wildlife Program (FWP) Measure 7.10-Provide Passage and Protective Screens on Tributaries, particularly measures 7.10A, a.2 and a.3, which mandated:

- screening and passage criteria based on NMFS standards;
- the use of existing expertise of federal, state and private entities to accelerate implementation of fish screening and passage measures;
- the maintenance of prioritized list of tributary screening and passage facility improvements – which will include both the construction of new facilities, upgrading, and maintenance of existing screen systems.

Additionally, this project directly conforms to the near-term objectives outlined in NMFS' Basinwide Salmon Recovery Strategy (see Grande Ronde Subbasin Summary), specifically to Objective #2, "screen diversions, combine diversions and rescreen existing diversions to comply with NMFS criteria to reduce overall mortality."

The expected outcome over the next year will be ongoing construction and installation to replace existing out of date screen systems remaining in the basins.

Relationship to Other Projects

Project ID	Title	Nature of Relationship
	The Grande Ronde River Watershed Fish Screening / Passage Program	Maintenance and operation of Grande Ronde Basin screens and fishways funded by NMFS through the Mitchell Act.
198909600	Monitor and Evaluate Genetic Characteristics of Supplemented Salmon and Steelhead	Monitoring of salmon and steelhead populations in the vicinity of fish screens to be installed under this program.
199606700	Manchester Spring Chinook Broodstock Project	Production of smolts through the Grande Ronde Basin spring chinook supplementation program to be released in the vicinity of screens installed under this program.
199703800	Preserve Listed Salmonids Stocks Gametes	Assist production under the Grande Ronde spring chinook supplemenation project for release in the vicinity of screens installed under this program.
199800702	Grande Ronde Supplementation O&M / M&E	Monitoring associated with the Grande Ronde spring chinook supplementation project in which releases will occur in the vicinity of screens installed under this program.
199800703	Facility O&M and Program M&E for Grande Ronde Spring Chinook Salmon	Funding for hatchery production of endemic spring chinook, which will be released in the vicinity of screens installed under this program.
198805301	Northeast Oregon Hatchery Master Plan	Planning for new and upgraded spring chinook hatchery facilities supporting releases made in the vicinity of screens installed under this program.
198805305	Northeast Oregon Hatcheries Planning and Implementation	Planning for new and upgraded spring chinook hatchery facilities supporting releases made in the vicinity of screens installed under this program.
199801001	Grande Ronde Basin Spring Chinook Captive Broodstock	Funding for hatchery production of endemic spring chinook, which will be released in the vicinity of screens installed under this program.
199202604	Life History of Spring Chinook Salmon and Summer Steelhead	Monitoring of spring chinook populations in vicinity of screens installed under this program.
198402500	Protect and Enhance Anadromous Fish Habitat in Grande Ronde Basin Streams	Implementation and maintenance of projects to improve habitat for spring chinook in the vicinity of screens installed under this program.
199202601	Grande Ronde Model Watershed Program	Implementation and maintenance of projects to improve habitat for spring chinook in the vicinity of screens installed under this program.
199608300	Grande Ronde Basin Watershed Restoration	Implementation and maintenance of projects to improve habitat for spring chinook in the vicinity of screens installed under this program.

Relationship to Existing Goals, Objectives and Strategies

The completion of these projects would result in the replacement of outdated fish screening devices with more efficient ones. The new screening devices meet current NMFS design criteria for the protection of all fish at all stages of their life cycle. The mission of the fish passage program in Northeast Oregon is to protect and enhance fish populations by assisting private landowners, public landowners, irrigation districts, and others to maintain fishways and fish screening devices. These systems reduce and help eliminate fish losses associated with irrigation withdrawals and as a result ensure fish populations are maintained for the enjoyment by present and future generations. Assistance is provided through state and federally funded programs and can range from simple technical advice to complete construction and maintenance of facilities.

Screen replacements on Bear Creek and Ladd Creek (Grande Ronde River Basin) will protect several fish species listed as threatened under the Federal Endangered Species Act. Spring chinook salmon were listed in 1992, while summer steelhead and bull trout were listed in 1997 and 1998, respectively. Spring chinook salmon; summer steelhead and bull trout are all present in Bear Creek. Ladd Creek contains summer steelhead, and may provide winter rearing habitat for bull trout and juvenile spring chinook in the lower reaches of the creek.

Replacing fish screens on Bear Creek and Ladd Creek will increase the survival rate of juvenile chinook salmon and steelhead. This will result in greater numbers of smolts migrating throughout the mainstem Snake and Columbia rivers. If these fish are protected as they migrate throughout the mainstem Snake and Columbia rivers, greater numbers of adult salmon and steelhead will return to the Grande Ronde River basin.

Replacing fish screens on Bear Creek and Ladd Creek could also increase the survival rate of both juvenile and adult bull trout. Bull trout migrate extensively within the Grande Ronde River Basin, and are susceptible to irrigation diversions at all life stages. Protecting these fish should result in increased bull trout populations.

In the Grande Ronde/Imnaha watersheds, ODFW, The Grande Ronde Watershed Council, and other private, state, and federal entities have aggressively implemented riparian recovery projects. These projects have improved vegetation, improved stream bank stability, instream habitat diversity, and better water quality and quantity. These habitat improvements have increased salmonid natural production. All of the proposed fish screen implementation projects are located in the same priority location as these improved habitat projects. It is essential to the survival of the salmonids to provide protection from irrigation diversions for these fish during migration and while inhabiting their spawning and rearing areas.

The Enterprise Fish Screening/Fish Passage Program operates and maintains 152 fish screening devices screening a total of 3,000 + cfs and provides maintenance on 21 fishways. This program includes 4 permanent and 6 seasonal positions stationed at program facilities located in Enterprise.

Review Comments

This project addresses RPA 149. The NMFS identified a lack of biological monitoring..

Budget
FY02
$153,314 Category: High Priority Comments:

Project: – 27019 – Adult Salmon Abundance Monitoring

Sponsor: Nez Perce Tribe and Pacific Northwest National Laboratory

Short Description:

Implement state-of-the-art technologies to accurately quantify chinook salmon spawner abundance in the Minam River. Adult abundance data would allow a measure of recovery threshold abundance of a listed species (NMFS 2000).

Abbreviated Abstract

The National Marine Fisheries Service in its 2000 Biological Opinion recommended population metrics for measuring the recovery of specific stocks of listed salmon in the Columbia River Basin. The recent Biological Opinion establishes a recovery abundance level based on adult returns for these index streams. Therefore, the Opinion makes clear the need for adult abundance monitoring. The Minam River spring chinook salmon population is the only Grande Ronde Subbasin stock listed as an index population in the Biological Opinion.

The ability to measure abundance is the basis for assessing whether listed chinook salmon meet recovery thresholds and are a candidate for delisting under the ESA. However, quantitative abundance data for many listed Snake River ESU's are sparse. Standard methods for estimating escapement such as spawning ground surveys provide an index of relative abundance only, and afford no direct quantitative measure of spawner abundance. Expansion of redd counts to spawner numbers are also influenced by the uncertainty of assumptions regarding estimates of fish per redd, relative numbers in surveyed and non surveyed areas, redd superimposition and pre-spawning mortality rates. Permanent and temporary weirs are vulnerable to high flow and debris loads. Enumeration at a weir and trap facility requires the capture and handling of the fish. Prudent research dictates that passive, non-invasive methodologies be used to determine the abundance of populations facing extirpation.

The Nez Perce Tribe proposes to use new and existing technologies that will provide accurate adult abundance information for the Minam River spring chinook salmon population. We will enlist the design and engineering expertise of the Battelle Northwest National Laboratory. Battelle has experience implementing hydroacoustic monitoring systems, Vaki fish and resistivity counters. Data from these technologies are measurable, quantifiable and have a demonstrated record of accuracy.

Relationship to Other Projects

Project ID	Title	Nature of Relationship
199202604	Life History of Spring Chinook Salmon and Steelhead (ODFW)	Links adult abundance with juvenile emigrant abundance in the Minam River.
198805301	Northeast Oregon Hatcheries	Will be integrated with the activities of project 198805301.
198712700	Grande Ronde Smolt Monitoring	Links adult abundance with juvenile emigrant abundance in the Minam River.
19970300	Chinook Salmon Abundance Monitoring	Determines adult abundance for another ESU.

Relationship to Existing Goals, Objectives and Strategies

Accurate counts of returning adults to natal spawning ground are necessary to evaluate recovery efforts related to the matrix threshold goals set by NMFS (NMFS 2000). The Nez Perce Tribe proposes to use technologies that will provide accurate adult abundance information for the Minam River spring chinook salmon population. Data from these technologies are measurable, quantifiable and have a demonstrated record of accuracy.

Many of the goals, objectives, needs, strategies and action items detailed in the Grande Ronde Subbasin Summary (Nowak et al. 2001) are also addressed by the Anadromous Adult Abundance Monitoring Project. Monitoring and research needs outlined in the Summary that relate specifically to spring chinook populations in the basin are as follows:

Monitoring need in general -
Monitoring the status of high priority populations (Minam spring chinook) is important to understanding recovery status and focusing recovery priorities and efforts. Therefore, in some cases, current efforts should be expanded to meet emerging information needs.

Specific monitoring needs -
1. Determine smolt-to-adult survival, spawning escapement and life history characteristics of natural spawning populations.
2. Determine migration characteristics and calculate the number of returns per spawner.
3. Examine population trends and develop monitoring “tools” to determine stray rates and impacts of hatchery fish to chinook populations in the Minam River.
4. Determine movement patterns of spring chinook salmon within the Grande Ronde Subbasin including assessment of adult holding areas.
5. Gather improved population status information for chinook salmon including adult spawner abundance, spawner to spawner ratios, spawner distribution and timing.

The Summary presents strategies and action items needed to meet the above needs. The table below lists the proposed abundance monitoring objectives and tasks associated with the strategies and actions identified in the Grande Ronde Subbasin Summary (Nowak et al. 2001) and specific to spring chinook salmon.

Grande Ronde Subbasin Summary Strategy and Action Items	Associated Adult Abundance Monitoring Objectives and Tasks
Strategy 2 Implement monitoring and evaluation to assess health, status and productivity of natural populations. *Action 2.4 Monitor run size and develop run size estimate models based on previous years escapement, spawning ground information and other available data.* *Action 2.5 Evaluate ability to estimate escapement and straying and to characterize the spawning populations in the system.* *Action 2.6 Determine progeny:parent ratios (productivity) based on spawner and recruit information.* *Action 1.13 Coordinate ESA permit activities and participate in program planning and oversight.* *Action 1.14 Summarize data and prepare and submit annual reports*	Objective 3, task 3.4-9 Objective 2, task 2.1-2 Objective 3, task 1.4-9 Objective 1, task 1-5 Objective 1.5 Objective 4, task 4.1-3
Objective 6 ***Accurately determine adult chinook salmon spawner abundance and spawner migration into the Minam River on an annual basis.*** *Strategy 1 Determine adult salmon abundance in relation to proposed recovery abundance levels (NMFS 2000)* *Strategy 2 Monitor adult salmon spawner migration timing* *Strategy 3 Effectively communicate project results with co-managers through briefings and annual reports* *Strategy 7 Develop a monitoring plan for the collection of baseline data in appropriate subbasin tributaries*	Objective 3, task 3.6-9 Objective 3, task 3.6-9 Objective 1.5 Objective 4, task 4.1-3 Objective 2, task 2.3-4
Objective 6b *Achieve and maintain self-sustaining populations in the Grande Ronde Subbasin* *Strategy 10 Monitor and evaluate the productivity, abundance, distribution, life history and biological characteristics of anadromous fish within the subbasin to assess the success of management strategies*	Objective 3, task 3.6-9 Objective 4, task 4.1

Review Comments

The sponsors suggest estimation of spawning escapement based on redd counts are biased and provide imprecise approximations of true escapement (abundance). The sponsors indicated that the hypothesis is based on PATH and other literature that have reviewed the limitations of redd count accuracy and redd count expansion methods to estimate abundance. The inaccuracy in an abundance estimate is also reflected in other parameters (growth rate, smolt to adult ratios, recruits per spawner, adult to adult returns, etc). The NMFS (2000) Biological Opinion, Viable Salmonid Population paper and other conservation literature call for performance standards at the population level to be evaluated in terms of abundance and call for more accurate counts of adult abundance. The current project is designed to provide adult salmon abundance information. There is concern about the impacts of the fish counting station on adult migrations; however, the reviewers agree that developing a non-invasive, passive monitoring technique for monitoring adult salmon escapements is a high priority. This project addresses RPA 180.

Discussion and coordination with co-managers will continue on the final plans for validation monitoring in the Minam River, monitoring and evaluation, and risk management.

Budget

FY02	FY03	FY04
$531,182 Category: High Priority Comments:	$630,024 Category: High Priority	$527,007 Category: High Priority

Project: – 27020 – Grande Ronde Subbasin Water Right Acquisition Program

Sponsor: Oregon Water Trust

Short Description:

Acquire 3 cfs of existing Grande Ronde Subbasin water rights on a voluntary basis and transfer to instream water rights under Oregon state law; target acquisitions to maximize fulfillment of habitat objectives for instream flows.

Abbreviated Abstract

The Oregon Water Trust is requesting BPA support for the Grande Ronde Subbasin Water Right Acquisition Program, an ongoing part of the Trust's efforts to acquire ecologically significant water rights in Eastern Oregon. The funding will help pay for water right acquisitions, and help support staff work needed to acquire and protect senior instream water rights.

The Grande Ronde Subbasin Water Right Acquisition Program is a three-year project. OWT is requesting $205,325 in multi-year funding (FY 2002 – 2004). We are requesting approximately two thirds of the total program costs from BPA; another $92,260 will be raised from other sources to support this $297,585 program over the next three years.

We are requesting $62,620 in funding for FY 02; $68,430 for FY 03; and $74,275 for FY 04. Our work in the Grande Ronde Subbasin was originally covered as a part of OWT's ongoing Project 199908800 (FY 2000-2002). We are now submitting a new proposal for work in this subbasin as a part of the rolling provincial review process.

This project focuses on acquiring senior consumptive water rights for conversion to instream use along small streams and tributaries that provide prime spawning and rearing habitat for anadromous fish, as well as habitat for resident fish. The fundamental need for water right acquisitions has been recognized by the Northwest Power Planning Council as a part of the Final 2000 Columbia River Basin Fish and Wildlife Program (November 14, 2000). The FWP notes that "Experience implementing this program has shown great advantages in being able to move quickly and flexibly to acquire interests in land and water rights for the purpose of protecting or enhancing fish and wildlife habitat," FWP page 66. OWT, as a private nonprofit entity that uses a voluntary, market-based approach to acquiring water rights from willing sellers, is ideally suited to carry out an ongoing water right acquisition program. OWT water right acquisitions are targeted to enhance instream flows and complement other watershed and habitat restoration projects.

The necessity of water right acquisitions as a component of aquatic habitat restoration has also been recognized by the National Marine Fisheries Service as a part of the Federal Columbia River Power System Biological Opinion (December 21, 2000). The Bi Op Section 9.6.2.1, Actions Related to Tributary Habitat, provides that tributary habitat efforts shall have the following objectives: "Water quantity – increase tributary water flow to improve fish spawning, rearing, and migration." Action 151 specifies that "BPA shall, in coordination with NMFS, experiment with innovative ways to increase tributary flows, by for example, establishing a water brokerage." While a land and water trust fund may eventually be established and provide future funding for water right acquisitions, this project is needed to assure that OWT's water right acquisition work continues without interruption in the Grande Ronde subbasin of the Blue Mountain Province..

The goal of this three year project is to acquire a total of 3.0 cfs (cubic feet per second) of flow on priority tributary stream systems within the project subbasin. The anticipation is to acquire approximately 1.0 cfs each year with an initial average cost of $60,000 per cfs, gradually increasing to $70,000 cfs in the third year of the project.

OWT uses a science-based methodology and works in consultation with OWRD and ODFW to target stream systems and reaches where streamflow is a limiting factor and where irrigation withdrawals impact fish production and survival. The outcome of this project, represented by successfully negotiated acquisitions and transfers to instream use, will be "wet water" that will directly benefit fish species in targeted Oregon tributaries to the Columbia River in the Grande Ronde subbasin.

Relationship to Other Projects

Project ID	Title	Nature of Relationship
199900800	Water Right Acquisition Program	OWT's multi-year (FY 1999-2001) project originally included work in the Grande Ronde subbasin. We previously separated out work in the Columbia Gorge and Columbia Plateau provinces, and are submitting this work under the Blue Mountain province review.

Relationship to Existing Goals, Objectives and Strategies

Funding of OWT's Grande Ronde Subbasin Water Right Acquisition Program is needed to address a fundamental limiting factor for fish habitat throughout the subbasin - inadequate flows in small streams and tributaries that provide crucial habitat for anadromous and resident fish. The Fish and Wildlife Program (FWP) as adopted in 1995 recognized the importance of water quantity and quality as components of watershed habitat objectives (FWP 7.6D), and specified water right acquisitions as one program measure to accomplish these objectives (FWP 7.8G1). The 2000 Fish & Wildlife Program and the 2000 FCRPS Biological Opinion also recognize that low flows are frequently a major limiting factor for fish habitat, and that acquisitions of senior consumptive water rights directly address this limiting factor.

In addition, the recently developed Subbasin Summary also recognizes the fact that low stream flows are an important limiting factor for fish production and survival, which can be hazardous to aquatic health, and the importance of water right acquisitions to accomplish streamflow restoration as a part of tributary habitat restoration. The General Needs section includes Item #7 at page 160 - "Promote the purchase, lease, exchange or seasonal rental of water rights for conversion to instream use in stream reaches where out-of-stream use causes flow problems." The Aquatic Habitat section includes Item #16 at page 161- "Acquire water rights when opportunities arise to help restore more natural flows to streams within the subbasin," and also Item #8 at page 160 - "Restore and augment streamflows at critical times using (but not limited to) water right leases, transfers, or purchases, and improved irrigation efficiency."

Work done under this project furthers the goals and objectives of many entities active in the subbasin, including NMFS, BOR, USFWS, USFS, Nez Perce Tribe, Confederated Tribes of the Umatilla Indian Reservation, ODFW, DEQ, DLCD, OWRD, the Grande Ronde Model Watershed Program, Wallowa SWCD, and Union SWCD.

Review Comments

This project addresses RPA 150. The sponsor suggests that 3 cfs would be secured through the work. The reviewers indicate that the 3 cfs is significant if it occurs in a small to moderate-sized stream; however, 3cfs is not a critical limiting factor throughout most of the subbasin. NMFS needs to assess biological impact on fish (see ISRP responses).

Budget

FY02	FY03	FY04
$62,620 Category: Recommended Action Comments:	$68,429 Category: Recommended Action	$74,273 Category: Recommended Action

Project: – 27022 – Wallowa County Culvert Inventory

Sponsor: Nez Perce Tribal Fisheries / Watershed Program

Short Description:

Prioritize on county, state, federal, and private land, culverts that either need maintenance or replacement to meet resource needs.

Abbreviated Abstract

The Wallowa County-Nez Perce Salmon Recovery Plan (2000) gives quality aquatic habitat high importance. Improving fish passage and connecting critical habitat for salmonids through road and culvert improvements is key to providing this high quality aquatic habitat. This proposal promotes this habitat objective by identifying and prioritizing culverts that restrict fish passage or fragment habitat. Over 1,128 culverts in Wallowa County have been identified as needing a survey for fish passage issues (Wallowa County, 2001).

This proposal will fund the field collection of culvert data. Upon completion of this inventory, data will be entered into a county maintained database and used to assess and prioritize rehabilitation work.

This proposal dovetails with U.S. Forest Service Region 6 efforts to survey all fish bearing culverts on Forest Service System Land by September 2001. Upon completion of both surveys, the county and forest can evaluate fish passage and connectivity needs at the watershed scale.

Using a two-person crew, one culvert takes approximately two hours to complete. In one field season (June-October) one crew (two technicians) can survey approximately

200 culverts. We plan to use two crews (400/year over three years) to complete this project by 2004. Forest Service Region 6, culvert survey protocols will be used for this project. These protocols are tested and have proven to be an effective way of prioritizing culverts. By using the same protocols all data is streamlined and comparable. Once surveyed, culvert information will be entered into an Access database similar to the one established by the Forest Service and be placed in a GIS overlay. Each culvert can then be evaluated and prioritized utilizing fish passage criteria modified from Forest Service protocols.

Administration of this project follows the rules and regulations set forth by the Nez Perce Tribe. Protecting all rights set forth by the treaty of 1855 are the overlying goal and priority of this program and this project proposal.

Relationship to Other Projects

Project ID	Title	Nature of Relationship
199202601	Grande Ronde Model Watershed Program	Calls for passage improvements.
199403900	Watershed Restoration Planner	Passage improvements have been and will continue to be an emphasis.
199702500	County/Tribe Plan Implementation	Calls for passage improvements.
198805301	Northeast Oregon Hatchery Project	Need good passage to spawning and rearing areas for production fish.
199604400	Captive Brood Project	Need good passage to spawning and rearing areas for production fish.
19970600	Nez Perce Tribal Focus Watershed Program	This project implements the goals and objectives of this program.

Relationship to Existing Goals, Objectives and Strategies

This project supports actions of the documents below. The critical needs and objectives met by this proposal are explained in detail.

NMFS Biological Opinion

This proposal would comply with the following objectives and actions of The Biological Opinion for the Federal Columbia River Power System authored by NMFS:

- This project proposal will help restore watershed health and degraded habitat.
- This project proposal will help restore connectivity with the critical habitat in Wallowa County.
- This project proposal is designed to help recover the ESU of Snake River summer steelhead.
- This project proposal helps avoid the jeopardy standard for the steelhead ESU.
- This project proposal complies with the Reasonable and Prudent Alternative selected by NMFS to avoid the jeopardy standard.
- This project proposal will help eliminate future road failures/landslides and protect the watershed from future degradation.
- This project will help to meet water quality standards and comply with the Clean Water Act.
- This project will be cost-shared with the U.S. Forest Service.

This project proposal addresses the following RPA actions:

- Action #149: BOR shall initiate programs in three priority subbasins per year over 5 years, in coordination with NMFS, FWS, the state and others, to address all flow, passage, and screening problems in each subbasin over 10 years. Under the NWPPC program, BPA addresses passage, screening, and flow problems, where they are not the responsibility of others.

Funding this project meets this action by initiating solutions to fish passage problems.

- Action #150: In subbasins with listed salmon and steelhead, BPA shall fund protection of currently productive non-Federal habitat, especially if at risk of being degraded, in accordance with criteria and priorities BPA and NMFS will develop by June 1, 2001.

A majority of the culverts surveyed by this project are on non-Federal lands that support listed salmon and steelhead. This project links federal (forest service) culvert surveys with Wallowa County culvert surveys to achieve overall watershed approach to addressing fish passage issues.

- Action #152: The action agencies shall coordinate their efforts and support offsite habitat enhancement measures undertaken by other federal agencies, states, tribes, and local governments.

Funding this project will allow action agencies to meet their action objective of supporting important habitat enhancement measures (culvert assessments) and locations (Nez Perce Tribal Territory) undertaken by the Nez Perce Tribe. It will also work towards the federal government meeting their tribal trust responsibility to the Nez Perce Tribe.

- Action #154: BPA shall work with the NWPPC to ensure development and updating of subbasin assessments and plans; match state and local funding for coordinated development of watershed assessments and plans; and help fund technical support for subbasin and watershed plan implementation from 2001 to 2006. The action agencies will work with other Federal agencies to ensure that subbasin and watershed assessments and plans are coordinated across non-Federal and Federal land ownerships and programs.

Completing surveys and prioritization of culverts helps development of assessments and plans by providing direction. The current Nez Perce Tribe and Wallowa County plan provide guidance for this project.

Grande Ronde & Imnaha Subbasin Summaries

The following list includes specific immediate or critical needs defined collectively by fish and wildlife resource managers within the Imnaha & Grande Ronde river subbasin summaries this project addresses. Needs have been defined to address limiting factors to fish and wildlife, and ensure that gaps in current data or knowledge are addressed. Numerous federal, state, and local entities are charged with maintenance and protection of the natural resources of the Imnaha & Grande Ronde Subbasins.

National Marine Fisheries Service and Federal Caucus

Objective 3. **Reduce passage obstructions to provide immediate benefit to migration, spawning, and rearing.**

Strategy 1. Federal agencies, state, and other to address all flow, passage, and screening problems over the next 10 years in the Imnaha & Grande Ronde Subbasins.

Strategy 2. BPA funds protection of currently productive non-federal habitat, especially if at risk of being degraded.

Strategy 4. Action Agencies to coordinate efforts and support off-site habitat enhancement measures undertaken by others.

US Bureau of Reclamation

Objective 2. **Eliminate barriers to fish passage.**

Strategy 1. Provide planning and engineering design assistance to replace barriers with permanent structures that will freely pass fish.

US Fish and Wildlife Service and BLM

Objective 1. **Provide harvest for sport anglers and tribes.**

Objective 5. **Meet tribal trust responsibilities.**

Nez Perce Tribe Department of Fisheries Resources Management
Goal 3. Protect Tribal sovereignty and treaty rights

Objective 5. **Implement and enforce existing federal laws for protection of water quality, habitat and aquatic resources.**

Objective 14. **Coordinate with the National Marine Fisheries Service and U.S. Fish and Wildlife Service to fund and implement actions identified in the Biological Opinions, and to implement other emergency actions that address imminent risk to listed salmon, steelhead, and bull trout populations.**

Objective 7. **Improve adult and juvenile salmonid fish passage**

Strategy 7.1. Prioritize replacement/modification of inadequate culverts based on an accepted culvert inventory methodology (e.g. U.S. Forest Service, Region 6).

Strategy 7.2. Replace/modify culverts based on the prioritization.

County and Local Government

Objective 7. **Improve adult and juvenile salmonid fish passage.**

Strategy 7.1. Replace/modify inadequate culverts.

Fish and Wildlife Needs

1. Replace culverts that present passage barriers and sediment sources based on a prioritized assessment of existing installations.

This proposal does exactly this. Culverts are prioritized according to survey protocol and risk rating sheets.

2. Ensure aquatic and terrestrial subbasin databases are compatible and accessible to all parties.

This proposal uses established Forest Service protocols and a compatible database to insure accessibility between all federal, state, county, tribal, and private parties.

3. Continue to educate the public and persons or agencies with resource protection obligations regarding natural resource laws, compliance and enforcement.

One aspect of the Project Leader position will be to initiate public presentations and other forums to present goals, objectives, and outcomes of this project.

4. Using existing assessments, seek out opportunities for cooperative habitat restoration and enhancement projects on public and private land.

This project utilizes cost share opportunities with the Forest Service and Columbia River Intertribal Fish Commission on culvert protocols and surveys. Culvert locations to be surveyed occur on both public and private lands. Prioritization and implementation of restoration work will be cooperative between federal, state, county, tribal, and private parties. This inventory work will be added as baseline data to county and federal watershed assessment documents.

5. Restore, protect, and create riparian, wetland, and floodplain areas within the subbasin and establish connectivity.

This proposal expedites the reestablishment of critical habitat for aquatic organisms above all current barriers.

2000 Fish and Wildlife Program

The program is habitat based and focused on rebuilding healthy, naturally producing fish and wildlife populations by protecting, mitigating, and restoring habitats and the biological systems within them. This project proposal works towards accomplishing the vision and objectives of the program by protecting and restoring the ecological functions, and habitats of Wallowa County. This project enhances fisheries habitat by identifying and prioritizing which culverts possess the greatest risk to fish passage. The following Overarching Objectives of the program are met by this project.

1. A Columbia River ecosystem that sustains an abundant, productive, and diverse community of fish and wildlife.
2. Sufficient populations of fish and wildlife for abundant opportunities for tribal trust and treaty right harvest and for non-tribal harvest.
3. Recovery of the fish and wildlife affected by the development and operation of the hydrosystem that are listed under the Endangered Species Act.

The following Objectives for Biological Performance, which address anadromous fish losses, are supported by this project proposal.

1. Halt declining trends in salmon and steelhead populations above Bonneville Dam by 2005.
2. Restore the widest possible set of healthy naturally reproducing populations of salmon and steelhead in each relevant province by 2012.
3. Increase total adult salmon and steelhead runs above Bonneville Dam by 2025 to an average of 5 million annually in a manner that supports tribal and non-tribal harvest. Within 100 years achieve population characteristics that, while fluctuating due to natural variability, represent on average full mitigation for losses of anadromous fish.

1994 Fish and Wildlife Program
The system wide goal and framework of sharing cost, 2.2C.1 of NPPC Fish and Wildlife Program (NPPC, 1994) is met with this proposal. This project will work towards 7.6D Habitat Objective of the NPPC Fish and Wildlife Program. This objective states that action agencies shall provide and maintain fish passage at all road crossings of existing and potential fish-bearing streams. By completing surveys and prioritizing culverts according to the risk they present to fish passage, we can insure this objective is met. In addition to this, Section 7.11B of the Fish and Wildlife Program identified tributary passage enhancement efforts as necessary to restore fish populations.

Salmon Recovery Strategy
The SRS habitat plan includes 1) immediate actions – restore water quality, remove passage barriers, secure high quality habitat, 2) Manage federal lands to protect fish, 3) Protect and improve tributary habitat.

This project proposal fits into this plan by implementing immediate actions that will restore water quality and return quality habitat to key fisheries species. All aspects of this project are cost-shared with the National Forest, and will manage and protect tributary habitat.

Wy-Kan-Ush-Mi-Wa-Kish-Wit, Spirit of the Salmon Fish Restoration Plan

The goals and objectives of our project proposal strives towards meeting all of the goals and objectives found in the Wy-Kan-Ush-Mi Wa-Kish-Wit (CRITFC, 1995), as stated below:

ANADROMOUS FISH RESTORATION PLANOF THE TRIBES

Goals
- Restore anadromous fishes to the rivers and streams that support the historical culture and economic practices of the tribes.
- Emphasize strategies that rely on natural production and healthy river systems to achieve this goal.
- Protect tribal sovereignty and treaty rights.
- Reclaim the anadromous fish resources and the environment in which it depends for future generations.
- Within 7 years, halt the declining trends in salmon, sturgeon, and lamprey populations originating upstream of Bonneville Dam.

- Within 25 years, increase the total adult salmon returns of stocking originating above Bonneville Dam to 4 million annually and in a manner that sustains natural production to support tribal commercial as well as ceremonial and subsistence harvests.
- Within 25 years, increase sturgeon and lamprey populations to naturally sustainable levels that also support tribal harvest abundance in perpetuity.

The project proposal also protects the goal of tribal sovereignty and treaty rights. In the Treaty of 1855, the Nez Perce Tribe ceded much of their aboriginal territory to the United States in exchange for a reservation that was to serve as a permanent homeland. In that treaty, the Nez Perce Tribe reserved certain rights including, "the exclusive right of taking fish in all the streams running through or bordering said reservations is further secured to said Indians (Nez Perce Treaty, 1855)." According to this, the federal government has a trust agreement to protect all tribal resources. This proposal will work toward protecting our resources, therefore fulfilling the government's responsibilities. The project will also allow the tribe to manage our own tribal resources, which will in turn protect our sovereignty and treaty rights.

Review Comments

This effort may be best addressed during the subbasin assessment effort. The proponent should verify with ODFW and ODOT whether 1998 inventories are available for Wallow County. Any cost savings achieved by using existing inventories should be applied to implementing corrective actions. This project addresses RPA 154.

Budget

FY02	FY03	FY04
$170,603 Category: Recommended Action Comments:	$184,398 Category: Recommended Action	$193,618 Category: Recommended Action

Project: – 27023 – Precious Lands Wildlife Habitat Expansion

Sponsor: Nez Perce Tribe

Short Description:

Expand the operation of the NE Oregon Wildlife Mitigation Project -- "Precious Lands" to protect, restore, and enhance up to 16,500 acres of additional grassland, riparian and ponderosa pine habitat to benefit fish and wildlife.

Abbreviated Abstract

This project is designed to manage low elevation habitats within the Grande Ronde, Asotin, Imnaha, and Snake Hell's Canyon subbasins for the benefit of target wildlife species. It serves as partial mitigation for the wildlife losses amended into the NPPC's Fish and Wildlife Program. Overall project goals include the protection, restoration and management of 16,500 acres of canyon grasslands and associated riparian, wetland, and forested habitats. Project lands will be acquired through fee purchase from willing sellers, and be managed in perpetuity for wildlife and watershed benefits. All project lands will lie within the lower Grande Ronde, Asotin Creek, Snake Hell's Canyon, or Imnaha watersheds as depicted in Figure 1. Native plant communities will be restored through a combination of passive and active restoration techniques including removal of domestic livestock, noxious weed control, and re-establishment of native species on disturbed sites. Habitat improvement projects will utilize a holistic, natural approach to best meet the needs of local wildlife while keeping ongoing O&M costs at a minimum.

This project is designed to benefit target wildlife species (mule deer, chukar, California quail, yellow warbler, song sparrow, beaver, black-capped chickadee, downy woodpecker, blue grouse, and western meadowlark) as well as listed salmonids. Habitat Evaluation Procedures (HEP) will be used to assess baseline conditions and evaluate the effectiveness of habitat improvement projects. Specific techniques will also be developed to monitor native plant communities, land bird populations, amphibians, and water quality.

Relationship to Other Projects

Project ID	Title	Nature of Relationship
199608000	NE Oregon Wildlife Mitigation Project – “Precious Lands”	The current proposal is an expansion of this original project and proposes to increase land holdings by an additional 16,500 acres.
199206900	Craig Mountain Wildlife Management Area	Complements canyon grassland and bighorn sheep management in the Snake Hell's Canyon subbasin.
199609400	WDF&W Habitat Unit Acquisitions (Chief Joseph Wildlife Area)	Compliments winter range and riparian management in lower Joseph Creek watershed.
200002000	Wenaha Wildlife Management Area Additions	Compliments winter range and habitat management in lower Grande Ronde watershed.
200123094	Acquire 27,000 ac. Camp Creek Ranch at Zumwalt Prairie	Compliments management and restoration of prairie and canyon grassland ecosystems.
199403900	Watershed Restoration Planner	Help meet watershed improvement goals of this project.
199702500	Implement the Wallowa County / Nez Perce Tribe Salmon Habitat Recovery Plan	Salmon recovery plan will be implemented on any acquired lands to help meet recovery goals.

Relationship to Existing Goals, Objectives and Strategies

This project has been designed to acquire, protect, restore and manage an additional 16,500 acres of canyon grasslands and associated riparian, wetland, and forested habitats. The property will be acquired through fee purchase and managed in perpetuity for wildlife, fisheries and watershed benefits. All project lands will lie within the lower Grande Ronde watershed. Native plant communities will be restored through a combination of passive and active restoration techniques including removal of domestic livestock, noxious weed control, and re-establishment of native species on disturbed sites. Habitat improvement projects will utilize a holistic, natural approach to best meet the needs of local wildlife and fisheries. The acquisitions of land will provides many opportunities, which will benefit the broadest range of resources. Management activities, which will benefit fish, will be the protection and enhancement of riparian vegetation, removal of passage blockages, addition of large woody debris, management to reduce sedimentation problems (both point and non-point), access for monitoring purposes, and the maintenance and restoration of the watershed which can provide increased water storage for later release into the system and reduction of flash flooding due to poor vegetation management. The on-going management of newly acquired property will be centered on managing for native flora and fauna species diversity, and the protection and restoration of watershed function and health. The Precious Land Expansion Project will benefit the widest possible range of resources fulfilling similar fish and wildlife habitat objectives outlined by every management agency and tribe in the sub-basin. Monitoring and evaluation procedures will be developed to track the success of project activities and their benefit to the resources. Land acquisition and management provides for the widest range of potential resources benefits.

Review Comments

Proposal addresses RPA 150 and 153. Reviewers believe the acquisition of parcels and the development of assessments will likely take at least one year and thus question whether implementation could be initiated during the first year. Although there are no cost-shares identified in the proposal, the sponsors indicate that they are working with TPL to develop cost-shares. Not all parcels that should/could be purchased have been identified. The Wildlife Committee rated the project as having significant wildlife benefits using the criteria of permanence, size, connectivity to other habitat, and juxtaposition to public lands. This project is an expansion of Project Number 199608000. If funded, the additional objectives presented in this proposal would likely be brought under the existing project.

Budget

FY02	FY03	FY04
$3,373,974 Category: High Priority Comments:	$3,377,500 Category: High Priority	$3,400,000 Category: High Priority

Project: – 27024 – Life History Strategies in *Oncorhynchus mykiss*: Interactions between Anadromous and Resident Forms

Sponsor: Oregon Department of Fish and Wildlife

Short Description:

To aid in conservation efforts for O. mykiss and alternative approaches within hatchery programs, evaluate the relationship between anadromous and resident forms.

Abbreviated Abstract

Oncorhynchus mykiss in the Snake River basin may exhibit multiple life history forms (Behnke 1992). Anadromous and resident fish are known to spawn in the spring while resident fish may spawn in the fall. The extent to which these forms interact is unknown (see Zimmerman and Reeves 2000). More specifically, it is unclear how much resident forms may contribute to future generations of anadromous fish. The proposed project is designed to evaluate the relationship and interactive potential between anadromous and resident forms of *O. mykiss*. In clinical trials, this project proposes to test whether and to what extent resident *O. mykiss* adults can produce anadromous progeny. As a natural occurrence, this project also proposes to assess the degree to which resident and anadromous forms of *O. mykiss* contribute to subsequent generations of resident and anadromous *O. mykiss*. Finally, this project proposes to begin describing the occurrence of fall spawning in *O. mykiss* and the potential of progeny from such spawning to contribute to the anadromous form.

Relationship to Other Projects

Project ID	Title	Nature of Relationship
198805301	NE Oregon Hatchery Master Planning	Supportive. Understanding the nature of the relationship between anadromous and resident forms of O. mykiss is essential to this planning.
198909600	Genetic M&E Program for Salmon and Steelhead	Supportive. Understanding the nature of the relationship between anadromous and resident forms of O. mykiss relates directly to understanding the population genetics of O. mykiss.
198909700	Evaluate Supplementing Imnaha Summer Steelhead	Collaborative. Understanding the nature of the relationship between anadromous and resident forms of O. mykiss is essential to a supplementation program.
199202601	Grande Ronde Model Watershed Development	Collaborative. O. mykiss are an important component of the Grande Ronde River subbasin.
199202604	Life Studies of Spring Chinook Salmon and Steelhead – Grande Ronde River	Collaborative. Understanding the nature of the relationship between anadromous and resident forms of O. mykiss is directly related to juvenile life history.
199306600	Northeast Oregon Fish Screening and Passage Project	Supportive. The population structure of O. mykiss may be influenced by or reflect screening and passage issues.
199403000	Technical Support – Grande Ronde Model Watershed	Collaborative. O. mykiss are an important component of the Grande Ronde River subbasin.
199404600	Columbia Basin Ecosystem Management	Supportive. Understanding the nature of the relationship between anadromous and resident forms of O. mykiss is essential to this planning.
	Lower Snake River Compensation Plan	Collaborative. Understanding the nature of the relationship between anadromous and resident forms of O. mykiss is directly related to the success of the LSRCP hatchery programs. LSRCP funded the pilot work.
	Oregon Plan for Salmon and Watersheds	Supportive. Understanding the nature of the relationship between anadromous and resident forms of O. mykiss is essential to monitoring the populations.

Relationship to Existing Goals, Objectives and Strategies

Declines of *O. mykiss* populations, particularly the anadromous forms, have been linked to the existence and operation of the federal hydropower system. The Power Act was established, at least in part, as a result of the operation of this system. The Northwest Power Planning Council (NPPC) serves as the nexus between fish and wildlife managers in the northwest and the Power Act. Various measures directed under the Columbia River Basin Fish and Wildlife Management Plan (Plan) (Northwest Power Planning Council

1994; Northwest Power Planning Council 2000) address *O. mykiss* biology and management. An overall objective of the Plan is to achieve a Columbia River ecosystem that sustains an abundant, productive and diverse community of fish. The Plan calls for recovery issues identified by the Endangered Species Act to be addressed as well as for mitigation for losses of the numbers and diversity of native fishes. In addition, the Plan requires a complete assessment of fish populations and directs that the purpose of research is to resolve key uncertainties. This proposal addresses life history, production and supplementation issues identified by the Northwest Power Planning Council under their management plan (sections 2.2A, 3.2D, 4.1A, 7.4A, 7.4O and 10.8A of NPPC 1994; NPPC 2000).

Recently the federal government published a Biological Opinion (Opinion) on the operation of the hydropower system in the Columbia River (NMFS 2000). Summaries from the Opinions indicate that *O. mykiss* (specifically the anadromous form) in the Grande Ronde and Imnaha river subbasins are impacted by the federal hydropower system. As noted previously, these Snake River steelhead are protected under the federal ESA. Ongoing Recovery Plan development as well as existing Biological Opinions indicate that better population assessments and improved hatchery operations may be critical to recovery efforts. In particular, the Biological Opinion lists several RPAs that this proposal addresses. RPA 107 includes an assessment of the reproductive success of *O. mykiss* and identification of the measures related to that success. RPA 164 includes assessments of harvest impacts to listed *O. mykiss*. RPA 169 calls for adequate HGMPs to be completed for Snake River ESUs. RPA 173 requires that reforms in HGMPs be implemented. Finally, RME 184 emphasizes research on hatchery programs. Understanding the nature of the relationship between anadromous and resident forms of *O. mykiss* is essential to all of these actions.

Both the Grande Ronde River (Nowak et al. 2001), and Imnaha River (Bryson et al. 2001) subbasin plans address specific goals and objectives related to *O. mykiss*. The subbasin plans for the Grande Ronde River subbasin (GRRSBP) and Imnaha River subbasin (IRSBP) emphasize *O. mykiss* as a key species. The GRRSBP and IRBP summarize the goals of various agencies with management responsibilities in the subbasin. In general, these goals include mitigating for damages resulting from the operation of the mainstem hydropower system, recovery of a species listed as threatened under the Endangered Species Act, evaluating the connectivity, the degree of interchange and gene flow between populations, responsible management of *O. mykiss*, protecting and enhancing *O. mykiss* populations, as well as coordinated management.

Relative to bull trout, both the GRRBP and IRSBP define specific goals and objectives. Specifically, these plans identify the need to determine life history composition of *O. mykiss* including the role of resident and anadromous forms to basin-wide production. In addition, the plans include needs to 1) determine population structure of *O. mykiss*, 2) redevelop of hatchery broodstocks (using existing or endemic stocks) and programs as necessary to meet conservation, natural production and harvest augmentation goals, 3) develop new methods to minimize the impact of hatchery production activities on endemic stocks, 4) continue and expand monitoring of hatchery supplementation and interactions with natural fish, 5) use improved statistical sampling techniques to ensure current spawning ground surveys are an appropriate measure of productivity, and use these techniques, reassess escapement and spawner/recruitment goals, 6) calculate returns per spawner from index surveys to determine if this relationship is improving as smolt passage facilities are modified at Columbia and Snake River dams, 7) consider alternative approaches to assess population status, 8) determine life history and movement patterns of steelhead including assessment of adult holding areas, juvenile rearing areas, and juvenile migration patterns, 9) determine extent of summer steelhead distribution within the subbasin at various life history stages, and 10) monitor summer steelhead by examining drainage escapements and population trends. Again, understanding the nature of the relationship between anadromous and resident forms of *O. mykiss* is essential to all of these needs.

The anadromous form of *O. mykiss* is listed as threatened under the ESA. In 2000 the NMFS published protective regulations for the Snake River ESU of anadromous *O. mykiss*. Currently, a recovery plan for these fish is being developed. Efficient and useful recovery measures require an understanding of the dynamic between anadromous and resident forms of *O. mykiss* .

Review Comments

This project addresses RPA 184.

This proposal evaluates the potential for using local stocks of resident rainbow trout to supplement steelhead broodstock at NE Oregon Hatcheries. The RFC suggests the study design, methods, and data analysis for each objective in the proposed project need to be strengthened.

For Objective 1, more detail is needed to describe the study design, methods and data analyses. For example: What conditions will mimic a steelhead smolt program? What times and locations will the author sample? What morphological and physical characteristics will be measured to assess smolt development? What kind of data analysis will be conducted (e.g. ANOVA, MANOVA, Chi-square goodness of fit)? Perhaps citations may be needed to demonstrate the strategies and techniques involved. The objectives are clearly defined, but there is little reference to how the tasks will be measured.

Objective 2 focuses on examining the relative proportions of known-origin anadromous and resident O. mykiss and unknown-origin juveniles that are produced by anadromous and resident forms. The RFC applauds the use of otolith microchemistry analyses to identify life history strategies and determine maternal origin and encourages the sponsor to summarize the microchemistry pilot work to strengthen the argument that otolith microchemistry would be a useful tool to address the objective. Again, the author should better define the study design, methods and data analysis in the tasks to strengthen the proposed objective. The approach is conceptually an excellent idea; however, more detail is needed to demonstrate the best use of the techniques and principles to address the objective.

Budget

FY02	FY03	FY04
$237,474 Category: Recommended Action Comments:	$217,906 Category: Recommended Action	$228,802 Category: Recommended Action

Project: 27026 – Monitoring and evaluation of aquatic resources in Wallowa Lake for the conservation and reestablishment of native fishes.

Sponsor: Oregon Department of Fish and Wildlife

Short Description:

Provide scientific information to aid conservation of native fishes of Wallowa Lake. Evaluate predatory and competitive impact of lake trout and Mysis relicta on kokanee and bull trout. Evaluate biological potential for sockeye reintroduction.

Abbreviated Abstract

The goal of this project is to provide scientific information that will aid in the conservation and management of native fishes inhabiting Wallowa Lake. Recent changes in key population indicators suggest Wallowa Lake's kokanee population may be incurring negative impacts from introductions of lake trout and mysid shrimp (*Mysis relicta*). Over the past few years average size of kokanee in the fishery has increased while catch rate has declined and these changes have occurred subsequent to the introduction of both lake trout and *M. relicta*. To initially address these changes in the Wallowa Lake ecosystem, we propose the first application of Oregon Plan for Salmon and Watershed principles to a lake system. We propose to monitor and evaluate both physical and biotic conditions in Wallowa Lake including temperature, dissolved oxygen, and zooplankton production. We also propose to evaluate the potential predatory impact of lake trout and competitive impact of *M. relicta* on kokanee and bull trout and develop a program to control lake trout if the impact is significant. To develop quantifiable interactions we propose to collect information on the distribution, abundance, and size structure of the lake trout, bull trout, kokanee, and *M. relicta* populations using netting, angler surveys, and hydroacoustic techniques. This information will then be used in a bioenergetics modeling approach to measure the impacts of introduced species. In the near-term, this study will collect much needed data for the preservation of native fisheries. This proposal will also provide biological information to evaluate the potential for future sockeye salmon reintroduction. However, we believe an assessment of the sustainability of the resident kokanee population should be completed before reintroduction of anadromous sockeye salmon is seriously considered.

Relationship to Other Projects

Project ID	Title	Nature of Relationship
199202604	Investigate Life History of Spring Chinook Salmon and Summer Steelhead in the Grande	Initially proposed as an objective under this ongoing project.

Project ID	Title	Nature of Relationship
199405400	Ronde River Basin and Monitor Salmonid Populations and Habitat Characterize the Migratory Patterns, Population Structure, Food Habits, and Abundance of Bull Trout from Subbasins in the Blue Mountain Province	Complimentary. We will collect population status, food habits, and distribution information for bull trout in Wallowa Lake.

Relationship to Existing Goals, Objectives and Strategies

Review Comments

No comments

Budget

FY02	FY03	FY04
$132,444 Category: High Priority Comments:	$139,067 Category: High Priority	$146,020 Category: High Priority

Research, Monitoring and Evaluation Activities

The on-the-ground BPA-funded projects in the Grande Ronde subbasin include a number of monitoring, evaluation and research activities. Specific monitoring strategies, including pre- and post-treatment sampling, have been designed for each completed and ongoing project. Monitoring includes project-specific and watershed level parameters. These activities are combined with watershed level, long term, time series indices for habitat and populations in order to evaluate direct and indirect effects of projects. Monitoring and evaluation of project effects is critical to the application of adaptive management strategies in the subbasin. Specific ongoing monitoring activities include:

For ODFW, ongoing BPA-funded monitoring includes:

- Assist ongoing LSRCP M&E to evaluate the success of the Grande Ronde Endemic Spring Chinook Supplementation program. The agency will compare the performance of natural, conventional hatchery and captive broodstock components of the program. The agency will conduct multiple spawning surveys and monitor genetic and life history characteristics of supplemented and non-supplemented populations and hatchery and natural chinook to evaluate program effects. The ODFW will also utilize data from other projects for evaluation of program success.
- Assess the success of alternative rearing treatments in the Captive Broodstock Program by monitoring the growth, development, survival, maturation, size and weight of spring chinook stocks reared at Manchester Marine laboratory, Bonneville Fish Hatchery and Lookingglass Fish Hatchery.
- Monitor success of the Captive Broodstock program by maintaining a complete database on captive fish, analyzing and summarizing program data and determining etiology of captive broodstock morbidity and mortality.

- Monitoring long-term changes in stream temperature in habitat restoration project areas. Temperatures are monitored via permanent thermographs installed at upper and lower ends of project stream reaches.
- Habitat transects to monitor physical and biological characteristics in habitat restoration project areas.
- Photopoints to monitor changes in vegetation and stream channel in habitat restoration project areas.
- Biological surveys to monitor changes in fish and wildlife populations in habitat restoration project areas.
- Habitat Evaluation Procedures (HEP) surveys to monitor changes in habitat values (HUs) in habitat restoration project areas.

For NPT, ongoing BPA-funded monitoring includes:

- Monitor the Captive Broodstock Artificial Propagation program through evaluation of the captive broodstock parr reared at Lookingglass Fish Hatchery, post smolts reared at Manchester marine Laboratory and Bonneville Fish Hatchery, F1 generation juveniles and captive F1 generation adults.
- Monitor and evaluate the Lostine portion of the Grande Ronde Supplementation program through evaluation of juvenile hatchery production and performance; collection of baseline information on Lostine River environmental conditions; collection and analysis of abundance, genetic and life history characteristics of wild spring chinook salmon for comparison to hatchery fish and monitoring of the adult collection facilities for impacts to fish populations in the Lostine river.
- General vegetation monitoring in habitat restoration project areas.
- Habitat Evaluation Procedures (HEP) surveys to monitor changes in habitat values (HUs) in habitat restoration project areas.
- Biological surveys to monitor changes in fish and wildlife populations in habitat restoration project areas.
- Monitor water quality variables annually in some locations.

For CTUIR, ongoing BPA-funded monitoring includes:

- Monitoring long-term changes in stream temperature and chemistry in habitat restoration project areas. Temperatures are monitored via 6-10 thermographs annually.
- General vegetation monitoring in habitat restoration project areas.
- Biological surveys to monitor changes in fish and wildlife populations in habitat restoration project areas.
- Photopoints to monitor changes in vegetation and stream channel in habitat restoration project areas.
- Monitor Population status for spring chinook salmon, summer steelhead and incidentally-caught bull trout in the upper Grande Ronde River and Catherine Creek.
- Monitor the success of facility operations and fish culture techniques for increasing populations and maintaining genetic diversity of spring chinook salmon and summer steelhead in Catherine Creek and the upper Grande Ronde River.

Research

A number of research programs undertaken by local, state, federal and tribal agencies are ongoing in the Grande Ronde subbasin. These are shown in *Research, Monitoring and Evaluation Activities* in the foregoing subbasin summary. In general, many of these projects are designed to investigate the life history, genetics, abundance, critical habitat, migration patterns and survival of ESA listed anadromous and resident salmonids and to evaluate management, production and supplementation strategies.

Needed Future Actions

The recommended actions outlined above, in the fiscal year 2002 project proposals, address many of the fish and wildlife needs identified in the Grande Ronde Subbasin Summary. However, implementation of the proposed projects will not fully restore fish and wildlife populations and their habitats within the Grande Ronde subbasin. Many of the needs within the subbasin are ongoing and continued action will be necessary to fully satisfy subbasin goals and objectives and to address the identified limiting factors.

The most critical needed future action is continued protection and restoration of terrestrial and aquatic habitats for the benefit of a variety of ESA and non-ESA fish and wildlife species. There is a need to develop a process for evaluating and selecting priority habitat projects. There is a need to develop mechanisms to effectively and efficiently secure and fund these habitat projects. There is a need to develop new partnerships with private landowners, local governments, and other interested parties within the Grande Ronde subbasin to accomplish habitat protection and restoration actions through conservation easement, fee-title purchase, long-term lease and cooperative management agreement. There is a need for BPA to provide funding for such projects to mitigate for the effects of the Columbia Basin Federal Hydropower System on Grande Ronde subbasin fish and wildlife. There is a need to assess and mitigate hydrosystem operational impacts to fish and wildlife and their habitats. There is a need to improve water quality and water quantity, fish passage and fish screening, and control noxious non-native vegetation. There is continued need for purchase of instream water rights to restore flows for fish passage and reduce water temperatures.

There is a need to reintroduce fish and wildlife species that have been extirpated from the subbasin and augment populations of species that are in decline or in peril of becoming extirpated. Bull trout need to be reintroduced into historic habitats where appropriate and feasible. Sharp-tailed grouse and bighorn sheep need to be reintroduced into appropriate habitats.

There is a need for research, monitoring and evaluation in all facets of natural resource restoration enhancement and protection. Ongoing RME is important for ensuring work plan compliance and effectiveness. Ongoing RME is necessary to assess trends and acknowledge success in restoration efforts, particularly at the watershed level. RME is needed to help demonstrate species response to habitat protection and restoration actions. There is a continuing need to document life history, distribution and habitat needs of high-priority fish and wildlife species and the effect of exotic species on native fish, wildlife and plants. There is a need for on-going inventories of limiting factors to help plan and prioritize future actions. For example, inventories of upland habitat conditions, fish and wildlife population distributions, spread of invasive weeds, and location and status of wetland areas will be used to adapt management actions. There is a need for consistency in data collection and a shared repository where data can be accessed by all subbasin entities. Continuation and enhancement of the cooperative approach in RME will facilitate restoration and enhancement measures.

There is a need to improve compliance with natural resource laws, codes and ethics through improved enforcement efforts and public education.

Actions by Others

There is a need for additional partnerships with state, federal, county and local entities; tribes; and private landowners to partner with BPA in protecting and restoring fish and wildlife and their habitats within the Grande Ronde subbasin. There is a continuing need for increased willingness by landowners to enter into conservation easement agreements, fee-title acquisitions, long-term leases, and cooperative management agreements.

There is a need to develop interstate and interagency cooperative initiatives to prevent the introduction and spread of terrestrial and aquatic nuisance species. Plans, initiatives, and agreements need to be suitably designed and monitored (i.e., weed spraying programs should be coupled with reseeding efforts, etc.). Public outreach and education should occur through schools, homeowner associations, sporting groups and agencies. The public needs to become more aware of the ability of many non-native species to out-compete native species. These activities could be sponsored through irrigation districts, state departments of fish and wildlife, environmental quality, transportation, and agriculture, the U. S. Forest Service and the Environmental Protection Agency. Cost-sharing arrangements with BPA would be appropriate.

There is a need to foster greater grassroots support to implement conservation measures on private lands. Agencies could help private groups acquire grants; assist with project design and implementation; and facilitate cost-share arrangements, grants, rehabilitation / enhancement efforts, and the promotion of conservation activities. Strategies need to be developed to educate private landowners on how to coexist with wildlife and preserve or enhance habitat. Agencies need to develop and/or implement other land and resource management plans, research the effectiveness of conservation programs and activities, and encourage the securing of management rights (including the use of conservation easements and land acquisitions) to improve water quality and fish and wildlife habitat in the subbasin. Training that teaches farmers and ranchers ecologically compatible agricultural practices could be provided. These workshops could teach methods of water conservation and rest/rotation grazing adjacent to streams and wetlands to eliminate or reduce livestock damages. They could show agricultural producers how to establish natural fence-rows and techniques for protecting and restoring riparian areas and wetlands. Such improvements may reduce sedimentation, increase density and diversity of riparian vegetation, improve channel form, and improve water quality.

There is a need to investigate and mitigate the impacts associated with transportation corridors. State departments of transportation and county road programs should seek alternative alignments and other long term roadway solutions to identify and mitigate impacts to wildlife movement, mortalities, and permeability. These agencies and programs especially need to address channel confinement and culvert and related fish/wildlife impediments. States should identify and adequately mitigate cumulative impacts associated with new highway construction, improvement, or expansion projects.

There is a need to increase effort by management agencies to reduce road densities, implement closures of existing roads on public lands and enforce road closures.

There is a need for increased protection of water resources through reduction/elimination of point sources of pollution and voluntary adherence to, or enforcement of, allowable water right. In addition, there is a need to re-allocate water rights. Many streams in the Grande Ronde subbasin are over allocated, leaving little or no instream water for fish and wildlife during low water periods. A review of water rights relative to availability may allow reallocation of water rights more in line with what the system can provide. Irrigation systems and diversions need to be inventoried and facilities improved to allow for more efficient use of water. There is also a need to develop funding mechanisms for development of off-stream water sources for livestock near critical aquatic habitats.

BPA-funded actions need to be more closely coordinated with the actions of city, county, state, and federal agencies and other organizations that are directed at benefiting fish and wildlife and their habitats. Agencies need to investigate, document, and monitor population trends and develop coordinated recovery plans for high-priority management species and other species that show declining populations.

Table 40. Grande Ronde Subbasin Summary FY 2002 - 2004 Funding Proposal Matrix – Continuation of Ongoing Projects

Project Proposal ID	**198402500**	**198805301**	**198805305**	**199202601**	**199202604**	**199403900**	**199405400**	**199608000**	**199608300**	**199702500**	**199800702**	**199800703**	**199800704**	**199801001**	**199801006**	**200002100**
Provincial Team Funding Recommendation	**High Priority**	**High Priority**	**High Priority**	**High Priority**	**High Priority**	**High Priority**	**High Priority**	**High Priority**	**High Priority**	**High Priority**	**High Priority**	**High Priority**	**High Priority**	**High Priority**	**High Priority**	**High Priority**
Federal																
National Marine Fisheries Service and Federal Caucus																
Habitat Goals: The existence of high quality habitats that are protected, degraded habitats that are restored and connected to other functioning habits.	+				+		+	+	+							+
A system where further degradation of tributary and estuary habitat and water quality is prevented.						+	+	+								+
Objective 1. Restore and increase tributary flows to improve fish Spawning, rearing, and migration.				+		+		+								+
Objective 2. Screen diversions, combine diversions, and rescreen existing diversions to comply with NMFS criteria to reduce overall mortality.				+		+										
Objective 3. Reduce passage obstructions to provide immediate benefit to migration, spawning, and rearing.	+			+		+		+	+	+						+

Project Proposal ID	198402500	198805301	198805305	199202601	199202604	199403900	199405400	199608000	199608300	199702500	199800702	199800703	199800704	199801001	199801006	200002100
Hatchery Goal **Research Monitoring and Evaluation Goal:** Identifying trends in abundance and productivity in populations of listed anadromous salmonids.						+					+				+	
Objective 1. Conduct population status monitoring to determine juvenile and adult distribution, population status, and trends.					+	+					+				+	
Objective 2. Monitor the status of environmental attributes potentially affecting salmonid populations, their trends, and associations with salmonid population status.					+	+		+		+	+				+	
Objective 3. Monitor the effectiveness of intended management actions on aquatic systems, and the response of salmonid populations to those actions.						+		+		+	+				+	
Objective 4. Assess quality of available regional databases, in terms of accuracy and completeness, which represent habitat quality throughout the basin.											+				+	
Objective 5. Monitor compliance of management actions toward proper implementation and maintenance.								+			+				+	
Bureau of Reclamation																
Goals: Working with willing private landowners through the existing local infrastructure to improve conditions related to instream flow, barriers, and habitat for anadromous fish.	+					+		+		+						
Objective 1. Restore and increase main stem and tributary flows to improve fish spawning, rearing, and migration.				+		+		+								+
Objective 2. Eliminate barriers to fish passage.	+			+		+		+	+	+						+
Objective 3. Improve habitat for migrating, spawning, and rearing anadromous fish.	+			+		+		+	+	+						+
US Fish and Wildlife Service																
Goal: Protect, restore, and enhance native anadromous and resident fish populations in the Grande Ronde River Basin.		+				+	+			+	+				+	+
Objective 1. Reverse declining trends of bull trout populations in the Grande Ronde River Basin.				+		+	+			+		+				
Objective 2. Increase natural production of anadromous salmonids to meet carrying capacities of the basin.				+		+				+						
Lower Snake River Compensation Plan																
Goal: Return 5,820 spring/summer chinook and 9,184 summer steelhead to the Snake River Basin above Lower Granite Dam.		+									+			+	+	
Objective 1. Provide harvest for sport anglers and tribes.		+									+	+		+	+	
Objective 2. Provide brood stock for hatchery programs.		+									+	+		+	+	
Objective 3. Provide some natural spawning		+									+	+		+	+	

Project Proposal ID	198402500	198805301	198805305	199202601	199202604	199403900	199405400	199608000	199608300	199702500	199800702	199800703	199800704	199801001	199801006	200002100
escapement where appropriate.																
Objective 4. Comply with the Endangered Species Act.		+						+			+	+		+	+	
Objective 5. Meet tribal trust responsibilities.		+						+			+	+		+	+	
Objective 6. Adhere to federal laws, agreements, and court orders.		+						+			+			+	+	
Objective 7. Pursue the USFWS Mission and Vision.								+								
US Forest Service																
Fish and Fish Habitat Objectives (Riparian Management Objectives – RMO)																
Objective 1. Establish Pool Frequencies (#pools/mi) dependent on width of wetted stream Width 10 20 25 50 75 100 125 150 200; #pools 96 56 47 26 23 18 14 12 9	+			+		+		+		+						
Objective 2. Comply with state water quality standards in all systems (max < 68°F).	+			+		+		+		+						
Objective 3. Establish large woody debris in all forested systems (>20 pieces/mi, >12 in diameter, >35 ft length).	+			+		+		+		+						
Objective 4. Ensure > 80% bank stability in non-forested systems.	+			+		+		+		+						+
Objective 5. Reduce bank angles (undercuts) in non-forested systems (>75% of banks with <90% angle).	+			+		+		+		+						
Objective 6. Establish appropriate width/depth ratios in all systems (<10, mean wetted width divided by mean depth).	+			+		+		+		+						
General Riparian Area Management																
Objective 1. Identify and cooperate with federal, Tribal, and state and local governments to secure instream flows needed to maintain riparian resources, channel conditions, and aquatic habitat.				+		+		+								+
Objective 2. Fell trees in Riparian Habitat Conservation Areas when they pose a safety risk. Keep felled trees on site when needed to meet woody debris objectives.				+				+								
Objective 3. Apply herbicides, pesticides, and other toxicants/chemicals in a manner to avoid impacts that are inconsistent with attainment of RMOs.				+				+	+							+
Objective 4. Locate water drafting sites to minimize adverse effects on stream channel stability, sedimentation, and in-stream flows.																
Watershed and Habitat Restoration																
Objective 1. Design and implement watershed restoration projects in a manner that promotes the long-term ecological integrity of ecosystems, conserve the genetic integrity of native species, and contributes to attainment of RMOs.	+			+		+		+	+							+
Objective 2. Cooperate with federal, state, and				+		+		+								

Project Proposal ID	198402500	198805301	198805305	199202601	199202604	199403900	199405400	199608000	199608300	199702500	199800702	199800703	199800704	199801001	199801006	200002100
tribal agencies, and private landowners to develop watershed-based CRMPs or other cooperative agreements to meet RMOs.																
Fisheries and Wildlife Restoration																
Objective 1. Design and implement fish and wildlife habitat restoration and enhancement activities in a manner that contributes to attainment of the RMOs.	+			+		+		+								+
Objective 2. Design, construct, and operate fish and wildlife interpretive and other use-enhancement facilities in a manner that is consistent with attainment of RMOs.				+				+								
Objective 3. Cooperate with federal, state, and tribal wildlife management agencies to identify and eliminate wild ungulate impacts that are inconsistent with attainment of RMOs.				+				+								
Objective 4. Cooperate with federal, state, and tribal fish management agencies to identify and eliminate impacts associated with habitat manipulation, fish stocking, fish harvest, and poaching that threaten the continued existence and distribution of native fish stocks inhabiting federal lands.	+			+		+		+								
Tribal **Nez Perce Tribe**																
Goals: Restore anadromous fishes to the rivers and streams that support the historical, cultural and economic practices of the Nez Perce Tribe (CRITFC 1995).		+		+		+		+		+	+				+	
Emphasize restoration strategies that rely on natural production and healthy river systems (CRITFC 1995).		+		+		+		+		+	+				+	
Protect Tribal sovereignty and treaty rights (CRITFC 1995).		+		+		+		+		+	+				+	
Reclaim the anadromous fish resource and the environment upon which it depends for future generations (CRITFC 1995).		+		+		+		+		+	+				+	
Conserve, restore and recover native resident fish populations (NPT DFRM 2000).				+		+	+	+		+						
Restore upland habitat and the native wildlife populations that depend on it.				+		+		+		+						+
Management Objectives:																
Objective 1. Restore and recover historically present fish species.		+	+	+		+	+				+	+	+	+	+	
Objective 2. Provide for harvestable, self-sustaining populations of anadromous and resident fish species in their native habitat.		+	+	+		+				+	+	+	+	+	+	
Objective 3. Manage salmon and steelhead for long-term population persistence.		+	+	+		+					+	+			+	+
Objective 4. Manage aquatic resources for healthy ecosystem function and rich species biodiversity.		+		+		+		+		+	+				+	+

Project Proposal ID	**198402500**	**198805301**	**198805305**	**199202601**	**199202604**	**199403900**	**199405400**	**199608000**	**199608300**	**199702500**	**199800702**	**199800703**	**199800704**	**199801001**	**199801006**	**200002100**
Objective 5. Implement and enforce existing federal laws for protection of water quality, habitat and aquatic resources.								+							+	
Objective 6. Protect and enhance treaty fishing rights and fishing opportunities.		+		+		+		+			+				+	
Objective 7. Provide optimum tributary stream flows to meet life stage specific habitat requirements of resident and anadromous fish species and all other aquatic species.				+		+		+		+						
Objective 8. Provide optimum mainstem river flows for anadromous fish passage and water spill at mainstem dams to maximize fish survival.								+								
Objective 9. Integrate aquatic habitat and species management with terrestrial species management.				+		+		+								+
Objective 10. Maintain a natural smolt-to-adult survival rate of 2 to 6% for salmon and steelhead.				+												
Objective 11. Meet federal fisheries mitigation responsibilities for LSRCP program.		+	+								+		+		+	
Objective 12. Provide for Tribal hatchery production needs in federal and state managed facilities.		+	+								+		+		+	
Objective 13. Address key limiting survival factors and mainstem hydroelectric facilities.																
Objective 14. Coordinate with the National Marine Fisheries Service and U.S. Fish and Wildlife Service to fund and implement actions identified in the Biological Opinions, and to implement other emergency actions that address imminent fish to listed salmon, steelhead, and bull trout populations.		+	+	+		+					+		+		+	
Objective 15. Develop conservation hatcheries for supplementation of ESA listed fish populations.		+									+				+	
Research Monitoring and Evaluation																
Objective 1. Establish baseline information on the Lostine River chinook salmon subpopulation prior to supplementation and monitor and evaluate the effectiveness of supplementation (NPT DFRM 2000).					+						+				+	
Objective 2. Implement a captive broodstock program to prevent extirpation of native Grande Ronde basin chinook salmon, and maintain genetic diversity in the artificially propagated population (NPT DFRM 2000).		+									+	+		+	+	
Objective 3. Conduct Lower Snake River Compensation Plan (LSRCP) hatchery evaluations (NPT DFRM 2000, Hesse and Kucera 2000).											+				+	
Objective 4. Develop a comprehensive monitoring and evaluation plan including a summary of exiting information on chinook and steelhead population status, including base lien genetic stock structure (NPT DFRM 2000).		+									+	+			+	
Objective 5. Preserve the genetic diversity of salmonid populations at high risk of extirpation through application of cryogenic techniques (NPT DFRM 2000, Armstrong 2000).												+				

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Objective 6. Accurately determine adult chinook salmon spawner abundance and spawner migration timing into the Minam River on an annual basis (NPT DFRM 2000).																
Artificial Production																
Objective 1. Complete planning and development of spring chinook conservation facilities as proposed in the spring chinook master plan.		+				+						+				
Objective 2. Develop a master plan for the development of a native broodstock for steelhead conservation and restoration in the Grande Ronde subbasin and transition of steelhead production in the Imnaha subbasin from mitigation to conservation and restoration.		+				+						+				
Objective 3. Reintroduce and restore coho salmon in the Grande Ronde subbasin.		+				+										
Objective 4. Restore fall chinook salmon in the Imnaha and Grande Ronde subbasins.						+										
Objective 5. Reintroduce and restore sockeye salmon to Wallowa Lake in the Grande Ronde subbasin.		+				+										
Watershed																
Goals: Implement the Wallowa County/Nez Perce Tribe Salmon Habitat Recovery Plan and Multi-Species Strategy.				+		+				+						
Provide habitat for the restoration and enhancement of anadromous salmonids and other native fish species.	+			+		+		+		+						+
Develop recommendations for management and utilization of water by agriculture and other industries.				+		+										
Conduct a public involvement program to address concerns of landowners, land managers and resource users.				+		+										
Provide recommendations for management of resources which will enhance the quality and quantity of stream flows.				+		+		+								
Recommend resource management and research activities.						+		+								
Assure that watershed restoration activities implemented in the Basin are adequately monitored and evaluated.	+			+		+		+								
Restore upland habitat and the native wildlife populations that depend on it.						+		+		+						
Objective 1. Coordinate watershed restoration activities.	+			+		+		+								
Objective 2. Improve in-stream habitat diversity for salmonid spawning and rearing.	+			+		+		+		+						
Objective 3. Enhance riparian condition (vegetation, function, etc.)	+			+		+		+		+						
Objective 4. Reduce stream sedimentation.	+			+		+		+		+						
Objective 5. Increase late-season streamflows.				+		+		+								

Project Proposal ID	**198402500**	**198805301**	**198805305**	**199202601**	**199202604**	**199403900**	**199405400**	**199608000**	**199608300**	**199702500**	**199800702**	**199800703**	**199800704**	**199801001**	**199801006**	**200002100**
Objective 6. Improve upland watershed condition and function.				+		+		+		+						
Objective 7. Improve adult and juvenile salmonid fish passage.	+			+		+		+		+						
Objective 8. Improve water quality.				+		+		+		+						
Confederated Tribes of the Umatilla Indian Reservation																
Goals: Protect, enhance and restore wild and natural populations of spring and fall chinook, summer steelhead, bull trout, shellfish and other indigenous fish in the Grande Ronde Basin.		+		+		+					+			+	+	
Reestablish runs of extirpated coho and sockeye salmon and Pacific lamprey into the Grande Ronde River Basin.		+		+		+										
Provide sustainable ceremonial, subsistence, and recreational fisheries and non-consumptive fish benefits such as cultural and ecological values.		+		+		+					+				+	
Maintain genetic and other biological characteristics of indigenous populations and genetic viability of reintroduced populations.		+		+							+				+	
Objective 1. Achieve and maintain an average run of 16,400 spring chinook to the Grande Ronde River mouth for purposes of natural production, fisheries, and broodstock.		+	+	+							+	+	+	+	+	
Objective 2. Achieve and maintain an average run of 10,000 fall chinook to the Grande Ronde River mouth for purposes of natural production, fisheries, and broodstock.				+								+				
Objective 3. Achieve and maintain an average run of 27,500 summer steelhead to the Grande Ronde River mouth for purposes of natural production, fisheries, and broodstock.		+		+								+				
Objective 4. Reestablish and maintain an average run of 3,500 coho to the Grande Ronde River mouth for purposes of natural production, fisheries, and broodstock.		+		+												
Objective 5. Reestablish and maintain an average run of 2,500 sockeye to the Grande Ronde River mouth for purposes of natural production, fisheries, and broodstock.		+		+												
Objective 6. Achieve and maintain self-sustaining populations and fisheries of Pacific lamprey, bull trout and other indigenous fishes in the Grande Ronde subbasin.				+		+						+				
Tribal and State **Confederated Tribes of the Umatilla Indian Reservation, Nez Perce Tribe and Oregon Department of Fish and Wildlife**																
Habitat Goal and Objectives: Protect and enhance fish habitat of endemic stocks of resident and anadromous salmonids, and maximize natural fish production potential.	+			+		+		+	+	+						+
Objective 1. Achieve a net gain in fish habitat	+			+		+		+	+	+						+

Project Proposal ID	198402500	198805301	198805305	199202601	199202604	199403900	199405400	199608000	199608300	199702500	199800702	199800703	199800704	199801001	199801006	200002100
quantity and quality in the subbasin.																
Objective 2. Develop a habitat database that provides a basis for monitoring short- and long-term change.						+		+								
Objective 3. Develop monitoring programs that ensure land-use practices comply with established standards.				+		+		+								
Objective 4. Achieve and maintain minimum streamflows.				+		+		+								
Fish Goal and Objectives																
Goal: Productive, healthy, and sustainable wild populations of anadromous spring and fall chinook salmon, summer steelhead, and resident trout populations and protected habitat for their continued viability.		+		+		+				+	+	+		+	+	
Spring Chinook Salmon Objective: Achieve restored annual returns of spring chinook salmon to meet recovery goals and allow for resumption of tribal and sport harvest.		+		+		+				+	+	+		+	+	
Fall Chinook Salmon Objective: Increased annual returns of fall chinook salmon to meet recovery goals and allow for harvest to meet social goals.				+		+				+		+				
Summer Steelhead Objective: Achieve restored annual returns of summer steelhead to meet recovery goals and provide for tribal and sport harvest to meet social goals.		+		+		+				+		+				
Coho Salmon Objective: Develop and maintain a hatchery-supplemented and naturally reproducing run of coho salmon to meet recovery goals and provide harvest to meet social goals.		+		+		+				+						
Sockeye Salmon Objective: Develop and maintain a hatchery-supplemented and naturally producing run of sockeye salmon to meet recovery goals and provide harvest to meet social goals.		+		+		+				+						
Bull Trout Recovery Team (State, Federal, Tribal)																
Goal: The recovery of bull trout in the Grande Ronde Recovery Unit and to increase their stability and long-term persistence.				+		+	+			+						
Objective 1. Maintain or expand distribution of bull trout within their current range in the Grande Ronde Recovery Unit.				+		+	+			+						
Objective 2. Maintain stable or increasing trends in abundance of bull trout.				+		+	+			+						
Objective 3. Restore and maintain suitable habitat conditions for all bull trout life history stages and strategies.	+			+		+	+	+	+	+						
Objective 4. Provide opportunities for genetic exchange between local populations.				+		+	+			+						
State of Oregon																
Oregon Department of Forestry																

Project Proposal ID	**198402500**	**198805301**	**198805305**	**199202601**	**199202604**	**199403900**	**199405400**	**199608000**	**199608300**	**199702500**	**199800702**	**199800703**	**199800704**	**199801001**	**199801006**	**200002100**
Goal: Protect, manage and promote a healthy forest environment which will enhance Oregon's livability and economy for today and tomorrow.				+		+		+								
Oregon Department of Agriculture Oregon Noxious Weed Strategic Plan																
Goal: Heightened awareness among Oregon's citizens, the legislature, local governments, tribal governments, conservation organizations and land managers of the impact of noxious weeds and the need for effective noxious weed management.				+		+		+								
Objective 1. Leadership and Organization				+				+								
Objective 2. Cooperative Partnerships				+		+		+								
Objective 3. Planning and Prioritizing				+		+		+								
Objective 4. Education and Awareness				+				+								
Objective 5. Integrated Weed Management (IWM)				+				+		+						+
Objective 6. Early Detection and Control of New Invaders				+				+		+						+
Objective 7. Noxious Weed Information System and Data Collection				+				+								
Objective 8. Monitoring and Evaluation				+				+		+						
Objective 9. Policy, Mandates, Law Compliance and Enforcement				+				+								
Objective 10. Funding and Resources				+				+		+						
Oregon Department of Environmental Quality																
Goal: Restore, maintain and enhance the quality of Oregon's air, water and land.	+			+		+		+		+						
Oregon Parks and Recreation Department																
Goal: Provide and protect outstanding natural, scenic, cultural, historic, and recreational sites for the enjoyment and education of present and future generations.	+			+				+								
Oregon Division of State Lands																
Goals: Manage and protect state trust lands for the maximum long-term benefit of the public schools, consistent with sound stewardship, conservation and business management principles.																
Manage non-trust lands for the greatest benefit of all the people of the state.								+								
Oregon State Police																
Goal: Develop, promote and maintain protection of the people, property, and natural resources of the state.				+												
Department of Land Conservation and Development																
Goals: Establish a framework for all land use decisions and actions.				+		+										
Preserve and maintain all agricultural lands.				+		+										
Conserve forest lands in a manner consistent				+		+		+								

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with sound management of soil, air, water, and fish and wildlife resources, and to provide for recreational opportunities and agriculture.																
Protect natural resources and conserve scenic and historic areas and open spaces.				+		+		+								
Maintain and improve the quality of the air, water, and land resources of the state.				+		+		+								
Protect life and property from natural disasters and hazards.						+		+								
Oregon Water Resources Department																
Goal: To serve the public by practicing and promoting wise long-term water management.				+				+								
Oregon Revised Statute – ORS 496.012																
Goals: Species of wildlife maintained at optimum levels.				+				+								+
Lands and waters of this state that are developed and managed to enhance the production and public enjoyment of wildlife.				+		+		+								+
Utilization of wildlife that is orderly and equitable.								+								
Public access to lands and waters of the state, and the wildlife resources thereon, that are developed and maintained.								+								+
Wildlife populations and public enjoyment of wildlife are regulated compatibly with primary uses of the lands and waters of the state.								+								
Provision of optimal recreational benefits.								+								+
Oregon Department of Fish and Wildlife																
Fish Objectives for Steelhead and Spring Chinook Salmon																
Goals: Fish recovery and production that are defined through the LSRCP, NEOH and GRESP programs.		+		+		+					+			+	+	
Objective 1. Achieve a sufficient spawner numbers and productivity of Grande Ronde Basin spring chinook salmon, by restoring and maintaining natural spawning populations, to will allow delisting.		+	+	+		+				+	+	+	+	+	+	
Objective 2. Reduce the demographic risks associated with the low productivity and decline of native spring chinook salmon populations in Catherine Creek, Lostine River and Grande Ronde River.		+	+	+		+				+	+	+	+		+	
Objective 3. Maintain artificial production programs for spring chinook salmon and steelhead, using locally-adapted broodstocks to meet recovery, conservation and harvest goals, and mitigate for fish losses associated with construction and operation of lower Snake River dams.		+	+								+	+	+	+	+	
Objective 4. Establish an annual supply of steelhead and spring chinook salmon brood fish		+	+	+							+	+	+	+	+	

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capable of meeting annual production goals.																
Objective 5. Maintain sport and tribal fisheries for steelhead and reestablish fisheries for spring chinook salmon, consistent with protection of endemic, naturally-produced stocks. Determine the number of summer steelhead and spring chinook salmon harvested annually and angler effort in recreational fisheries on the Grande Ronde and Wallowa rivers.		+		+							+				+	
Objective 6. Identify, conserve, and monitor the life history characteristics of chinook salmon and resident and anadromous forms of Oncorhynchus mykiss in northeast Oregon.		+			+						+	+			+	
Objective 7. Maintain genetic diversity of indigenous, artificially-propagated spring chinook salmon populations in Catherine Creek, Lostine River and Grande Ronde River.		+									+	+		+	+	
Objective 8. Identify, evaluate, conserve and enhance natural production and genetic diversity of natural stocks of steelhead and chinook salmon (e.g., Minam and Wenaha rivers).		+		+	+	+				+				+		
Objective 9. Minimize impacts of hatchery programs on resident fish and naturally produced spring chinook salmon and steelhead.		+									+	+		+	+	
Objective 10. Modify facilities at Lookingglass Fish Hatchery to provide capability to implement Captive and Conventional hatchery programs.		+														
Objective 11. Determine optimum program operational criteria to ensure success of achieving objectives.		+														
Objective 12. Assess utility of Conventional and Captive broodstock programs for use in recovering salmonid populations.		+									+	+			+	
Objective 13. Develop facilities and operations to improve safety and productivity of the hatchery environment for captive and conventional chinook salmon programs.		+									+				+	
Objective 14. Collect information to allow implementation of adaptive management process to evaluate management practices in the Grande Ronde Basin.		+		+							+	+			+	
Warmwater Game Fish Plan																
Goal: Provide optimum recreational benefits to the people of Oregon by managing warmwater game fishes and their habitats.						+				+						
Objective 1. Provide diversity of angling opportunity.								+								
Trout Plan																
Goal: Achieve and maintain optimum populations and production of trout to maximize benefits and to insure a wide diversity of opportunity for present and future citizens.				+		+				+						

Project Proposal ID	198402500	198805301	198805305	199202601	199202604	199403900	199405400	199608000	199608300	199702500	199800702	199800703	199800704	199801001	199801006	200002100
Objective 1. Maintain the genetic diversity and integrity of wild trout stocks throughout Oregon.				+												
Objective 2. Protect, restore and enhance trout habitat.	+			+		+			+	+						+
Objective 3. Provide a diversity of trout angling opportunities.								+								
Objective 4. Determine the statewide management needs for hatchery trout.																
Steelhead Plan																
Goal: Sustain healthy and abundant wild populations of steelhead.				+		+				+						
Objective 1. Protect and restore spawning and rearing habitat.	+			+		+		+		+						
Objective 2. Provide safe migration corridors.	+			+		+		+		+						+
Objective 3. Protect wild populations of steelhead from overharvest.																
Objective 4. Protect wild populations of steelhead from detrimental interactions with hatchery fish.																
Objective 5. Monitor the status of wild steelhead populations so that long-term trends in populations can be determined.					+	+						+				
Goal: Provide recreational, economic, cultural and aesthetic benefits from fishing and non-fishing uses of steelhead.				+				+								
Objective 6. Provide for harvest by Treaty Tribes without overharvesting wild fish.								+								
Objective 7. Provide recreational angling opportunities reflecting the desires of the public while minimizing impacts on wild fish.								+								
Objective 8. Increase non-angling uses of steelhead that provide recreation.																
Goal: Involve the public in steelhead management and coordinate ODFW actions with Tribes and other agencies.				+		=										
Objective 9. Increase awareness of issues facing steelhead management and ODFW's management programs.				+												
Objective 10. Provide a forum for public input on steelhead management.				+												
Objective 11. Coordinate ODFW steelhead management activities with other habitat and fisheries managers.				+		+										
Kokanee Plan																
Goal: Maintain a productive population of kokanee in Wallowa Lake capable of sustaining recreational harvest.																
Objective 1. Understand relationships among kokanee and introduced lake trout and *mysid* populations in Wallowa Lake.					+											
Objective 2. Identify potential tools to control lake trout abundance.																

Project Proposal ID	198402500	198805301	198805305	199202601	199202604	199403900	199405400	199608000	199608300	199702500	199800702	199800703	199800704	199801001	199801006	200002100
Oregon Wildlife Diversity Plan (ODFW 1993)																
Goal: Maintain Oregon’s wildlife diversity by protecting and enhancing populations and habitats of native non-game wildlife at self-sustaining levels throughout natural geographic ranges.	+			+		+		+		+						+
Objective 1. Protect and enhance populations of all existing native non-game species at self-sustaining levels throughout their natural geographic ranges by supporting the maintenance, improvement or expansion of habitats and by conducting other conservation actions.	+					+		+		+						+
Objective 2. Restore and maintain self-sustaining populations of non-game species extirpated from the state or regions within the state, consistent with habitat availability, public acceptance, and other uses of the lands and waters of the state.								+								
Objective 3. Provide recreational, educational, aesthetic, scientific, economic and cultural benefits derived from Oregon’s diversity of wildlife.				+				+								+
Objective 4. Address conflicts between non-game wildlife and people to minimize adverse economic, social, and biological impacts.				+				+								
Oregon Black Bear Management Plan (ODFW 1987)																
Goal: Protect and enhance black bear populations in Oregon to provide optimum recreational benefits to the public and to be compatible with habitat capability and primary land uses.																
Objective 1. Determine black bear population characteristics.																
Objective 2. Determine black bear harvest levels.																
Objective 3. Continue current practice of allowing private and public landowners to take damage causing black bear without a permit.																
Oregon’s Cougar Management Plan (ODFW 1993a)																
Goals: Recognize the cougar as an important part of Oregon’s wildlife fauna, valued by many Oregonians.								+								
Maintain healthy cougar populations within the state into the future.								+								
Conduct a management program that maintains healthy populations of cougar and recognizes the desires of the public and the statutory obligations of the Department.								+								
Objective 1. Continue to gather information on which to base cougar management.																
Objective 2. Continue to enforce cougar harvest regulations.																
Objective 3. Document and attempt to eliminate potential future human-cougar conflicts.								+								
Objective 4. Manage cougar populations through																

Project Proposal ID	198402500	198805301	198805305	199202601	199202604	199403900	199405400	199608000	199608300	199702500	199800702	199800703	199800704	199801001	199801006	200002100
controlled hunting seasons.																
Objective 5. Continue to allow private and public landowners to take damage-causing cougar without a permit.																
Objective 6. Manage deer and elk populations to maintain the primary prey source for cougar.								+								
Mule Deer Management Plan (ODFW 1990)																
Goals: Increase deer numbers in units that are below management objectives and attempt to determine what factors are contributing to long term depressed mule deer populations.								+								
Maintain population levels where hers are at management objectives.																
Reduce populations in the areas where deer numbers exceed population management objectives.																
Population objectives were set by Oregon Department of Fish and Wildlife Commission action in 1982 and are to be considered maximums.																
Objective 1. Set management objectives for buck ratio, population level/density and fawn:doe ratio benchmark for each hunt unit and adjust as necessary.																
Objective 2. Hunter opportunity will not be maintained at the expense of meeting population and buck ratio management objectives.																
Oregon's Elk Management Plan (ODFW 1992)																
Goal: Protect and enhance elk populations in Oregon to provide optimum recreational benefits to the public and to be compatible with habitat capability and primary land uses.								+								
Objective 1. Maximize recruitment into elk populations and maintain bull ratios at Management Objective levels. Establish Management Objectives for population size in all herds, and maintain populations at or near those objectives.																
Objective 2. Coordinate with landowners to maintain, enhance and restore elk habitat.								+								
Objective 3. Enhance consumptive and non-consumptive recreational uses of Oregon's elk resource.								+								
Oregon's Bighorn Sheep Management Plan (ODFW 1992)																
Goal: Restore bighorn sheep into as much suitable unoccupied habitat as possible.																
Objective 1. Maintain geographical separation of California and Rocky Mountain subspecies.																
Objective 2. Maintain healthy bighorn sheep populations.								+								
Objective 3. Improve bighorn sheep habitat as								+								

Project Proposal ID	198402500	198805301	198805305	199202601	199202604	199403900	199405400	199608000	199608300	199702500	199800702	199800703	199800704	199801001	199801006	200002100
needed and as funding becomes available.																
Objective 4. Provide recreational ram harvest opportunities when bighorn sheep population levels reach 60 to 90 animals.																
Objective 5. Conduct annual herd composition, lamb production, summer lamb survival, habitat use and condition, and general herd health surveys.																
Oregon Migratory Game Bird Program Strategic Management Plan (ODFW 19193)																
Goal: Protect and enhance populations and habitats of native migratory game birds and associated species at prescribed levels throughout natural geographic ranges in Oregon and the Pacific flyway to contribute to Oregon's wildlife diversity and the uses of those resources.						+		+		+						+
Objective 1. Integrate state, federal, and local programs to coordinate biological surveys, research, and habitat development to obtain improved population information and secure habitats for the benefit of migratory game birds and other associated species.						+		+		+						
Objective 2. Assist in the development and implementation of the migratory game bird management program through information exchange and training.								+								
Objective 3. Provide recreational, aesthetic, educational, and cultural benefits from migratory game birds, other associated wildlife species, and their habitats.								+								+
Objective 4. Seek sufficient funds to accomplish programs consistent with the objectives outlined in the plan and allocate funds to programs based on management priorities.								+								
Other General Habitat Goals, Objectives and Strategies that might be applicable																
Goal: Protect and maintain remaining high quality riparian, aquatic, and upland habitats.				+		+		+		+						+
Objective 1. Maintain or increase wildlife species diversity				+				+								+
State of Washington																
Washington Department of Fish and Wildlife																
Goals: Protect, restore, and enhance the abundance and distribution of wild summer steelhead, spring chinook salmon, bull trout and other indigenous fish in the subbasin to provide non-consumptive fish benefits including cultural or ecological values.		+		+							+			+	+	
Maintain, enhance, or restore sustainable fishery and harvest opportunities for anadromous and resident fish.		+		+				+			+			+	+	
Maintain or enhance genetic and other		+		+							+			+	+	

Project Proposal ID	**198402500**	**198805301**	**198805305**	**199202601**	**199202604**	**199403900**	**199405400**	**199608000**	**199608300**	**199702500**	**199800702**	**199800703**	**199800704**	**199801001**	**199801006**	**200002100**
biological characteristics of naturally and hatchery produced anadromous and resident fish.																
Objective 1. Increase native or hatchery chinook salmon to sustainable and harvestable levels. Determine the wild and hatchery escapement goals to meet this objective.		+		+							+			+	+	
Objective 2. Increase native summer steelhead to sustainable and harvestable levels. Refine the wild fish escapement goal and needs. Meet the LSRCP goal to return an average of 1,250 adult hatchery steelhead to the Lower Grande Ronde River annually for harvest.		+		+												
Objective 3. Restore and maintain the health and diversity of bull trout and other resident salmonids to sustainable and harvestable levels. Determine the spawning escapement goals and population needs of resident fish.				+												
Objective 4. Maintain warmwater and other fisheries as appropriate without conflicting with indigenous fish needs.																
County and Local **Wallowa County**																
Goals: Wallowa County is part of the Grande Ronde Model Watershed Program and supports their goals, objectives, and strategies.				+		+		+		+						
Provide quality habitat for native wildlife found in the county.				+		+		+		+						
Grande Ronde Model Watershed Program **GRMWP Mission Statement**																
Goals: Provide habitat for the restoration and enhancement of anadromous salmonids and other native fish species.	+			+		+		+		+						+
Develop recommendations for management and utilization of water by agriculture and other industries.				+		+										
Conduct a public involvement program to address concerns of landowners, land managers and resource users.				+		+		+								
Provide recommendations for management of resources, which will enhance the quality and quantity of stream flows.				+		+		+								
Recommend resource management and research activities, which meet the Program mission.				+		+		+								
Promote the mission, goals and objectives of the Program to regional, state and national entities.				+		+		+								
Assure that watershed restoration activities implemented in the Basin are adequately monitored and evaluated.				+		+		+								
Protect the customs, culture, and economic stability of the citizens of the Basin, the Nez Perce Tribe, Confederated Tribes of the Umatilla Indian Reservation, and the citizens of the United States of America.				+		+		+			+				+	

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Objective 1. Coordinate program administration and watershed restoration activities.				+		+		+								
Objective 2. Improve in-stream habitat diversity for salmonid spawning and rearing.	+			+		+		+		+						
Objective 3. Enhance riparian condition (vegetation, function, etc.)	+			+		+		+		+						+
Objective 4. Reduce stream sedimentation.	+			+		+		+		+						+
Objective 5. Increase late-season streamflows.				+		+		+								+
Objective 6. Improve upland watershed condition and function.				+		+		+		+						+
Objective 7. Improve adult and juvenile salmonid fish passage.	+			+		+		+		+						+
Objective 8. Improve water quality.																
Wallowa Soil and Water Conservation District																
Goals: Healthy economy and desirable quality of life in Wallowa County.				+		+		+		+	+				+	
Productive and healthy watersheds in Wallowa County.				+		+		+		+						
Habitat quality and quantity for sustainable populations of native and anadromous fish species and native wildlife.				+		+		+		+						
Objective 1. Continue to assist landowners/cooperators in meeting local, state, and federal natural resource goals.				+		+		+								
Objective 2. Continue to promote efficient management and ranch planning for resource conservation and economic viability.				+		+										
Objective 3. Continue to address fish passage issues related to irrigation diversions.				+		+				+						
Objective 4. Continue to address irrigation tailwater returns.				+		+				+						
Objective 5. Continue to address water conservation and efficient use of irrigation water.				+		+		+								
Objective 6. Continue to address riparian ecosystem restoration and enhancement.				+		+		+		+						
Objective 7. Continue to address upland restoration and enhancement.				+		+		+		+						
Union Soil and Water Conservation District																
Goals: Identify local conservation needs. Develop, implement, and evaluate programs to meet them.				+		+		+								
Educate and inform landowners and operators, general public and local, state, and federal legislator on conservation issues and programs.				+		+		+								
Participate in water management planning to advocate and sponsor watershed improvement projects in a coordinated effort with our partners.				+		+										
Supervise staff and volunteers working for the district, coordinate with other cooperating agency personnel.																
Coordinate assistance and funding from federal, state, and local government: Oregon Association				+		+										

Project Proposal ID	198402500	198805301	198805305	199202601	199202604	199403900	199405400	199608000	199608300	199702500	199800702	199800703	199800704	199801001	199801006	200002100
on Conservation Districts (OACD), National Association of Conservation Districts (NACD), district associations and private groups.																
Assist the Oregon Department Agriculture (ODA) with the administration of their programs.				+												
Objective 1. Agricultural Water Quality Management Plan				+												
Objective 2. Area Planning				+												
Objective 3. Education				+												
Objective 4. Noxious Weeds				+												
Grande Ronde Water Quality Committee																
Goal: To meet the necessary load allocations and achieve the water quality standards primarily by implementing management measures that will improve stream temperature, dissolved oxygen and pH. Protect the beneficial uses of the waters of the subbasin by implementing management measures to protect existing high quality waters and to improve water quality of impaired waters to the point that state water quality standards are met.				+		+		+								
Objective 1. Eliminate point source discharges of nutrients during the summer.				+		+		+								
Objective 2. Reduce NPS pollution contributions from transportation sources.				+				+								
Objective 3. Reduce NPS pollution contributions from residential and commercial sources.				+				+								
Objective 4. Reduce NPS pollution contributions from forest sources.				+				+								
Objective 5. Reduce non-point pollution contributions from agricultural sources.				+		+		+								
Asotin County Conservation District																
Goal: Restore sustainable, naturally producing populations of spring and fall chinook salmon, bull trout, and summer steelhead populations to support tribal and non-tribal harvest and cultural and economic practices while protecting the biological integrity and genetic diversity of these species in the watershed.				+		+				+						
Objective 1. Reduce pre-spawner adult mortality.				+		+				+						
Objective 2. Increase incubation success.				+		+				+						
Objective 3. Increase juvenile salmonid survival.				+		+				+						
Asotin County Noxious Weed Board																
Goal: To provide technical assistance to the citizens of the county in developing effective control strategies in dealing with their noxious weed problems and encourage people to be good land stewards.				+				+								
Objective 1. Develop and maintain an accurate and comprehensive noxious weed inventory – with special emphasis toward locating and destroying new invading species.				+				+		+						

Project Proposal ID	198402500	198805301	198805305	199202601	199202604	199403900	199405400	199608000	199608300	199702500	199800702	199800703	199800704	199801001	199801006	200002100
Objective 2. Develop an effective educational program to be disseminated as required to schools and all user groups as necessary.				+				+								
Objective 3. Weed control staff will strive to be current with the latest techniques in noxious weed control methods.				+				+								
Objective 4. Weed control staff will maintain response to public need as the top priority.				+				+								
Objective 5. Every effort will be made to facilitate landowners in achieving compliance with RCW 17.10.				+				+								
Wallowa Resources																
Goal: To catalyze and facilitate community based stewardship in Wallowa County.				+		+		+								
Objective 1. Promote community, forest and watershed health.	+			+		+		+								
Objective 2. Create and maintain family-wage job and business opportunities.				+		+										
Objective 3. Broaden understanding of the links between community well-being and ecosystem health.				+		+		+								

These Projects are referenced by ID above:
198402500 – Grande Ronde Basin Fish Habitat Enhancement
198805301 – Northeast Oregon Hatchery Master Plan
198805305 – Northeast Oregon Hatcheries Implementation (ODFW)
199202601 – Implement the Grande Ronde Model Watershed Program Administration and Habitat Restoration Projects
119202604 – Investigate Life History of Spring Chinook Salmon and Summer Steelhead in the Grande Ronde River Basin and Monitor Salmonid Populations and Habitat
199403900 – Watershed Restoration Planner
199405400 – Characterize the Migratory Patterns, Population Structure, Food Habits, Abundance of Bull Trout from Subbasins in the Blue Mountain Province.
199608000 – NE Oregon Wildlife Mitigation Project -- "Precious Lands"
199608300 – CTUIR Grande Ronde Subbasin Restoration
199702500 – Implement The Wallowa County/Nez Perce Tribe Salmon Habitat Recovery Plan
199800702 – Grande Ronde Supplementation: Lostine River O&M and M&E
199800703 – Facility O&M And Program M&E For Grande Ronde Spring Chinook Salmon and Summer Steelhead
199800704 – Northeast Oregon Hatcheries Implementation (ODFW)
199801001 – Grande Ronde Basin Spring Chinook Captive Broodstock Program
199801006 – Captive Broodstock Artificial Propagatio
200002100 - Securing Wildlife Mitigation Sites - Oregon, Ladd Marsh WMA Additions

Note: + = potential or anticipated effect on subbasin objectives.

Table 41. Grande Ronde Subbasin Summary FY 2002-2004 Funding Proposal Matrix - New Project Proposals

Project Proposal ID	27003	27004	27005	27006	27007	27008	27011	27012	27013	27018	27019	27020	27022	27023	27024

Project Proposal ID	27003	27004	27005	27006	27007	27008	27011	27012	27013	27018	27019	27020	27022	27023	27024
Provincial Team Funding Recommendation	Do Not Fund	Recom. Action	Do Not Fund	Do Not Fund	Deferred	Recom. Action	High Priority	Recom. Action	Recom. Action	High Priority	Deferred	Recom. Action	Recom. Action	High Priority	Recom. Action
Federal															
National Marine Fisheries Service and Federal Caucus															
Habitat Goals: The existence of high quality habitats that are protected, degraded habitats that are restored and connected to other functioning habits.	+						+	+	+			+		+	
A system where further degradation of tributary and estuary habitat and water quality is prevented.							+	+						+	
Objective 1. Restore and increase tributary flows to improve fish Spawning, rearing, and migration.												+		+	
Objective 2. Screen diversions, combine diversions, and rescreen existing diversions to comply with NMFS criteria to reduce overall mortality.										+					
Objective 3. Reduce passage obstructions to provide immediate benefit to migration, spawning, and rearing.		+							+			+	+	+	
Hatchery Goal **Research Monitoring and Evaluation Goal:** Identifying trends in abundance and productivity in populations of listed anadromous salmonids.											+				
Objective 1. Conduct population status monitoring to determine juvenile and adult distribution, population status, and trends.											+				
Objective 2. Monitor the status of environmental attributes potentially affecting salmonid populations, their trends, and associations with salmonid population status.											+			+	
Objective 3. Monitor the effectiveness of intended management actions on aquatic systems, and the response of salmonid populations to those actions.											+			+	
Objective 4. Assess quality of available regional databases, in terms of accuracy and completeness, which represent habitat quality throughout the basin.															
Objective 5. Monitor compliance of management actions toward proper implementation and maintenance.														+	
Bureau of Reclamation															
Goals: Working with willing private landowners through the existing local infrastructure to improve conditions related to instream flow, barriers, and habitat for anadromous fish.									+			+		+	
Objective 1. Restore and increase main stem and tributary flows to improve fish spawning, rearing, and migration.												+		+	
Objective 2. Eliminate barriers to fish passage.		+							+	+		+	+	+	
Objective 3. Improve habitat for migrating, spawning, and rearing anadromous fish.									+	+		+		+	
US Fish and Wildlife Service															
Goal: Protect, restore, and enhance native anadromous and resident fish populations in the Grande Ronde River Basin.							+					+			

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Objective 1. Reverse declining trends of bull trout populations in the Grande Ronde River Basin.							+					+			
Objective 2. Increase natural production of anadromous salmonids to meet carrying capacities of the basin.												+			
Lower Snake River Compensation Plan															
Goal: Return 5,820 spring/summer chinook and 9,184 summer steelhead to the Snake River Basin above Lower Granite Dam.															
Objective 1. Provide harvest for sport anglers and tribes.													+		
Objective 2. Provide brood stock for hatchery programs.															
Objective 3. Provide some natural spawning escapement where appropriate.															
Objective 4. Comply with the Endangered Species Act.															
Objective 5. Meet tribal trust responsibilities.													+	+	
Objective 6. Adhere to federal laws, agreements, and court orders.														+	
Objective 7. Pursue the USFWS Mission and Vision.														+	
														+	
US Forest Service															
Fish and Fish Habitat Objectives (Riparian Management Objectives – RMO)															
Objective 1. Establish Pool Frequencies (#pools/mi) dependent on width of wetted stream Width 10 20 25 50 75 100 125 150 200; #pools 96 56 47 26 23 18 14 12 9														+	
Objective 2. Comply with state water quality standards in all systems (max < 68°F).														+	
Objective 3. Establish large woody debris in all forested systems (>20 pieces/mi, >12 in diameter, >35 ft length).														+	
Objective 4. Ensure > 80% bank stability in non-forested systems.														+	
Objective 5. Reduce bank angles (undercuts) in non-forested systems (>75% of banks with <90% angle).														+	
Objective 6. Establish appropriate width/depth ratios in all systems (<10, mean wetted width divided by mean depth).														+	
General Riparian Area Management															
Objective 1. Identify and cooperate with federal, Tribal, and state and local governments to secure instream flows needed to maintain riparian resources, channel conditions, and aquatic habitat.												+		+	
Objective 2. Fell trees in Riparian Habitat Conservation Areas when they pose a safety risk. Keep felled trees on site when needed to meet woody debris objectives.						+								+	
Objective 3. Apply herbicides, pesticides, and other toxicants/chemicals in a manner to avoid impacts that are inconsistent with attainment of RMOs.														+	
Objective 4. Locate water drafting sites to minimize adverse effects on stream channel stability, sedimentation, and in-stream flows.															
Watershed and Habitat Restoration															
Objective 1. Design and implement watershed restoration projects in a manner that promotes the long-term ecological integrity of ecosystems, conserve the genetic integrity of native species, and	+			+		+		+				+		+	

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contributes to attainment of RMOs.															
Objective 2. Cooperate with federal, state, and tribal agencies, and private landowners to develop watershed-based CRMPs or other cooperative agreements to meet RMOs.	+													+	
Fisheries and Wildlife Restoration															
Objective 1. Design and implement fish and wildlife habitat restoration and enhancement activities in a manner that contributes to attainment of the RMOs.	+					+		+				+		+	
Objective 2. Design, construct, and operate fish and wildlife interpretive and other use-enhancement facilities in a manner that is consistent with attainment of RMOs.	+													+	
Objective 3. Cooperate with federal, state, and tribal wildlife management agencies to identify and eliminate wild ungulate impacts that are inconsistent with attainment of RMOs.														+	
Objective 4. Cooperate with federal, state, and tribal fish management agencies to identify and eliminate impacts associated with habitat manipulation, fish stocking, fish harvest, and poaching that threaten the continued existence and distribution of native fish stocks inhabiting federal lands.														+	
Tribal **Nez Perce Tribe**															
Goals: Restore anadromous fishes to the rivers and streams that support the historical, cultural and economic practices of the Nez Perce Tribe (CRITFC 1995).												+		+	
Emphasize restoration strategies that rely on natural production and healthy river systems (CRITFC 1995).							+				+	+		+	
Protect Tribal sovereignty and treaty rights (CRITFC 1995).											+			+	
Reclaim the anadromous fish resource and the environment upon which it depends for future generations (CRITFC 1995).	+											+		+	
Conserve, restore and recover native resident fish populations (NPT DFRM 2000).												+		+	
Restore upland habitat and the native wildlife populations that depend on it.	+											+		+	
Management Objectives:															
Objective 1. Restore and recover historically present fish species.												+			
Objective 2. Provide for harvestable, self-sustaining populations of anadromous and resident fish species in their native habitat.												+			
Objective 3. Manage salmon and steelhead for long-term population persistence.											+	+			+
Objective 4. Manage aquatic resources for healthy ecosystem function and rich species biodiversity.							+					+		+	
Objective 5. Implement and enforce existing federal laws for protection of water quality, habitat and aquatic resources.													+	+	
Objective 6. Protect and enhance treaty fishing rights and fishing opportunities.														+	
Objective 7. Provide optimum tributary stream flows to meet life stage specific habitat requirements of resident and anadromous fish species and all other aquatic species.												+		+	
Objective 8. Provide optimum mainstem river flows for anadromous fish passage and water spill at mainstem dams to maximize fish survival.												+		+	

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Objective 9. Integrate aquatic habitat and species management with terrestrial species management.	+													+	
Objective 10. Maintain a natural smolt-to-adult survival rate of 2 to 6% for salmon and steelhead.															
Objective 11. Meet federal fisheries mitigation responsibilities for LSRCP program.															
Objective 12. Provide for Tribal hatchery production needs in federal and state managed facilities.															
Objective 13. Address key limiting survival factors and mainstem hydroelectric facilities.															
Objective 14. Coordinate with the National Marine Fisheries Service and U.S. Fish and Wildlife Service to fund and implement actions identified in the Biological Opinions, and to implement other emergency actions that address imminent fish to listed salmon, steelhead, and bull trout populations.													+		
Objective 15. Develop conservation hatcheries for supplementation of ESA listed fish populations.															
Research Monitoring and Evaluation															
Objective 1. Establish baseline information on the Lostine River chinook salmon subpopulation prior to supplementation and monitor and evaluate the effectiveness of supplementation (NPT DFRM 2000).															
Objective 2. Implement a captive broodstock program to prevent extirpation of native Grande Ronde basin chinook salmon, and maintain genetic diversity in the artificially propagated population (NPT DFRM 2000).															
Objective 3. Conduct Lower Snake River Compensation Plan (LSRCP) hatchery evaluations (NPT DFRM 2000, Hesse and Kucera 2000).															
Objective 4. Develop a comprehensive monitoring and evaluation plan including a summary of exiting information on chinook and steelhead population status, including base line genetic stock structure (NPT DFRM 2000).											+				+
Objective 5. Preserve the genetic diversity of salmonid populations at high risk of extirpation through application of cryogenic techniques (NPT DFRM 2000, Armstrong 2000).															
Objective 6. Accurately determine adult chinook salmon spawner abundance and spawner migration timing into the Minam River on an annual basis (NPT DFRM 2000).											+				
Artificial Production															
Objective 1. Complete planning and development of spring chinook conservation facilities as proposed in the spring chinook master plan.															
Objective 2. Develop a master plan for the development of a native broodstock for steelhead conservation and restoration in the Grande Ronde subbasin and transition of steelhead production in the Imnaha subbasin from mitigation to conservation and restoration.															
Objective 3. Reintroduce and restore coho salmon in the Grande Ronde subbasin.															
Objective 4. Restore fall chinook salmon in the Imnaha and Grande Ronde subbasins.															

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Objective 5. Reintroduce and restore sockeye salmon to Wallowa Lake in the Grande Ronde subbasin.															
Watershed															
Goals: Implement the Wallowa County/Nez Perce Tribe Salmon Habitat Recovery Plan and Multi-Species Strategy.	+													+	
Provide habitat for the restoration and enhancement of anadromous salmonids and other native fish species.								+				+		+	
Develop recommendations for management and utilization of water by agriculture and other industries.	+														
Conduct a public involvement program to address concerns of landowners, land managers and resource users.	+														
Provide recommendations for management of resources which will enhance the quality and quantity of stream flows.												+		+	
Recommend resource management and research activities.	+													+	
Assure that watershed restoration activities implemented in the Basin are adequately monitored and evaluated.	+													+	
Restore upland habitat and the native wildlife populations that depend on it.	+													+	
Objective 1. Coordinate watershed restoration activities.	+													+	
Objective 2. Improve in-stream habitat diversity for salmonid spawning and rearing.						+		+	+			+		+	
Objective 3. Enhance riparian condition (vegetation, function, etc.)	+					+		+	+					+	
Objective 4. Reduce stream sedimentation.						+	+		+					+	
Objective 5. Increase late-season streamflows.												+		+	
Objective 6. Improve upland watershed condition and function.							+							+	
Objective 7. Improve adult and juvenile salmonid fish passage.									+			+	+	+	
Objective 8. Improve water quality.									+			+		+	
Confederated Tribes of the Umatilla Indian Reservation															
Goals: Protect, enhance and restore wild and natural populations of spring and fall chinook, summer steelhead, bull trout, shellfish and other indigenous fish in the Grande Ronde Basin.										+					
Reestablish runs of extirpated coho and sockeye salmon and Pacific lamprey into the Grande Ronde River Basin.															
Provide sustainable ceremonial, subsistence, and recreational fisheries and non-consumptive fish benefits such as cultural and ecological values.															
Maintain genetic and other biological characteristics of indigenous populations and genetic viability of reintroduced populations.															
Objective 1. Achieve and maintain an average run of 16,400 spring chinook to the Grande Ronde River mouth for purposes of natural production, fisheries, and broodstock.															
Objective 2. Achieve and maintain an average run of 10,000 fall chinook to the Grande Ronde River mouth for purposes of natural production, fisheries, and broodstock.															
Objective 3. Achieve and maintain an average run of 27,500 summer steelhead to the Grande Ronde River mouth for purposes of natural production, fisheries, and broodstock.															
Objective 4. Reestablish and maintain an average run of 3,500 coho to the Grande Ronde River mouth for purposes of natural production, fisheries, and broodstock.															

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Objective 5. Reestablish and maintain an average run of 2,500 sockeye to the Grande Ronde River mouth for purposes of natural production, fisheries, and broodstock.															
Objective 6. Achieve and maintain self-sustaining populations and fisheries of Pacific lamprey, bull trout and other indigenous fishes in the Grande Ronde subbasin.															
Tribal and State **Confederated Tribes of the Umatilla Indian Reservation, Nez Perce Tribe and Oregon Department of Fish and Wildlife**															
Habitat Goal and Objectives: Protect and enhance fish habitat of endemic stocks of resident and anadromous salmonids, and maximize natural fish production potential.												+			
Objective 1. Achieve a net gain in fish habitat quantity and quality in the subbasin.	+					+	+	+				+		+	
Objective 2. Develop a habitat database that provides a basis for monitoring short- and long-term change.	+										+			+	
Objective 3. Develop monitoring programs that ensure land-use practices comply with established standards.	+													+	
Objective 4. Achieve and maintain minimum streamflows.												+		+	
Fish Goal and Objectives															
Goal: Productive, healthy, and sustainable wild populations of anadromous spring and fall chinook salmon, summer steelhead, and resident trout populations and protected habitat for their continued viability.												+			+
Spring Chinook Salmon Objective: Achieve restored annual returns of spring chinook salmon to meet recovery goals and allow for resumption of tribal and sport harvest.															
Fall Chinook Salmon Objective: Increased annual returns of fall chinook salmon to meet recovery goals and allow for harvest to meet social goals.															
Summer Steelhead Objective: Achieve restored annual returns of summer steelhead to meet recovery goals and provide for tribal and sport harvest to meet social goals.															
Coho Salmon Objective: Develop and maintain a hatchery-supplemented and naturally reproducing run of coho salmon to meet recovery goals and provide harvest to meet social goals.															
Sockeye Salmon Objective: Develop and maintain a hatchery-supplemented and naturally producing run of sockeye salmon to meet recovery goals and provide harvest to meet social goals.															
Bull Trout Recovery Team (State, Federal, Tribal)															
Goal: The recovery of bull trout in the Grande Ronde Recovery Unit and to increase their stability and long-term persistence.												+			
Objective 1. Maintain or expand distribution of bull trout within their current range in the Grande Ronde Recovery Unit.															
Objective 2. Maintain stable or increasing trends in abundance of bull trout.															
Objective 3. Restore and maintain suitable habitat conditions for all bull trout life history stages and strategies.						+			+			+		+	
Objective 4. Provide opportunities for genetic exchange between local populations.									+						

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State of Oregon															
Oregon Department of Forestry															
Goal: Protect, manage and promote a healthy forest environment which will enhance Oregon's livability and economy for today and tomorrow.	+													+	
Oregon Department of Agriculture **Oregon Noxious Weed Strategic Plan**															
Goal: Heightened awareness among Oregon's citizens, the legislature, local governments, tribal governments, conservation organizations and land managers of the impact of noxious weeds and the need for effective noxious weed management.														+	
Objective 1. Leadership and Organization														+	
Objective 2. Cooperative Partnerships															
Objective 3. Planning and Prioritizing														+	
Objective 4. Education and Awareness														+	
Objective 5. Integrated Weed Management (IWM)														+	
Objective 6. Early Detection and Control of New Invaders														+	
Objective 7. Noxious Weed Information System and Data Collection														+	
Objective 8. Monitoring and Evaluation														+	
Objective 9. Policy, Mandates, Law Compliance and Enforcement														+	
Objective 10. Funding and Resources														+	
Oregon Department of Environmental Quality															
Goal: Restore, maintain and enhance the quality of Oregon's air, water and land.	+											+		+	
Oregon Parks and Recreation Department															
Goal: Provide and protect outstanding natural, scenic, cultural, historic, and recreational sites for the enjoyment and education of present and future generations.	+													+	
Oregon Division of State Lands															
Goals: Manage and protect state trust lands for the maximum long-term benefit of the public schools, consistent with sound stewardship, conservation and business management principles.	+														
Manage non-trust lands for the greatest benefit of all the people of the state.	+													+	
Oregon State Police															
Goal: Develop, promote and maintain protection of the people, property, and natural resources of the state.														+	
Department of Land Conservation and Development															
Goals: Establish a framework for all land use decisions and actions.	+														
Preserve and maintain all agricultural lands.															
Conserve forest lands in a manner consistent with sound management of soil, air, water, and fish and wildlife resources, and to provide for recreational opportunities and agriculture.	+													+	
Protect natural resources and conserve scenic and historic areas and open spaces.	+														

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Maintain and improve the quality of the air, water, and land resources of the state.	+											+		+	
Protect life and property from natural disasters and hazards.	+													+	
Oregon Water Resources Department															
Goal: To serve the public by practicing and promoting wise long-term water management.												+		+	
Oregon Revised Statute – ORS 496.012															
Goals: Species of wildlife maintained at optimum levels.	+													+	
Lands and waters of this state that are developed and managed to enhance the production and public enjoyment of wildlife.	+											+		+	
Utilization of wildlife that is orderly and equitable.														+	
Public access to lands and waters of the state, and the wildlife resources thereon, that are developed and maintained.	+													+	
Wildlife populations and public enjoyment of wildlife are regulated compatibly with primary uses of the lands and waters of the state.	+													+	
Provision of optimal recreational benefits.														+	
Oregon Department of Fish and Wildlife															
Fish Objectives for Steelhead and Spring Chinook Salmon															
Goals: Fish recovery and production that are defined through the LSRCP, NEOH and GRESP programs.										+					
Objective 1. Achieve a sufficient spawner numbers and productivity of Grande Ronde Basin spring chinook salmon, by restoring and maintaining natural spawning populations, to will allow delisting.											+				
Objective 2. Reduce the demographic risks associated with the low productivity and decline of native spring chinook salmon populations in Catherine Creek, Lostine River and Grande Ronde River.															
Objective 3. Maintain artificial production programs for spring chinook salmon and steelhead, using locally-adapted broodstocks to meet recovery, conservation and harvest goals, and mitigate for fish losses associated with construction and operation of lower Snake River dams.															
Objective 4. Establish an annual supply of steelhead and spring chinook salmon brood fish capable of meeting annual production goals.															
Objective 5. Maintain sport and tribal fisheries for steelhead and reestablish fisheries for spring chinook salmon, consistent with protection of endemic, naturally-produced stocks. Determine the number of summer steelhead and spring chinook salmon harvested annually and angler effort in recreational fisheries on the Grande Ronde and Wallowa rivers.															
Objective 6. Identify, conserve, and monitor the life history characteristics of chinook salmon and resident and anadromous forms of Oncorhynchus mykiss in northeast Oregon.											+				+
Objective 7. Maintain genetic diversity of indigenous, artificially-propagated spring chinook salmon populations in Catherine Creek, Lostine River and Grande Ronde River.															
Objective 8. Identify, evaluate, conserve and enhance natural											+				

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production and genetic diversity of natural stocks of steelhead and chinook salmon (e.g., Minam and Wenaha rivers).															
Objective 9. Minimize impacts of hatchery programs on resident fish and naturally produced spring chinook salmon and steelhead.															
Objective 10. Modify facilities at Lookingglass Fish Hatchery to provide capability to implement Captive and Conventional hatchery programs.															
Objective 11. Determine optimum program operational criteria to ensure success of achieving objectives.															
Objective 12. Assess utility of Conventional and Captive broodstock programs for use in recovering salmonid populations.															
Objective 13. Develop facilities and operations to improve safety and productivity of the hatchery environment for captive and conventional chinook salmon programs.															
Objective 14. Collect information to allow implementation of adaptive management process to evaluate management practices in the Grande Ronde Basin.	+										+				
Warmwater Game Fish Plan															
Goal: Provide optimum recreational benefits to the people of Oregon by managing warmwater game fishes and their habitats.															
Objective 1. Provide diversity of angling opportunity.														+	
Trout Plan															
Goal: Achieve and maintain optimum populations and production of trout to maximize benefits and to insure a wide diversity of opportunity for present and future citizens.												+			
Objective 1. Maintain the genetic diversity and integrity of wild trout stocks throughout Oregon.															
Objective 2. Protect, restore and enhance trout habitat.						+						+			
Objective 3. Provide a diversity of trout angling opportunities.														+	
Objective 4. Determine the statewide management needs for hatchery trout.															
Steelhead Plan															
Goal: Sustain healthy and abundant wild populations of steelhead.	+											+			
Objective 1. Protect and restore spawning and rearing habitat.						+			+			+		+	
Objective 2. Provide safe migration corridors.						+			+	+				+	
Objective 3. Protect wild populations of steelhead from overharvest.															
Objective 4. Protect wild populations of steelhead from detrimental interactions with hatchery fish.															
Objective 5. Monitor the status of wild steelhead populations so that long-term trends in populations can be determined.															+
Goal: Provide recreational, economic, cultural and aesthetic benefits from fishing and non-fishing uses of steelhead.															+
Objective 6. Provide for harvest by Treaty Tribes without overharvesting wild fish.															+
Objective 7. Provide recreational angling opportunities reflecting the desires of the public while minimizing impacts on wild fish.															+
Objective 8. Increase non-angling uses of steelhead that provide recreation.															
Goal: Involve the public in steelhead management and coordinate															

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ODFW actions with Tribes and other agencies.															
Objective 9. Increase awareness of issues facing steelhead management and ODFW's management programs.															
Objective 10. Provide a forum for public input on steelhead management.															
Objective 11. Coordinate ODFW steelhead management activities with other habitat and fisheries managers.															
Kokanee Plan															
Goal: Maintain a productive population of kokanee in Wallowa Lake capable of sustaining recreational harvest.															
Objective 1. Understand relationships among kokanee and introduced lake trout and *mysid* populations in Wallowa Lake.															
Objective 2. Identify potential tools to control lake trout abundance.															
Oregon Wildlife Diversity Plan (ODFW 1993)															
Goal: Maintain Oregon's wildlife diversity by protecting and enhancing populations and habitats of native non-game wildlife at self-sustaining levels throughout natural geographic ranges.	+					+		+						+	
Objective 1. Protect and enhance populations of all existing native non-game species at self-sustaining levels throughout their natural geographic ranges by supporting the maintenance, improvement or expansion of habitats and by conducting other conservation actions.	+							+						+	
Objective 2. Restore and maintain self-sustaining populations of non-game species extirpated from the state or regions within the state, consistent with habitat availability, public acceptance, and other uses of the lands and waters of the state.	+													+	
Objective 3. Provide recreational, educational, aesthetic, scientific, economic and cultural benefits derived from Oregon's diversity of wildlife.	+													+	
Objective 4. Address conflicts between non-game wildlife and people to minimize adverse economic, social, and biological impacts.	+													+	
Oregon Black Bear Management Plan (ODFW 1987)															
Goal: Protect and enhance black bear populations in Oregon to provide optimum recreational benefits to the public and to be compatible with habitat capability and primary land uses.	+														
Objective 1. Determine black bear population characteristics.															
Objective 2. Determine black bear harvest levels.															
Objective 3. Continue current practice of allowing private and public landowners to take damage causing black bear without a permit.															
Oregon's Cougar Management Plan (ODFW 1993a)															
Goals: Recognize the cougar as an important part of Oregon's wildlife fauna, valued by many Oregonians.														+	
Maintain healthy cougar populations within the state into the future.	+													+	
Conduct a management program that maintains healthy populations of cougar and recognizes the desires of the public and the statutory obligations of the Department.	+													+	

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Objective 1. Continue to gather information on which to base cougar management.	+														
Objective 2. Continue to enforce cougar harvest regulations.															
Objective 3. Document and attempt to eliminate potential future human-cougar conflicts.														+	
Objective 4. Manage cougar populations through controlled hunting seasons.															
Objective 5. Continue to allow private and public landowners to take damage-causing cougar without a permit.															
Objective 6. Manage deer and elk populations to maintain the primary prey source for cougar.	+													+	
Mule Deer Management Plan (ODFW 1990)															
Goals: Increase deer numbers in units that are below management objectives and attempt to determine what factors are contributing to long term depressed mule deer populations.	+														
Maintain population levels where numbers are at management objectives.															
Reduce populations in the areas where deer numbers exceed population management objectives.															
Population objectives were set by Oregon Department of Fish and Wildlife Commission action in 1982 and are to be considered maximums.															
Objective 1. Set management objectives for buck ratio, population level/density and fawn:doe ratio benchmark for each hunt unit and adjust as necessary.															
Objective 2. Hunter opportunity will not be maintained at the expense of meeting population and buck ratio management objectives.															
Oregon's Elk Management Plan (ODFW 1992)															
Goal: Protect and enhance elk populations in Oregon to provide optimum recreational benefits to the public and to be compatible with habitat capability and primary land uses.	+													+	
Objective 1. Maximize recruitment into elk populations and maintain bull ratios at Management Objective levels. Establish Management Objectives for population size in all herds, and maintain populations at or near those objectives.															
Objective 2. Coordinate with landowners to maintain, enhance and restore elk habitat.														+	
Objective 3. Enhance consumptive and non-consumptive recreational uses of Oregon's elk resource.														+	
Oregon's Bighorn Sheep Management Plan (ODFW 1992)															
Goal: Restore bighorn sheep into as much suitable unoccupied habitat as possible.	+														
Objective 1. Maintain geographical separation of California and Rocky Mountain subspecies.															
Objective 2. Maintain healthy bighorn sheep populations.														+	
Objective 3. Improve bighorn sheep habitat as needed and as funding becomes available.	+													+	
Objective 4. Provide recreational ram harvest opportunities when bighorn sheep population levels reach 60 to 90 animals.															
Objective 5. Conduct annual herd composition, lamb production,															

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summer lamb survival, habitat use and condition, and general herd health surveys.															
Oregon Migratory Game Bird Program Strategic Management Plan (ODFW 19193)															
Goal: Protect and enhance populations and habitats of native migratory game birds and associated species at prescribed levels throughout natural geographic ranges in Oregon and the Pacific flyway to contribute to Oregon's wildlife diversity and the uses of those resources.	+													+	
Objective 1. Integrate state, federal, and local programs to coordinate biological surveys, research, and habitat development to obtain improved population information and secure habitats for the benefit of migratory game birds and other associated species.	+													+	
Objective 2. Assist in the development and implementation of the migratory game bird management program through information exchange and training.	+													+	
Objective 3. Provide recreational, aesthetic, educational, and cultural benefits from migratory game birds, other associated wildlife species, and their habitats.	+													+	
Objective 4. Seek sufficient funds to accomplish programs consistent with the objectives outlined in the plan and allocate funds to programs based on management priorities.														+	
Other General Habitat Goals, Objectives and Strategies that might be applicable															
Goal: Protect and maintain remaining high quality riparian, aquatic, and upland habitats.	+					+								+	
Objective 1. Maintain or increase wildlife species diversity	+													+	
State of Washington															
Washington Department of Fish and Wildlife															
Goals: Protect, restore, and enhance the abundance and distribution of wild summer steelhead, spring chinook salmon, bull trout and other indigenous fish in the subbasin to provide non-consumptive fish benefits including cultural or ecological values.										+					
Maintain, enhance, or restore sustainable fishery and harvest opportunities for anadromous and resident fish.														+	
Maintain or enhance genetic and other biological characteristics of naturally and hatchery produced anadromous and resident fish.															
Objective 1. Increase native or hatchery chinook salmon to sustainable and harvestable levels. Determine the wild and hatchery escapement goals to meet this objective.											+				
Objective 2. Increase native summer steelhead to sustainable and harvestable levels. Refine the wild fish escapement goal and needs. Meet the LSRCP goal to return an average of 1,250 adult hatchery steelhead to the Lower Grande Ronde River annually for harvest.															
Objective 3. Restore and maintain the health and diversity of bull trout and other resident salmonids to sustainable and harvestable levels. Determine the spawning escapement goals and population needs of resident fish.															

Project Proposal ID	27003	27004	27005	27006	27007	27008	27011	27012	27013	27018	27019	27020	27022	27023	27024
Objective 4. Maintain warmwater and other fisheries as appropriate without conflicting with indigenous fish needs.															
County and Local **Wallowa County**															
Goals: Wallowa County is part of the Grande Ronde Model Watershed Program and supports their goals, objectives, and strategies.	+													+	
Provide quality habitat for native wildlife found in the county.								+						+	
Grande Ronde Model Watershed Program **GRMWP Mission Statement**															
Goals: Provide habitat for the restoration and enhancement of anadromous salmonids and other native fish species.						+		+				+		+	
Develop recommendations for management and utilization of water by agriculture and other industries.	+													+	
Conduct a public involvement program to address concerns of landowners, land managers and resource users.	+											+		+	
Provide recommendations for management of resources, which will enhance the quality and quantity of stream flows.	+													+	
Recommend resource management and research activities, which meet the Program mission.	+													+	
Promote the mission, goals and objectives of the Program to regional, state and national entities.	+													+	
Assure that watershed restoration activities implemented in the Basin are adequately monitored and evaluated.	+													+	
Protect the customs, culture, and economic stability of the citizens of the Basin, the Nez Perce Tribe, Confederated Tribes of the Umatilla Indian Reservation, and the citizens of the United States of America.											+			+	
Objective 1. Coordinate program administration and watershed restoration activities.	+													+	
Objective 2. Improve in-stream habitat diversity for salmonid spawning and rearing.						+		+	+					+	
Objective 3. Enhance riparian condition (vegetation, function, etc.)			+			+		+	+					+	
Objective 4. Reduce stream sedimentation.						+		+						+	
Objective 5. Increase late-season streamflows.												+		+	
Objective 6. Improve upland watershed condition and function.														+	
Objective 7. Improve adult and juvenile salmonid fish passage.		+							+			+	+	+	
Objective 8. Improve water quality.												+		+	
Wallowa Soil and Water Conservation District															
Goals: Healthy economy and desirable quality of life in Wallowa County.	+													+	
Productive and healthy watersheds in Wallwa County.	+													+	
Habitat quality and quantity for sustainable populations of native and anadromous fish species and native wildlife.	+													+	
Objective 1. Continue to assist landowners/cooperators in meeting local, state, and federal natural resource goals.			+											+	
Objective 2. Continue to promote efficient management and ranch planning for resource conservation and economic viability.			+												
Objective 3. Continue to address fish passage issues related to irrigation diversions.		+	+						+	+					

Project Proposal ID	27003	27004	27005	27006	27007	27008	27011	27012	27013	27018	27019	27020	27022	27023	27024
Objective 4. Continue to address irrigation tailwater returns.															
Objective 5. Continue to address water conservation and efficient use of irrigation water.												+		+	
Objective 6. Continue to address riparian ecosystem restoration and enhancement.	+		+											+	
Objective 7. Continue to address upland restoration and enhancement.	+													+	
Union Soil and Water Conservation District															
Goals: Identify local conservation needs. Develop, implement, and evaluate programs to meet them.	+								+					+	
Educate and inform landowners and operators, general public and local, state, and federal legislator on conservation issues and programs.	+		+											+	
Participate in water management planning to advocate and sponsor watershed improvement projects in a coordinated effort with our partners.									+			+			
Supervise staff and volunteers working for the district, coordinate with other cooperating agency personnel.															
Coordinate assistance and funding from federal, state, and local government: Oregon Association on Conservation Districts (OACD), National Association of Conservation Districts (NACD), district associations and private groups.															
Assist the Oregon Department Agriculture (ODA) with the administration of their programs.															
Objective 1. Agricultural Water Quality Management Plan															
Objective 2. Area Planning	+														
Objective 3. Education	+														
Objective 4. Noxious Weeds															
Grande Ronde Water Quality Committee															
Goal: To meet the necessary load allocations and achieve the water quality standards primarily by implementing management measures that will improve stream temperature, dissolved oxygen and pH. Protect the beneficial uses of the waters of the subbasin by implementing management measures to protect existing high quality waters and to improve water quality of impaired waters to the point that state water quality standards are met.														+	
Objective 1. Eliminate point source discharges of nutrients during the summer.														+	
Objective 2. Reduce NPS pollution contributions from transportation sources.														+	
Objective 3. Reduce NPS pollution contributions from residential and commercial sources.														+	
Objective 4. Reduce NPS pollution contributions from forest sources.														+	
Objective 5. Reduce non-point pollution contributions from agricultural sources.														+	
Asotin County Conservation District															
Goal: Restore sustainable, naturally producing populations of spring and fall chinook salmon, bull trout, and summer steelhead populations to support tribal and non-tribal harvest and cultural and economic practices while protecting the biological integrity															

Project Proposal ID	27003	27004	27005	27006	27007	27008	27011	27012	27013	27018	27019	27020	27022	27023	27024
and genetic diversity of these species in the watershed.															
Objective 1. Reduce pre-spawner adult mortality.															
Objective 2. Increase incubation success.															
Objective 3. Increase juvenile salmonid survival.															
Asotin County Noxious Weed Board															
Goal: To provide technical assistance to the citizens of the county in developing effective control strategies in dealing with their noxious weed problems and encourage people to be good land stewards.														+	
Objective 1. Develop and maintain an accurate and comprehensive noxious weed inventory – with special emphasis toward locating and destroying new invading species.														+	
Objective 2. Develop an effective educational program to be disseminated as required to schools and all user groups as necessary.														+	
Objective 3. Weed control staff will strive to be current with the latest techniques in noxious weed control methods.														+	
Objective 4. Weed control staff will maintain response to public need as the top priority.														+	
Objective 5. Every effort will be made to facilitate landowners in achieving compliance with RCW 17.10.														+	
Wallowa Resources															
Goal: To catalyze and facilitate community based stewardship in Wallowa County.														+	
Objective 1. Promote community, forest and watershed health.	+													+	
Objective 2. Create and maintain family-wage job and business opportunities.															
Objective 3. Broaden understanding of the links between community well-being and ecosystem health.	+													+	

These Projects are referenced by ID above:

27003 – Characterize and Assess Wildlife-Habitat Types and Structural Conditions for Subbasins within the Blue Mountain Province

27004 – Grande Ronde and Imnaha Stream Channel Complexity and Fish Passage Barrier Inventory, Prioritization and Remediation

27005 – Increase CREP Enrollment and Enhance Riparian Protections in the Grande Ronde and Imnaha basins

27006 – Establishing Baseline Key Ecological Functions of Fish and Wildlife for Subbasin Planning

27007 – Assessment of spring/summer chinook salmon habitat within the Grande Ronde Subbasin.

27008 – Grande Ronde River Riparian Restoration

27011 – Lookingglass Creek land purchase for watershed protection (spawning and rearing habitat continuity and water quality at Lookingglass Hatchery)

27012 – Restore and Enhance Grande Ronde Valley Deciduous Riparian Habitat

27013 – Grande Ronde River Stream Restoration - La Grande, Oregon

27018 – Oregon Plan Blue Mountain Province Fish Screening/Fish Passage

27019 – Adult Salmon Abundance Monitoring
27020 – Grande Ronde Subbasin Water Right Acquisition Program
27022 – Wallowa County Culvert Inventory
27023 – Precious Lands Wildlife Habitat Expansion
27024 - Life history strategies in Oncorhynchus mykiss: interactions between anadromous and resident forms

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Appendix A. Memorandum from Oregon Department of Fish and Wildlife to US Fish and Wildlife Service regarding HGMPs

From: Bruce Eddy
To: Joe Krakker
Date: 1/17/01 9:55AM
Subject: HGMPS Associated with LSRCP Production in Oregon

Joe

Winter of 1999/2000 the Department of Fish and Wildlife submitted to National Marine Fisheries Service (NMFS) Hatchery and Genetics Management Plans (HGMPs) for Lower Snake River Compensation Plan (LSRCP) hatchery operations. Attached are electronic versions of these documents as well as the letters of transmittal submitting them to NMFS.

It is my understanding that these documents were developed and submitted pursuant to Department discussions with NMFS regarding how best to meet 4(d) expectations.

To date we have not received comments from NMFS regarding these submissions. As a result, at least for the time being, it's my assumption that these documents meet NMFS' expectations.

As we discussed recently, some aspects of these programs are changing in association with our current NMFS permits, current work under Grande Ronde and Imnaha Master Planning and expectations of NMFS' 1999 hatchery Bi Op. I am committed to working with LSRCP and our co-managers in redeveloping these HGMPs as necessary to accommodate these changes.

Bruce

CC: Becky Ashe; Bill Knox; Bob Hooton; Cindy Studebaker; Glen Mendel; Herb Pollard; Jeffrey Zakel; Mark Fritsch; Peter Lofy; Ray Temple; Rich Carmichael; Scott Patterson; Trent Stickell.

Appendix B. Hatchery and Genetics Management Plan for Grande Ronde River Spring Chinook Salmon

SECTION 1.0 GENERAL PROGRAM DESCRIPTION

1.1) Name of Program

Grande Ronde River Spring Chinook Salmon

1.2) Population (or stock) and species

There are currently three broodstocks in this basin using three different wild donor populations in the Grande Ronde. These programs are addressed together in this HGMP:

Oncorhynchus tshawytscha, chinook salmon
- Catherine Creek Population - (stock 201)
- Lostine River Population - (stock 200)
- Upper Grande Ronde River Population - (stock 080)

1.3) Responsible organization and individual

ODFW Portland Staff:

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ODFW Regional Staff:

Name (and Title):	Bruce Eddy, Grande Ronde Watershed District Manager
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Fax:	541-963-6670
Email:	bruce.r.eddy@state.or.us

Other organizations involved:

US Fish and Wildlife Service
Confederated Tribes of the Umatilla Indian Reservation
Nez Perce Tribe

1.4) Location(s) of hatchery and associated facilities:

- *Early captive brood rearing, Egg incubation, and juvenile rearing:*
Lookingglass hatchery (LGFH) is located 18 miles north of the town of Elgin, adjacent to Lookingglass Creek 2.2 miles above its confluence with the Grande Ronde River at about river mile 86. Elevation at the hatchery is 2,550 feet above sea level. Adult facilities consist of a trap and two concrete raceways (4,560 ft^3). Incubation is in 288 vertical incubator trays with a capacity of 2.3 million eggs to hatching. There are 32

Canadian troughs for starting fish each with a capacity of 100 to 125 pounds of fish. Rearing is in 18 concrete raceways (3,000 ft^3) each with a capacity of 4,000 lb (Lewis 1996).

- <u>*Captive brood rearing, spawning, and early egg incubation:*</u>
  Bonneville hatchery (BOH) is located 4 miles west of the town of Cascade Locks, adjacent to the Columbia River at the base of Bonneville Dam (river mile 145.5). Elevation at the hatchery is 46 feet above sea level. Conventional hatchery facilities are reported in Lewis (1996). In 1998 a new building and rearing facilities were added for the captive brood stock program. Those facilities consist of 19 circular fiberglass tanks; four 10^{ft} diameter (1,800 gal.), and fifteen 20^{ft} diameter (9,400 gal.).
- <u>*Captive brood rearing:*</u>
  The Manchester Marine Lab (MML) is a seawater facility located on Clam Bay in Puget Sound. This facility is utilized for a variety of experimental and developmental fish and shellfish efforts, including rearing a portion of the Redfish Lake sockeye captive brood stock program.
- <u>*Acclimation:*</u>
  The Nez Perce Tribe operates an acclimation facility on the Lostine River.

  The Confederated Tribes of the Umatilla Indian Reservation operates an acclimation facility on the Upper Grande Ronde and Catherine Creek.

Other organizations involved and intent

The U.S. Army Corps of Engineers, through the Lower Snake River Compensation Plan (LSRCP), funds production and operation expenditures at Lookingglass hatchery. The National Marine Fisheries Service (NMFS) funds and operates the Manchester Marine Lab. The Nez Perce Tribe, Oregon Department of Fish and Wildlife, and the Confederated Tribes of the Umatilla Indian Reservation are co-managers of the Grande Ronde River spring/summer chinook salmon program.

1.5) Type of program:

The Grande Ronde River spring chinook salmon (stocks 080, 200, 201) fish propagation project is a "supplementation" program intended to increase natural production of spring chinook in the Grande Ronde. It utilizes "captive brood stock" technology as well as potential conventional juvenile rearing.

1.6) Purpose (Goal) of program (DeHart and Carmichael 1996**):**

The program goal is to prevent the extinction of three wild chinook populations in the Grande Ronde Basin, and to provide a future basis to reverse the decline in stock abundance of Grande Ronde River chinook salmon and ensure a high probability of population persistence well into the future once the causes of basin wide population declines have been addressed. Associated objectives include:

1) To prevent extinction of native wild chinook populations in the Lostine, upper Grande Ronde River and Catherine Creek,
2) Maintain genetic diversity of indigenous artificially propagated chinook populations,
3) Maintain genetic diversity in wild chinook populations.

1.7) Specific performance objectives(s) of program:

1.8) List of Performance Indicators designated by "benefits" and "risks"

1.9) Expected size of program

1.9.1 Expected Release -

The program goal is to release 150,000 smolts per year for each of the three populations (AOP 1999). The 1998 brood year, released in spring 2000, will be the first juveniles released for this program. Anticipated smolt releases for the 1998 brood year are:

- 38,000 stock 201 smolts released into Catherine Creek.
- 35,000 stock 200 smolts released into the Lostine Rivers.
- 1,500 stock 080 smolts released into the upper Grande Ronde River.

1.9.2 Adult fish produced and harvested

Not applicable. There have not yet been any juvenile fish released for the program, and thus no adults have been produced.

1.9.3 Escapement Goals

The threshold population goal is 150 spawning adults to each target stream annually (DeHart and Carmichael 1996).

1.10) Date Program started or is expected to start:

The program began in 1995 with the collection of naturally-produced juvenile spring chinook salmon parr (1994 brood year) from the three natural populations.

1.11) Expected duration of program:

This program, including experimental captive brood stock artificial propagation programs and associated monitoring and evaluation programs are planned to continue through the year 2015 (DeHart and Carmichael 1996). Collection of naturally produced parr is expected to continue through five consecutive brood years or through 1999 (DeHart and Carmichael 1996). It is anticipated that these programs will transition from captive-brood programs to conventional smolt programs when adult collection becomes more feasible.

1.12) Watersheds targeted by program:

Naturally produced juveniles are collected from, and hatchery-reared fish will be released into the Grande Ronde River Subbasin (as defined by the Northwest Power Planning Council (NWPPC)). Three subbasins of the Grande Ronde: the Lostine, Catherine Creek, and upper Grande Ronde are specifically targeted.

SECTION 2.0 RELATIONSHIP OF PROGRAM TO OTHER MANAGEMENT OBJECTIVES

2.1) List all existing cooperative agreements, memorandum of agreement, or other management plans or court orders under which program operates. Confirm HGMP consistency.

2.2) Status of natural populations in target area.

2.2.1. Geographic and temporal spawning distribution

Spring chinook salmon historically spawned throughout the mainstem of the Grande Ronde River subbasin (Olsen et. al. 1994). Currently, spawning is primarily in the Wenaha, Minam, Lostine, and upper Grande Ronde Rivers, and in Catherine and Lookingglass Creeks (Olsen et. al. 1994). Spawning ground surveys conducted in the Grande Ronde subbasin in 1995 (August 21st to September 27th) and 1997 (August 18th to September 18th) documented new redds and live fish during these periods (Parker et. al. 1995, Parker and Keefe 1997).

2.2.2. Annual spawning abundance for as many years as available

2.2.3. Progeny to parent ratios, survival data by life stage, or other measures of productivity for as many brood years as available.

2.2.4. Annual proportions of hatchery and natural fish on natural spawning grounds for as many years as possible.

There have been no releases from the hatchery programs described in this document and so there have been no hatchery adults on the spawning grounds. However, hatchery fish have been present in the Grande Ronde basin during the 1990s from releases of Rapid River stock. The use of Rapid River stock in the Grande Ronde has been discontinued. The proportion of marked carcasses recovered during 1994 through 1997 spawning ground surveys in the Grande Ronde River subbasin is reported in Table 1.

Table 1: Origin of spring chinook salmon carcasses (Rapid River stock), based on marking of hatchery fish, recovered during spawning ground surveys in the Grande Ronde River subbasin. Data from: 1994 and 1996 (Keniry 1999); 1995 (Parker et. al. 1995); and 1997 (Parker and Keefe 1997).

Run Year	Marked	Unmarked	Percent Marked
1994	26	46	36.1%
1995	1	19	5.0%
1996	8	136	5.6%
1997	13	219	5.6%

2.2.5. Status of natural population relative to critical and viable population thresholds.

2.3) Relationship to harvest objectives.

There are currently no direct harvest objectives for this program. Mitigation and production goals stated in the LSRCP and *US vs Oregon* Columbia River Management Plan are presently not achievable because sufficient brood stocks of appropriate origin are not available (DeHart and Carmichael 1996). This captive brood stock and supplementation programs is viewed as an essential initial step towards developing brood stocks of appropriate origin that will conserve listed populations. It is anticipated that this program should improve population status in the Grande Ronde and so that eventually the

LSRCP mitigation and production goals could be met, including (Carmichael and Wagner 1983):

1. Establish an annual supply of spring chinook salmon brood fish capable of meeting annual production goals.
2. Restore and maintain natural spawning populations of spring chinook salmon in the Grande Ronde basin.
3. Re-establish sport and tribal fisheries for spring chinook salmon.
4. Maintain wild reserves of chinook salmon in the Minam and Wenaha rivers.
5. Minimize impacts of hatchery programs on resident and naturally produced anadromous stocks.

2.4) Relationship to habitat protection and recovery strategies.

This hatchery program is part of the recovery strategy for naturally produced spring chinook salmon in the Grande Ronde River subbasin.

2.5) Ecological interactions

Potential ecological interactions with listed fish specifically caused by this hatchery program are unknown.

SECTION 3.0 WATER SOURCE:

SECTION 4.0 FACILITIES:

SECTION 5.0 ORIGIN AND IDENTITY OF BROOD STOCK

5.1) Source (DeHart and Carmichael 1996)

Brood stock for this program is based on collecting naturally produced spring chinook salmon parr from each of three populations. We plan to collect naturally-produced juveniles for a minimum of five years, rear the juveniles to near smolt stage at Lookingglass Fish Hatchery (LGFH), transport two-thirds as smolts to Bonneville Fish Hatchery (BOH) and one-third as smolts to NMFS Manchester Marine Lab (MML), respectively, rear fish at those facilities to maturity. Maturing adults will be transported from MML to BOH and all fish spawned at BOH. Captive brood stock progeny will be incubated to eyed stage at BOH then transported to LGFH for final incubation and rearing to the smolt stage. Resulting smolts will be released into the river of parent origin and/or other chinook producing streams within that drainage.

5.2.1 History

The number of parr collected for each of the three populations is listed in Table 2. Since the beginning of this program in 1995 (1994 brood year) only natural produced parr from each respective population have been included in the captive brood stock program.

In 1997, the Nez Perce Tribe collected and spawned four adults from the Lostine River. Smolts from this collection were released in 1999.

Table 2. Grande Ronde River number of naturally produced parr collected and dates of collection for captive brood stock program.

Brood Year	Catherine Creek			Lostine River			Upper Grande Ronde River		
	Number of Parr	Collection Dates		Number of Parr	Collection Dates		Number of Parr	Collection Dates	
		Begin	End		Begin	End		Begin	End
1994	498	08/28/95	08/31/95	499	08/14/95	08/17/95	110	09/18/95	09/22/95
1995	500	08/26/96	08/29/96	481	08/14/96	08/16/96	0		
1996	500	08/18/97	08/22/97	500	08/25/97	08/27/97	500	09/02/97	09/04/97
1997	500	08/17/98	08/19/98	500	08/24/98	08/26/98	500	09/08/98	09/10/98
1998	500	08/16/99	08/18/99	498	08/23/99	08/25/99	500	08/30/99	09/01/99

5.2.2 Annual Size

The program annual brood stock collection goal is 500 parr from each of the three populations, Catherine Creek, Lostine River, and Upper Grande Ronde River (DeHart and Carmichael 1996). Actual number of parr collected for each population is reported in Table 2. The green egg take goal is 300,000 per stock (AOP 1999).

5.2.3 Past and proposed level of natural fish in brood stock

Only naturally produced fish are collected for brood stock.

5.2.4 Genetic and ecological differences

The brood stock is exclusively collected from naturally produced fish from throughout the rearing range of each population, in proportion to the number of redds observed in each area (DeHart and Carmichael 1996). There are no known genetic or ecological differences between the parr collected for brood stock and those remaining in the natal streams.

5.2.5 Reasons for choosing

These brood stocks were chosen as they represent endemic natural populations of spring chinook salmon in the Grande Ronde River subbasin.

5.3) Unknowns

SECTION 6.0 BROOD STOCK COLLECTION

6.1) Prioritized Goals:

6.2) Supporting Information:

6.2.1 Proposed number of each sex

The program goal is to collect 500 naturally produced parr from each of the three populations for brood stock. The sex ratio of the parr is assumed to be 1:1 (DeHart and Carmichael 1996). Actual number of parr collected for each population is reported in Table 2.

6.2.2 Life-history stage to be collected (e.g., eggs, adults, etc.)

Naturally-produced chinook parr, approximately 60 mm-100 mm (DeHart and Carmichael 1996).

6.2.3 Collection or sampling design (DeHart and Carmichael 1996)

Parr are collected from throughout the rearing range in each stream based on known distribution of rearing juveniles. Rearing sections are stratified, and collection numbers based on proportion of total redds within each section. The goal is to provide a good probability of representing all families in the subbasin and to provide as much genetic variability in the collection as possible. Parr are collected during August and September, approximately 12 month after eggs were fertilized. Actual collection dates are reported in Table 2. Fish are large enough at this time to minimize handling mortality, and this time period is also prior to fall migration in these streams.

6.2.4 Identity -

(a) Methods for identifying target populations (if more than one population may be present).

Juvenile hatchery fish are not present in the areas and at the times naturally-produced parr are collected. Thus naturally-produced fish are identified based on age (parr), location, and lack of marks or tags. Parr are collected in areas felt to represent discrete naturally-produced populations.

(b) Methods for identifying hatchery origin fish from naturally spawned fish.

Juvenile hatchery fish are not present in the areas and at the times naturally-produced parr are collected. All fish that will be released from these programs will be marked.

6.2.5 Holding -

6.2.6 Disposition of Adults

Parr collected for captive brood stock are retained throughout their life cycle. Mortalities will be measured, examined, saved, individually labeled and handled appropriately to be used for genetic and disease analysis (DeHart and Carmichael 1996). Some returning adults from F1 generation smolts released for this program will be allowed to spawn naturally and some may be collected at weirs for use as spawners in unseeded habitat. Adult returns from the captive brood stock program will not be incorporated into any conventional adult collection supplementation program (DeHart and Carmichael 1996).

6.3) Unknowns:

SECTION 7.0 MATING

7.1) Selection method

7.1.1 Adult Selection – (DeHart and Carmichael 1996)

The goal of the spawning protocol in this captive brood stock program is to maximize the genetic diversity of the population of embryos while at the same time minimizing the effects of gametes with low viability and the risk of losing gametes to donor mortality. Our approach to this considers the total spawning population, multiple age classes, and cyropreserved semen as well as a balance with the logistic limitations associated with spawning. Furthermore, we have some concern about potential sibling crosses and inbreeding. We will attempt to use the following decision-making process to spawn captive brood. We may need to adjust these protocols as we learn more about the process, but will follow similar principles. We assumed that females will mature at age 4 and 5 and that males will mature at age 3, 4, and 5. The general spawning routine will follow procedures established at Lookingglass Hatchery for Imnaha stock, spring/summer chinook.

Maturation of fish will be judged by gross morphological characteristics (i.e. coloration). Once near mid-July and once near mid-August, maturing fish will be separated from immature fish. Maturing fish from MML will be transported to BOH. At BOH mature fish from MML and BOH will be held in Tanner Creek water so they can experience water temperature fluctuations and held under a simulated natural photoperiod to help synchronize their maturation. Once maturing fish have been separated from immature fish, hauled to BOH, and they near final maturation, their degree of maturity will be assessed once each week. Each week, fish of a similar age and sex that are ready to spawn will be placed in a holding container. This will allow the separation and enumeration of, for example, four and five year-old females as well as three, four, and five year-old males. Once this process is complete, we will determine the female:male ratio of fish that are ready to spawn.

7.1.2 Selection of Egg Take -

Actual numbers of females spawned, eggs collected, and fry ponded, by brood year and stock, are reported in Table 3. All live mature females are spawned. Excess fish are not collected and thus selection or culling of eggs is not done.

Table 3. Grande Ronde Basin spring chinook salmon captive brood stock numbers of females spawned, eggs collected, and fry ponded, by brood year and stock.

	Females	Egg	Spawning Dates		Egg	Fry	Ponding
Brood	Spawned	Take	First	Last	Loss	Ponded	Date
Catherine Creek (Stock 201)							
1998	69	95,178	09/15/98	10/21/98	52,430	42,748	02/01/99
1999	162	261,764	09/10/99	10/13/99			
Lostine River (Stock 200)							
1998	47	65,203	09/11/98	10/28/98	25,325	39,878	02/01/99
1999	142	251,624	09/09/99	10/19/99			
Grande Ronde River (Stock 080)							
1998	4	4,145	09/30/98	10/21/98	2,462	1,683	02/01/99
1999	5	8,998	09/15/99	10/13/99			

7.2) Males

Spawning ratios and the use of repeat spawners will be determined based on the number of mature fish, by stock, sex, and age class, available for spawning (See Section 7.3.1).

7.3) Fertilization

7.3.1 Fertilization Scheme - (DeHart and Carmichael 1996)

The female:male ratio will determine the type and number of matrices to be used during spawning. We focused on making each parent's contribution to the next generation as equal as possible, increasing the numbers of fish in a matrix, making sure females were fertilized by more than one male, and having the highest numbers in each matrix cell for a given number of spawners (i.e. a 2 x 2 matrix is preferred over a 1 x 3 matrix). Based on genetic and logistics considerations, the preferred ratio to work with is even numbers of males and females, where we would use 3 x 3, 2 x 2, or 1 x 1 matrices (in that order) during spawning. The female:male ratio (x) will fall into one of seven categories: A) $x >$ 4:1, B) 4:1 $\geq x >$ 3:2, C) 3:2 $\geq x >$ 1:1, D) $x =$ 1:1, E) 1:1 $> x \geq$ 2:3, F) 2:3 $> x \geq$ 1:4, or G) 1:4 $> x$. Generally we hope to be in category C, D, or E. Each category is associated with a particular spawning matrix. After the first matrix is assigned we will recalculate the female:male ratio of the remaining spawners. If the new ratio is in the same category, we will use the same matrix design. If the ratio is in a new category we will use the new, appropriate matrix. This is an iterative process that will occur after each successive matrix assignment.

The preferred ratio is one that falls in Category D. Under Category D we will spawn fish in a 3 female x 3 male matrix. If fewer than six spawners are available, then we will spawn fish in either a 2 female x 2 male or 1 female x 1 male matrix (in that order of preference).

If the ratio of available spawners reaches Category E, we will spawn fish in a 2 female x 3 male matrix. If the ratio of available spawners reaches Category F, we will develop a working ratio by inverting the original ratio (i.e. if the female:male ratio is 0.32:1, the working ratio would be 1:0.32 or 3.125:1 males:females). We will then round up to the nearest whole number the males in the ratio (i.e. if the ratio is 3.125:1, round to 4:1). We will spawn the fish using a matrix design equal to the rounded ratio (for example, a 1 female x 4 male matrix). We will continue to use this matrix until the ratio of available spawners changes to a new category or all fish are spawned. If this matrix is used throughout the spawning cycle, it is imperative to make sure that the last group of fish are accounted for appropriately in a final matrix. In categories E and F we will attempt to make sure that the minimum number of either sex in a matrix is two (for example, if the ratio is 1:2 we will use a 2 x 4 matrix) and the maximum number of either sex in a matrix is four.

If the ratio of available spawners reaches Category C, we will spawn fish in a 3 female x 2 male matrix. If the ratio of available spawners reaches Category B, we will round up to the nearest whole number the females in the ratio (i.e. if the ratio is 2.4:1, round to 3:1.). We will spawn the fish using a matrix design equal to the rounded ratio (for example, a 3 female x 1 male matrix). We will continue to use this matrix until the ratio of available spawners changes to a new category or all fish are spawned. If this matrix is used throughout the spawning cycle, it is imperative to make sure that the last group of fish are accounted for appropriately in a final matrix. In categories B and C we will attempt to make sure that the minimum number of either sex in a matrix is two (for example, if the ratio is 2:1 we will use a 4 x 2 matrix) and the maximum number of either sex in a matrix is four.

If the ratio reaches Category G we will develop matrices using the protocols for Category F. We will cryopreserve a semen sample from males in excess of a 1 female:4 male ratio. We will recycle the males from which semen is cryopreserved so they may be incorporated into the brood during later spawns.

If the ratio reaches Category A we will attempt to use cryopreserved semen samples to increase the parent population to a 4 female:1 male ratio. If too few cryopreserved semen samples are available to accomplish a 4:1 ratio, we will attempt to use recycled males to increase the parent population to a 4:1 ratio. If too few cryopreserved semen samples and recycled males are available to achieve this ratio, and if brood stock was available from Grande Ronde River stocks, we will consider using conventional male brood stock to increase the parent populations to a 4:1 ratio. If all of these options combined do not allow us to achieve a 4:1 ratio, we will modify the spawning matrix to ensure that all eggs are fertilized using whatever matrices are necessary.

Table 4. Example of matrix assignment. The overall spawning protocol consists of two, 2 female x 3 male matrices; one, 2 female x 4 male matrix; and one, 1 female x 1 male matrix.

Fish ready to spawn on a given day: four age 4 females three age 5 females six age 3 males four age 4 males one age 5 males													
Therefore: female:male ratio = 7:11 = Category F Therefore: begin with a 2 x 4 spawning matrix.													
# of females:	7	-	2	=	5	-	2	=	3	-	2	=	1
# of males:	11	-	4	=	7	-	3	=	4	-	3	=	1
Iteration:	1				2				3				4
Matrix #:	1				2				3				4
# of available spawners	17				13				7				2
Female:male ratio:	0.389				0.417				0.429				0.500
Category: matrix	F				E				E				Final
Category change:					Yes				No				Yes

The overall matrix design and age distribution of the spawners will be used to assign fish of a specific age and sex to each matrix. Our goal is to promote crosses from different age classes and maximize crosses between all age classes. Thus, we will use the following guidelines to assign fish to each matrix based on their age. This protocol is based on the number and sex of fish in a given matrix and the associated preferences of age distribution. In general, we will try to achieve different ages and no duplicate ages within each matrix. For example, if we were using a matrix that called for 3 males, our preference would be to have 1 male from each age class. Our second choice in this example would be to have 2 males from one age class and 1 male from a second age class. Our last choice would be to have 3 males from 1 age class, especially the same age class as the female. We will begin by assigning females, then males to matrix 1, then to matrix 2, then to matrix 3, and so on. When we have to use more than one fish from a given age class, we will initially target mates from a different age class and then target mates from the age class with the greatest number of fish. Using these protocols, the following is a hierarchical preference structure of age distributions within a matrix:

Table 5. Hierarchical preference of age distributions[a]

Sex in matrix	# in matrix	Possible age distributions: Age L	Age M	Age N	preference in matrix
female	5	2	3	-	1
		1	4	-	2
		0	5	-	3
	4	2	2	-	1
		1	3	-	2
		0	4	-	3
	3	2	1	-	1
		0	3	-	2
	2	1	1	-	1
		0	2	-	2
male	5	2	2	1	1
		3	1	1	2
		3	2	0	3
		4	1	0	4
		5	0	0	5
	4	2	1	1	1
		2	2	0	2
		3	1	0	3
		4	0	0	4
	3	1	1	1	1
		2	1	0	2
		3	0	0	3
	2	1	1	0	1
		2	0	0	2
	1	1	0	0	1

[a] For the sake of design, assume 2 age classes for females and 3 age classes for males.

The following uses the age distribution protocol to assign fish in the Table 4 example of matrix development, and completes the example.

matrix 1: 2x4
- 2 females; ages 4, and 5 - 4 males; ages 3, 4, 5, and 3.

matrix 2: 2x3
- 2 females; ages 4, and 5 - 3 males; ages 3, 4, and 3.

matrix 3: 2x3
- 2 females; ages 4 and 5 - 3 males; ages 3, 4, and 4.

matrix 4: 1x1
- 1 female; age 4 - 1 male; age 3.

7.3.2 Fish Health Procedures -

Fish health procedures are established in DeHart and Carmichael (1996) and in the annual operation plan. Specific plans for February 1999 through January 2000 are reported in AOP (1999).

7.4) Cryopreserved gametes (DeHart and Carmichael 1996)

Proposed criteria for use of cryopreserved semen in the current captive breeding program are: 1) To promote genetic diversity, consider using cryopreserved semen from unrelated year classes when the majority of fish to be spawned are from the same year class; 2) Consider using cryopreserved semen at a higher frequency when average fertilization rates exceed 80% and if sufficient cryogenic repository exists; 3) Use cryopreserved semen when a lack of ripe males are available for spawning; and 4) Maintain 10% of the germplasm repository from all males for future management or research use.

7.5) Unknowns

SECTION 8.0 REARING AND INCUBATION

SECTION 9.0 RELEASE

9.1) Life history stage, size, and age at release (DeHart and Carmichael 1996)

Spring chinook salmon smolts (F1 generation) produced from spawning of captive brood stock will be released as yearlings in April after approximately 14 to 15 months of rearing in a hatchery environment. Hatchery smolt release size is intended to correspond to the size of naturally produced smolts in the area the hatchery smolts are released. The target size at release for this program is 22.7 gm/fish (20 fish/lb), or a mean fork length of 125 mm.

9.2) Life history stage, size, and age of natural fish of same species

9.3) Dates of release and release protocol (DeHart and Carmichael 1996)

The first smolt releases for this program will be 1998 smolts released in April 2000. All smolts will be acclimated prior to release at locations within the area of their natal stream where natural fish spawn.

9.4) Location(s) of release (DeHart and Carmichael 1996)

Smolts will be released from at least 2 acclimation sites within the area of their natal stream where natural fish spawn.

9.5) Acclimation procedures (DeHart and Carmichael 1996)

In March, fish will be hauled to acclimation facilities located within the area of their natal stream where natural fish spawn. A proportionate number of fish from each evaluation group within a given stock will be mixed together at the time of transportation. A minimum of two acclimation sites will be distributed along this area so that releases will be scattered spatially. Acclimation sites will be supplied with ambient stream water and fish at these sites given supplemental feed. In April, after a 20-30 day period of acclimation, fish will be released into the stream.

9.6) Number of fish released

The annual release goal (F1 generation) is 150,000 smolts per stock (DeHart and Carmichael 1996). The first smolt releases for this program will occur in April 2000. Anticipated releases in 2000 (F1 1998 brood year) are; 38,000 for Catherine Creek, 35,000 for Lostine River, and 1,500 for upper Grande Ronde River (AOP 1999).

9.7) Marks used to identify hatchery adults (DeHart and Carmichael 1996)

All F1 generation spring chinook salmon smolts released for this program will be Ad+CWT marked. In addition some fish will be marked with Passive Integrated Transponders (PIT tags). The number of fish to be PIT tagged will be determined in the Annual Operation Plan. Marking will uniquely identify smolts to their natural population (stock) and brood stock treatment group (saltwater reared versus freshwater reared, and natural versus accelerated growth rate).

9.8) Unknowns

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Appendix C. Hatchery and Genetics Management Plan for Grande Ronde Basin Summer Steelhead

SECTION 1.0. GENERAL PROGRAM DESCRIPTION

1.0) Name of Program

Grande Ronde Basin Summer Steelhead Hatchery Program

1.1) Population (or stock) and species

Oncorhynchus mykiss, summer steelhead (stock 056, Wallowa River Stock) - Lower Snake River Compensation Plan (LSRCP).

1.2) Responsible organization and individual

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Other organizations involved:

US Fish and Wildlife Service
Confederated Tribes of the Umatilla Indian Reservation
Nez Perce Tribe

1.3) Location(s) of hatchery and associated facilities:

- *Adult Collection and Holding:*
  Adult summer steelhead are collected and held at Wallowa Hatchery and Big Canyon acclimation pond. Wallowa Hatchery is located along Spring Creek, a tributary to the Wallowa River, one mile west of Enterprise, Oregon. Site elevation is 3,700 feet above sea level (IHOT, 1995). Big Canyon acclimation facility is operated as a satellite facility to Wallowa Hatchery. It is located at the junction of Deer Creek and the Wallowa River, just east of Minam, Oregon (IHOT, 1995).

- *Spawning:*
  Fish collected at Big Canyon Hatchery and Wallowa Hatchery are spawned at Wallowa hatchery.

- *Rearing (eyed-egg to smolt):*

All fish are reared from eyed-egg to smolt size at Irrigon Hatchery. Irrigon Hatchery is located along the south bank of the Columbia River, above John Day Dam, near Irrigon, Oregon. Site elevation is 277 feet above sea level.

Currently, a small group (400) of eyed eggs is appropriated to a STEP program. These fish are reared from eyed-egg to fry, and are released into Marr Pond (200) and Wallowa Wildlife Pond (200).

Acclimation to release:

For the current 1999 program, 430,000 smolts were transferred from Irrigon Hatchery in February and April and acclimated at Wallowa Acclimation Pond and held for varying lengths of time, before being released into the Wallowa River. A second group of 440,000 smolts were transferred from Irrigon Hatchery to Big Canyon Acclimation Pond in March and April, and acclimated for one month before being released into Deer Creek (a tributary to the Wallowa River).

1.4) Type of program:

Wallowa River summer steelhead stock is managed to compensate for a portion of the summer steelhead losses caused by the construction and operation of four lower Snake River dams and to provide sports fisheries augmentation.

1.5) Purpose of program:

1) Produce hatchery summer steelhead for release into the Grande Ronde River Basin, to support tribal and sport fisheries of the Columbia River, Snake River, Grande Ronde River, and select Grande Ronde tributaries under the LSRCP.

1.6) **Specific performance objectives(s) of program: To be addressed later.**

1.7) **List of performance Indicators designated by "benefits" and "risks": To be addressed later.**

1.8) **Epected size of program:**

1.8.1 Expected Releases

Current ODFW production goals based on the 1999 Grande Ronde River Basin summer steelhead are:

- Release 200 unfed fry into Marr Pond in June (STEP).
- Release 200 unfed fry into Wallowa Wildlife Pond in June (STEP).
- Release 200,000 marked smolts at 5.0/lb into the Wallowa River in April.
- Release 135,000 marked smolts at 5.0/lb into the Wallowa River in May.
- Release 240,000 marked smolts at 5.0/lb into the Deer Creek in April.
- Release 200,000 marked smolts at 5.0/lb into the Deer Creek in May.

Historically Wallowa stock production has targeted 1.6M smolts released to the Wallowa River, Catherine Creek, upper Grande Ronde River and lower Grande Ronde River. Wallowa stock releases are to be reduced by 33 percent in 2000, 66 percent in 2005 and completely eliminated in 2008. The program will be replaced by an indigenious broodstock. Size of the indigenious stock program replacing Wallowa stock will be tailored to the specific needs and characteristics of target production areas in the Wallowa River and lower Grande Ronde.

Adult fish produced and harvested

The number of adults returning to Wallowa hatchery and Big Canyon facility since 1990 is presented in Table 1.

Table 1: Adult fish returning to Wallowa Hatchery and Big Canyon Acclimation Site, 1990-1999.

Calendar Year	Adults Counted		Basin Total
	Wallowa Hatchery	Big Canyon	
1990	948	334	1,282
1991	478	428	906
1992	2059	0[1]	2,059
1993	1,353	370	1,723
1994	598	444	1,042
1995	318	380	698
1996	988	527	1,515
1997	1,473	1,277	2,750
1998	1,374	1,236	2,610
1999	1,168	601	1,769

[1] Adults were not collected at Big Canyon Hatchery in 1992.

The 1990 to 1993 summer steelhead (stock 056) brood reared at Irrigon and Wallowa hatcheries and released into Big Canyon Creek survived at an average rate of 0.48% and were caught in tribal gillnet and other freshwater fisheries (Lewis, 1999). Likewise, the 1989 to 1993 brood reared at Irrigon hatchery, acclimated at Wallowa hatchery and released into Spring Creek survived at an average rate of 0.60% and were caught in the tribal gillnet and other freshwater fisheries (Lewis, 1999). Total steelhead harvest for 1986 to 1995 averaged 144,900 fish per year (53% of Columbia River returns). Mainstem harvests accounted for more than half of the harvested fish (~29%).

1.9.2 Escapement Goals -

Hatchery escapement goals are based upon annual broodstock needs. Currently, a return of 645 adults is needed to meet the annual green egg-take goal (1,343,000) which will supply 870,000 million smolts to the Grande Ronde River Basin. From 1988 to 1993, Oregon escapement to the Grande Ronde River basin was 9,774 adults; the current mitigation goal is 9,187 fish returns. Adult spawner escapement goals for wild/natural summer steelhead in the Grande Ronde Basin are 8,000.

1.10) Date program started or is expected to start:

A new program using an indigenious broodstock is expected to start in the next several years. Completion of guidelines directing implementation is expected in late 2000 or early 2001. Baseline evaluation of target production areas is expected to take two to three years. Initiation of an indigenious broodstock program will be dependent on completion of baseline evaluations, development of program specifics, and approval.

1.11) Expected duration of program:

The existing Grande Ronde River Basin stock 056 will be phased-out beginning in 1999, and will be replaced with a more localized indigenious stock. Direct stream releases of Wallowa stock were eliminated with the 1999 brood (NMFS, 1999). Wallowa stock (056) will be completely replaced by 2008.

1.12) Watersheds targeted by program:

Wallowa River and lower Grande Ronde River are target production areas. Minam River, Wenaha River and Joseph Creek will be managed as wild reservies.

SECTION 2.0. RELATIONSHIP OF PROGRAM TO OTHER MANAGEMENT OBJECTIVES

2.2) List all existing cooperative agreements, memorandum of agreement, or other management plans or court orders under which program operates. Confirm HGMP consistency.

2.3) Status of natural populations in target area.

2.2.1 Geographic and temporal spawning distribution

Migrating adults enter the Grande Ronde basin in the spring (between February and May), and typically spawn in May. Principal spawning and rearing areas include the mainstem Wallowa River and its tributaries, the upper mainstem and tributaries of the Grande Ronde River, Joseph Creek and tributaries, Wenaha River and tributaries, and tributaries to the Lower and Middle Grande Ronde (Lookingglass, Indian, Catherine, Wildcat, Mud and Courtney Creeks) (BiOp, 1999).

2.2.2 Annual spawning abundance for as many years as available

2.2.3 Progeny to parent ratios, survival data by life stage, or other measures of productivity for as many brood years as available.

2.2.4 Annual proportions of hatchery and natural fish on natural spawning grounds for as many years as possible.

To date, actual contributions of hatchery production to natural spawning and natural escapement is not known.

2.2.5 Status of natural population relative to critical and viable population thresholds.

2.4) Relationship to harvest objectives.

Grande Ronde River Basin steelhead stock 056 is being produced to meet sports and tribal fisheries objectives. Harvest of wild steelhead does not occur within the Grande Ronde basin.

2.4) Relationship to habitat protection and recovery strategies.

The program does not include habitat protection and recovery strategies.

2.5) Ecological interactions
Ecological interactions specific to this program are unknown. Steelhead hatchery programs can produce residual juveniles which may cause ecological interactions.

SECTION 3.0 WATER SOURCE - To be completed at a later date.

SECTION 4.0 FACILITY - To be completed at a later date.

SECTION 5.0 ORIGIN AND IDENTITY OF BROODSTOCK

5.1) Source

♦ *Existing broodstock*

Broodstock for the Grande Ronde Basin summer steelhead program is collected from adult steelhead returning to Wallowa hatchery and Big Canyon hatchery. Broodstock originated from adults captured at the lower Snake River dams.

♦ *New indigenious broodstock*

Broodstock development will be tailored to the specific needs and characteristics of the target production areas and will provide for the greatest likelihood of achieving conservation objectives.

5.2.1) <u>History</u>
Summer steelhead stock 056 is a mixed lineage stock. Broodstock development originated from fish trapped at Ice Harbor Dam in 1976 and Little Goose Dam in 1977 and 1978, and likely included fish destined for the Salmon and Clearwater Rivers and other tributaries of the Snake River (Grande Ronde River Basin Fish Management Plan, 1993). The 1979 brood was made-up entirely from brood collected at Pahsimeroi Ponds on the upper Salmon River, Idaho (stock 097). Likewise, in 1994 and 1996, adults from Cottonwood trap were transferred to Wallowa Hatchery and used to supplement broodstock needs. In all other years, stock 056 has been comprised entirely of adults returning to the Grande Ronde River Basin (from 1980 to present).

Table 2. Adult summer steelhead collected, number spawned, number of egg transferred and fry ponded at Wallowa Hatchery and Big Canyon Hatchery, 1990 - 1999.

Brood Year	Collection Facility	Adults Counted	Adults Collected 1/ # Males Spawned	# Females Spawned	Spawning Ratio (M:F)	Egg Take (in 1,000's)	Egg Transfers (in 1,000's) [In/Out] 2/	Fry Ponded (in 1,000's) /3	Other Stock Transfers Ponded
1990	Wallowa H	948	NA 1/	457	NA 1/	2,456	594 / 1,993	1,689	0
	Big Canyon	334	NA 1/	119	NA 1/	594	0 / 594		
1991	Wallowa H	478	NA 1/	789	NA 1/	4,230	0 / 2,073	1,838	0
	Big Canyon	428	NA 1/	0	NA 1/	0	0 / 0		
1992	Wallowa H	2,059	NA 1/	594	NA 1/	2,532	0 / 1,921	1,837	0
	Big Canyon	0	NA 1/	0	NA 1/	0	0 / 0		
1993	Wallowa H	1,353	NA 1/	495	NA 1/	2,167	92 / 1,395	1,333	0
	Big Canyon	370	NA 1/	19	NA 1/	92	0 / 92		
1994	Wallowa H	598	239	680	0.35	3,300	0 / 2,393	1,831	0
	Big Canyon	444	0	0	0		0 / 0		
1995	Wallowa H	318	375	396	0.95	1,602	0 / 1,381	1,358	0
	Big Canyon	380	0	0	0		0 / 0		
1996	Wallowa H	988	605	592	1.02	2,782	0 / 2,084	1,771	0
	Big Canyon	527	0	0	0		0 / 0		
1997	Wallowa H	1,473	530	544	0.97	2,787	0 / 2,208	1,753	0
	Big Canyon	1,277	0	0	0		0 / 0		
1998	Wallowa H	1,374	584	582	0.99	2,883	0 / 1,897	1,744	0
	Big Canyon	1,236	0	0	0		0 / 0		
1999	Wallowa H	1,168	470	491	0.96	2,482	0 / 1,314	1,041	0
	Big Canyon	601	0	0	0		0 / 0		

1/ Prior to 1993, the number of males spawned was not recorded.
2/ All green eggs collected were transferred to Irrigon Hatchery.
3/ All fry are ponded and reared to pre-smolt age at Irrigon Hatchery.

5.2.2) Annual Size

Hatchery escapement goals are based upon annual broodstock needs. Future broodstock sizes for the new indigenious stock will be defined after a baseline evaluation of populations in the target areas is developed.

5.2.3) Past and proposed level of natural fish in brood stock

Only known hatchery-origin fish (adipose fin-clipped) are collected for Wallowa stock. The new indigenious broodstocks will be founded from one or more populations in the Grande Ronde.

5.2.4) Genetic and ecological differences

Summer steelhead stock 056 is a mixed-lineage hatchery stock. Genetic and ecological differences between wild and hatchery brood are unknown, but if present are assumed to be the result of this origin.

5.2.5) Reasons for choosing

Wallowa River summer steelhead stock 056 was chosen as the optimal brood source for the Grande Ronde River Basin in the early 1970's because it was of Snake River origin. The new stock will be founded from known populations within target areas of the Grande Ronde River basin.

5.3) Unknowns

SECTION 6.0. BROODSTOCK COLLECTION

6.2) Supporting Information:

6.2.7 Proposed number of each sex

The Wallowa hatchery goal is to have a spawning population of 645 (331 males and 314 females). Spawning ratios for 1994 and beyond are reported in Table 2.

6.2.8 Life-history stage to be collected (e.g., eggs, adults, etc.)

Returning adults are collected for broodstock. Adults are of one, two and three salt age.

6.2.9 Collection or sampling design

Adult steelhead are trapped at two sites on the Wallowa River: Wallowa Hatchery and Big Canyon Hatchery. Fish traps at both Wallowa and Big Canyon facility open in early February and run until no fish are caught in the trap for 10 consecutive days: typically in early-to-mid June. Adult collection data shows that steelhead enter Big Canyon facility between early April and late May, and enter Wallowa Hatchery from early March to mid-May (Grande Ronde Basin Fish Management Plan, 1993).

All unmarked fish are presumed naturally produced and are passed above the weir at Big Canyon Creek facility. Before release, all unmarked fish are measured and given an opercule punch combination (AOP, 1999). All marked adults (hatchery origin) are collected and held throughout the run at both facilities. Since 1994, adults returning to Big Canyon hatchery (and used for broodstock purposes) have been transferred to Wallow hatchery holding ponds until spawning. Adults retained for broostock purposes at Wallowa Hatchery are spawned on-site.

6.2.10 Identity -

(c) Methods for identifying target populations (if more than one population may be present).

A portion of the Big Canyon Acclimation and Wallowa Acclimation release groups are coded wire tagged, along with an adipose fin clip (Ad+CWT). CWT tag data allow differing hatchery stocks to be differentiated based upon their tag code; hence, the number of out-of-basin stray adults returning to the Grande Ronde drainage and alternate subbasins can be monitored.

(d) Methods for identifying hatchery origin fish from naturally spawned fish.

Beginning with broodyear 1987, all hatchery reared summer steelhead have been marked with an adipose fin clip. The external mark allows hatchery origin fish to be distinguished from naturally spawned fish.

6.2.11 Holding -

Adults are collected and held throughout the run at both facilities. Since 1994, adults returning to Big Canyon hatchery (and used for broodstock purposes) have been transferred to Wallow hatchery holding ponds until spawning. Adults retained for broostock purposes at Wallowa Hatchery are spawned on-site.

6.2.12 Disposition of carcasses - Priorities set as of 1999

All spawned adults are taken to a local landfill.

SECTION 7.0. MATING

7.6) Selection method

7.1.3 Adult Selection -

Only hatchery origin fish (adipose fin clipped) are used for broodstock. Fish held at Wallowa Hatchery are mixed and randomly selected (from early, mid and late returns) for spawning. Unmarked fish are presumed to be naturally produced, and are thus released upstream of the adult collection facility.

7.1.4 Selection of Egg Take -

If the hatchery reduces the number of eggs retained, a representative sample of each male/female cross is culled. Exceptions may occur if there is a high degree of disease or epidemics associated with certain parents; if this occurs, offspring of diseased parents may be culled, in order to maximize long-term survival of the brood.

7.7) Males

Although past hatchery goals were to spawn at a 2:3 male-to-female spawning ratio (IHOT, 1995), actual sex ratio for this program has been a 1:1 male-to-female spawning ratio. Current annual operation plans track past occurrences, and direct spawning at a 1:1 male-to-females sex ratio.

7.8) Fertilization

7.3.3 Fertilization Scheme -

7.3.4 Fish Health Procedures -

In addition to the Department-wide fish disease control and disease prevention programs, Wallowa and Irrigon Hatchery monitors fish health, fish and egg movement, therapeutic and prophylactic treatments, and sanitation activities (IHOT, 1994).

7.9) Cryopreserved gametes

No cryopreserved gametes are used for the Grande Ronde River Basin summer steelhead (stock 056) program.

SECTION 8.0 REARING AND INCUBATION

SECTION 9.0 RELEASE

9.1) Life history stages, sizes, and age at release

Table 3 shows the history of summer steelhead releases into the Grande Ronde River Basin, since 1990. Spring release groups are of smolt condition and rear in the hatchery environment for 12-14 months. Wallowa stock production targets a 4/lb. smolt. For brood years 1990 to 1998, the size of the smolts at the time of release has averaged:

Deer Creek	= 4.86 fish/lb. (4.00 - 6.20 fish/lb.)
Catherine Creek	= 5.39 fish/lb. (4.71 - 7.25 fish/lb.)
Spring Creek	= 4.87 fish/lb. (4.72 - 5.05 fish/lb.)
Grande Ronde River (R-1 and R-2)	= 5.48 fish/lb. (4.75 - 7.47 fish/lb.)
Out-of-basin	= 5.00 fish/lb. (3.10 - 6.20 fish/lb.) (excluding 1990 brood year releases)

Life history and size at release for the new indigenious stock program replacing Wallowa stock will be tailored to the specific needs and characteristics of target population areas in the Wallowa River and lower Grande Ronde basins.

9.2) Life history stage, size, and age of natural fish of same species

9.3) Dates of release and release protocol

Most wild smolts migrate from April through June with peak migration in May. Hatchery smolts are programmed to track these trends, and are thus released in April and May. Initial release is volitional over a two-week period, with forced release during the last 24 hours. Details regarding the number (and pounds) of fish stocked into each designated water body is provided in Tables 3-7.

Dates of release for the new indigenious stock program replacing Wallowa stock will be tailored to the specific needs and characteristics of target population areas in the Wallowa River and lower Grande Ronde basins.

9.4) Location(s) of release

Steelhead have been released into two tributaries of the mainstem Grande Ronde River (Spring Creek and Catherine Creek), into the mainstem Grande Ronde River, and into Deer Creek (a tributary to the Wallowa River). Direct stream releases into Catherine Creek, Wildcat Creek and Upper Grande Ronde were terminated in 1999 (Tables 3-7). Wallowa stock steelhead are currently released from acclimation ponds at Wallowa Hatchery, Big Canyon and Cottonwood satellite facilities.

Release locations for the new indigenious stock program replacing Wallowa stock will be tailored to the specific needs and characteristics of target population areas in the Wallowa River and lower Grande Ronde basins.

Table 3. Summer steelhead smolt releases into Deer Creek, a tributary to the Wallowa River (brood years 1990 to 1998). All data extrapolated from ODFW HMIS database.

Brood Year	Facility	Release Date	Location	Number Released	Lbs. Released	# / Lbs.
1990	Big Canyon	04/26-05/06/91	Deer Creek	268,972	53,047	5.07
	Irrigon H	04/26/91	Deer Creek	52,487	9,903	5.30
1991	Big Canyon	04/23-05/08/92	Deer Creek	422,748	86,133	4.91
	Irrigon H	04/23/92	Deer Creek	53,741	10,335	5.20
1992	Big Canyon	04/23-05/07/93	Deer Creek	381,403	73,320	5.20
	Irrigon H	04/23/93	Deer Creek	51,574	10,525	4.90
1993	Big Canyon	04/22/94	Deer Creek	105,547	26,321	4.01
	Irrigon H	04/22/94	Deer Creek	50,204	12,552	4.00
1994	Big Canyon	04/21-05/08/95	Deer Creek	379,152	80,511	4.71
	Irrigon H	04/21/95	Deer Creek	53,822	11,213	4.80
1995	Big Canyon	04/16-05/05/96	Deer Creek	372,603	80,368	4.64
	Irrigon H	04/17/96	Deer Creek	50,943	10,189	5.00
1996	Big Canyon	04/08-05/21/97	Deer Creek	430,323	85,366	5.04
1997	Big Canyon	03/31-05/13/98	Deer Creek	362,141	74,644	4.85
	Big Canyon	05/28/98	Roulet Pond	2,188	500	4.38
1998	Big Canyon	04/07-06/03/99	Deer Creek	447,574	93,266	4.80
	Big Canyon	06/09/99	Kinney Lake	2,571	415	6.20
	Irrigon H	05/07/99	Deer Creek	800	178	4.49

Table 4. Summer steelhead smolt releases into Spring Creek, a tributary to the Grande Ronde River (brood years 1990 to 1998). All data extrapolated from ODFW HMIS database.

Brood Year	Facility	Release Date	Location	Number Released	Lbs. Released	# / Lbs.
1990	Wallowa H	04/22-05/02/91	Spring Creek	606,677	128,506	4.72
1991	Wallowa H	04/20-05/04/92	Spring Creek	172,115	34,423	5.00
1992	Wallowa H	04/19-05/05/93	Spring Creek	656,227	134,995	4.86
1993	Wallowa H	04/18-05/02/94	Spring Creek	211,635	41,908	5.05
1994	Wallowa H	04/16-05/05/95	Spring Creek	657,433	132,406	4.97
1995	Wallowa H	04/08-05/13/96	Spring Creek	656,372	137,564	4.77
1996	Wallowa H	04/01-05/16/97	Spring Creek	680,482	135,797	5.01
1997	Wallowa H	03/24-05/02/98	Spring Creek	759,402	159,552	4.76
1998	Wallowa H	03/31-05/13/99	Spring Creek	800,312	171,865	4.66

Table 5. Summer steelhead smolt releases into Catherine Creek, a tributary to the Grande Ronde River (brood years 1990 to 1998). All data extrapolated from ODFW HMIS database.

Brood Year	Facility	Release Date	Location	Number Released	Lbs. Released	# / Lbs.
1990	Irrigon H	04/11-04/16/91	Catherine Creek	111,464	15,383	7.25
1991	Irrigon H	04/08/92	Catherine Creek	62,649	12,268	5.11
1992	Irrigon H	04/15-04/16/93	Catherine Creek	62,563	11,047	5.66
1993	Irrigon H	04/18/94	Catherine Creek	62,556	13,293	4.71
1994	Irrigon H	04/12/95	Catherine Creek	62,513	11,918	5.25
1995	Irrigon H	04/10-04/11/96	Catherine Creek	62,481	11,446	5.46
1996	Irrigon H	04/09/97	Catherine Creek	62,490	12,571	4.97
1997	Irrigon H	04/08-04/09/98	Catherine Creek	62,505	13,181	4.74

Table 6. Summer steelhead smolt releases into the Grande River mainstem (brood years 1990 to 1998). All data extrapolated from ODFW HMIS database.

Brood Year	Facility	Release Date	Location	Number Released	Lbs. Released	# / Lbs.
1990	Irrigon H	04/30-05/01/91	Grande Ronde R-1	98,783	16,757	5.90
		04/08-04/11/91	Grande Ronde R-2	341,253	45,703	7.47
1991	Irrigon H	04/06-04/08/92	Grande Ronde R-2	200,214	38,078	5.26
1992	Irrigon H	04/12-04/15/93	Grande Ronde R-2	200,111	39,426	5.08
1993	Irrigon H	04/13-04/15/94	Grande Ronde R-2	200,806	40,174	5.00
1994	Irrigon H	04/10-04/12/95	Grande Ronde R-2	250,618	40,117	6.25
1995	Irrigon H	04/08-04/11/96	Grande Ronde R-2	200,021	38,304	5.22
1996	Irrigon H	04/07-04/08/97	Grande Ronde R-2	199,969	40,528	4.93
1997	Irrigon H	04/06-04/09/98	Grande Ronde R-2	199,960	42,130	4.75
1998	Irrigon H	04/06-04/07/99	Grande Ronde R-2	126,995	25,595	4.96

Table 7. Summer steelhead smolts released into standing water bodies in the Grande River Basin (brood years 1990 to 1998), and into areas outside of the Grande Ronde basin (since 1990). All data extrapolated from ODFW HMIS database. Fish released into standing water bodies do not have access to wild fish production areas.

Brood Year	Facility	Release Date	Location	Number Released	Lbs. Released	# / Lbs.
1990	Irrigon H	11/20/90	Snake River	140,787	2,617	53.80
	Irrigon H	03/27/91	Columbia River	8,400	1,400	6.00
1991	Irrigon H	11/14/91	Snake River	422,748	86,133	4.91
1994	Wallowa H	05/26/94	Marr Pond	80	Fry	
1995	Wallowa H	07/03/96	Wallowa Lake	2,933	946	3.10
1996	Wallowa H	06/10/97	Kinney Lake	5,029	932	5.40
	Wallowa H	05/03/96	Marr Pond	97	Fry	
	Wallowa H	05/10/96	Wallowa Wildlife Pond	92	Fry	
1997	Big Canyon	5/28/98	Roulet Pond	2,188	500	4.38
	Wallowa H	05/13/97	Marr Pond	77	Fry	
	Wallowa H	05/15/97	Wallowa Wildlife Pond	93	Fry	
1998	Big Canyon	06/09/99	Kinney Lake	2,571	415	6.20
	Wallowa H	05/15/97	Roulet Pond	178	Fry	

9.5) Acclimation procedures

Pre-smolt summer steelhead are acclimated at Wallowa Hatchery and Big Canyon Hatchery from March through May. Fish released into the Wallowa River are transferred from Irrigon Hatchery in February and April, acclimated at Wallowa acclimation ponds for one month, and are released in April and May. Likewise, summer steelhead released into Deer Creek, are transferred from Irrigon Hatchery in March and April, held at Big Canyon acclimation ponds for one month, before being released in April and May. Initial release is volitional over a two-week period, with forced release during the last 24 hours.

Acclimation procedures for the new indigenious stock program replacing Wallowa stock will be tailored to the specific needs and characteristics of target population areas in the Wallowa River and lower Grande Ronde basins.

9.6) Number of fish released

Summer steelhead hatchery releases since 1990 brood year is reported in Tables 3-7. Planned releases for the 1998 and 1999 brood years (2000 and 2001 release years) are 775,000 smolts and 400 unfed fry.

The Grande Ronde steelhead program is to transition from Wallowa stock to indigenious stock. Wallowa stock releases are to be reduced by 33% in 2000, 66% in 2005 and completely eliminated in 2008. The number of fish released from the indigenious stock program replacing the Wallowa stock will be tailored to the specific needs and characteristics of target production areas in the Wallowa River and lower Grande Ronde.

9.7) Marks used to identify hatchery adults

Since 1987, all juvenile summer steelhead released for this program have been externally marked with an adipose fin clip to identify hatchery fish among all returning adults. In 1999, 50,000 fish from the Wallowa River release group (15% of total release group) and 2) 50,000 fish from the Deer Creek release group (11% of total release groups), will be tagged with a coded-wire tag in addition to the adipose fin clip (Ad+CWT). In addition, a portion will be tagged with a Passive Integrated Transponder (PIT) tag, in order to monitor and track temporal and spatial smolt migration through the Columbia River. All indigenious brood will be marked with an adipose clip or other means of identification for harvest and monitoring.

9.8) Unknowns

SECTION 10. MONITORING AND EVALUATION OF PERFORMANCE INDICATORS - To be completed at later date.

SECTION 11. RESEARCH - To be completed at later date.

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Appendix D. Lower Snake River Compensation Plan Program Summary for the Independent Science Review Panel, April 2001

Program Overview

- The Lower Snake River Fish and Wildlife Compensation Plan (LSRCP) was authorized by the Water Resources Development Act of 1976, Public Law (P.L.) 94-587, to mitigate and compensate for fish and wildlife resource losses caused by the construction and operation of the four lower Snake River dams and navigation lock projects (FWS 1998). The fishery resource compensation plan identified the need to replace adult salmon and steelhead and resident trout fishing opportunities. The size of the anadromous program was based on estimates of salmon and steelhead adult returns to the Snake River basin prior to the construction of the four lower Snake River dams (Table 1). Estimates of total numbers of smolts needed for release to return the proper number of adults was determined by dividing the number of adult salmon and steelhead to be compensated by estimated smolt-to-adult survival rates (SAR's) (Table 2).

Table 1. Computation of adult anadromous fish losses associated with the four Lower Snake River dams and locks and the Lower Snake River Fish and Wildlife Compensation Plan (Corps 1975).

	Fall chinook	Spring/summer chinook	Steelhead trout
McNary Count (Year of count)	97,500 (1958)	222,100 (1957)	172,600 (1962-63)
Maximum Percent over Ice Harbor	33.5	55.0	66.5
Estimated Snake River run[1]	32,663	122,200	114,800
Adult losses attributed to the Lower Snake Projects[2]	18,300[3]	58,700	55,100

[1] McNary count times maximum percent over Ice Harbor
[2] Estimated Snake River run times 48% (total estimated turbine-related losses).
[3] For fall chinook, formula for adult loss calculation is (Snake R. run minus 5,000 adults) * 48% plus 5,000 adults. The 5,000 adults is credited for those that spawned in the reach inundated by the reservoirs – that loss was direct and therefore added in directly to compute the total loss.

Hatchery siting plans were based in part on the estimated losses by basin (Table 3) and on the availability of suitable sites and water, access, costs, and other factors. Rearing capacity needs for each proposed facility were calculated using the adult escapement goals for that basin or stream reach and the estimated SAR's, smolt target size, egg to smolt survival, etc. (Table 2). Ten major hatcheries were built by the Corp of Engineers (COE) between 1981 and 1991 and sixteen satellite facilities for adult trapping and juvenile acclimation facilities between 1980 and 1998 (Table 4 and Figure 1).

Table 2. Hatchery production model used to size the LSRCP Program to return the required numbers of adult chinook salmon and steelhead trout (Herrig 1990).

	Fall Chinook	Spring/Summer Chinook	Steelhead
Adult losses	18,300	58,700	55,100
Percent survival (smolt to adult)	0.20	0.87	0.50
Number of smolts	9,160,000	6,750,000	11,020,000
Size (smolts per pound)	90	15	8
Pounds of smolts	101,800	450,000	1,377,500
Percent survival (egg to smolt)	80	70	65
Number of eggs	*11,450,000*	*9,650,000*	*16,950,000*
Eggs per female	5,000	4,500	5,000
Number of females	2,290	2,145	3,390

Table 3. Distribution of adult salmon and steelhead requiring compensation by river reach and state (Corps 1975).

River/stream reach	Washington Spring chinook	Washington Fall chinook	Washington Steelhead	Oregon Spring chinook	Oregon Steelhead	Idaho Spring/summer chinook	Idaho Steelhead
Mainstem Snake River:							
Below Lewiston		5,000					
Lewiston-Hells Canyon			9,728	2,208			
Hells Canyon Dam		3,648			1,368	1,200	1,368
Tucannon River	1,152		1,632				
Clearwater River		68				288	20,736
Asotin Creek			816				
Grande Ronde River				5,856	7,632		
Salmon River						46,656	16,896
Imnaha		68		3,216	1,920		
Small tributaries					264	288	264
Totals	1,152	18,512[a]	4,656	9,072	11,184	48,432	39,264

[a] The subcommittee acknowledged that the fall chinook figure differed slightly from other estimates and therefore, 18,300 was adopted as the final number after this report was published.

Except for three recently completed fall chinook acclimation facilities on the Snake and Clearwater rivers (Pitsburg Landing, Capt. John’s, Big Canyon), the Fish and Wildlife Service LSRCP Office administers and funds the operation, maintenance, and evaluation of all LSRCP facilities through cooperative agreements with the agencies and tribes. The three fall chinook facilities are funded through the Northwest Power Planning Council’s (NWPPC) Fish and Wildlife Program (FWP). As the agency who markets Columbia River generated power, the Bonneville Power Administration (BPA) reimburses the FWS for all power-related LSRCP costs.

The hatcheries (FH) and satellite facilities are operated by Idaho Department of Fish and Game, Oregon Department of Fish and Wildlife, Washington Department of Fish and Wildlife, the Nez Perce Tribe, and the FWS (see Figure 1). All LSRCP cooperators, including the Confederated Tribes of the Umatilla Indian Reservation and Shoshone-Bannock Tribes participate in operation and management decisions. All cooperators except the Shoshone-Bannock Tribes are funded to conduct monitoring and evaluation studies and fish health.

- Although the original plan was to produce about 11 million steelhead smolts at 8 fish per pound (fpp), 6.75 million spring/summer chinook salmon smolts at 15 fpp, and 9.2 million fall chinook salmon at 90 fpp (Table 2), rearing conditions (e.g. water temperature) and disease concerns at some hatcheries required changes in the targeted size and number of smolts released (see subbasin summaries which follow). In some cases, larger smolts were produced then originally planned resulting in fewer being released; whereas in others, smaller and more smolts were released. Current production targets are consistent with those listed in the Columbia River Fish Management Plan (CRFMP) although some facilities have been below targeted releases due to lack of broodstock. CRFMP re-negotiations coupled with efforts to conserve listed salmon and steelhead populations will likely result in significant changes in production targets.

Figure 1 shows the location of all hatcheries and satellite facilities of the LSRCP program. The five steelhead rearing facilities (and associated satellite facilities) are Irrigon (Wallowa, Little Sheep Creek, and Big Canyon), Lyons Ferry (Cottonwood and Dayton ponds), Hagerman National, Magic Valley, and Clearwater FH's (Table 3). The six salmon rearing facilities (and associated satellite facilities) include Lookingglass (Big Canyon and Imnaha), Lyons Ferry (Tucannon, Curl Lake, Captain John Rapids, Pittsburg Landing, and Big Canyon-Clearwater R.), McCall (South Fork Salmon River), Sawtooth (East Fork Salmon River), Clearwater (Red River, Powell, and Crooked River), and Dworshak NFH's (Table 3). Kooskia NFH is located on Clear Creek, a tributary to the Middle Fork of the Clearwater River, is funded and operated by the FWS and is not a LSRCP facility, but is discussed in the Clearwater subbasin because it is operated as a complex with Dworshak NFH's chinook salmon program. The two resident rainbow trout rearing facilities include Lyons Ferry and Tucannon FH's.

The management objectives, facilities, past activities and accomplishments, and future plan for Walla Walla, Snake (mainstem), Tucannon, Clearwater, Asotin, Grande Ronde, Imnaha, and Salmon river subbasin programs are discussed below. Additional information on LSRCP operations is available in reviews of the program conducted in 1990 (Herrig 1990) and 1998 (FWS 1998).

Table 4. Lower Snake River Fish and Wildlife Compensation Plan hatchery facilities, estimated design capacities, and completion dates.

	Production Target in Pounds				
Hatchery:	Chinook		Trout		Completion
Satellite Facilities	Spring/summer	Fall	Steelhead	Resident	Date
Lookingglass	69,600				Nov. 82
Big Canyon Ck.					Apr. 87
Imnaha					Jul. 89
Irrigon			279,600		Oct. 85
Wallowa					May 85
Little Sheep Ck.					Aug. 87
Big Canyon Ck.					Apr. 87
Lyons Ferry (Phase I):			116,400	45,000	Nov. 83
Tucannon FH				41,000	Nov. 84
Cottonwood Pd.					Feb. 85
Dayton Pd.					Oct. 86
Curl Lk.					Feb. 85
Lyons Ferry Phase II	8,800	101,800			Nov. 84
Pittsburg					Mar. 96
Big Canyon					Mar. 97
Capt.John					Apr. 98
Tucannon FH					Nov. 84
McCall	61,300				Sep. 81
S.F. Salmon R.					Jul. 80
Sawtooth	149,000				Jan. 85
E.F. Salmon R.					Nov. 83
Clearwater	91,300		350,000		Dec. 91
Red River					Nov. 86
Crooked R.					May 90
Powell R.					May 89
Magic Valley			291,500		Aug. 87
Hagerman			340,000		Apr. 84
Dworshak	70,000				Nov. 82
TOTALS	450,000	101,800	1,377,500	86,500	

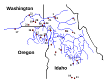

Figure 1. LSRCP facility locations and operators

Idaho Department of Fish and Game
1. Clearwater Fish Hatchery (FH)
2. Powell Satellite Facility (SF)
3. Crooked River SF
4. Red River SF
5. McCall FH
6. South Fork Salmon River SF
7. Sawtooth FH
8. East Fork SF
11. Magic Valley FH

Fish and Wildlife Service
2. Dworshak NFH Expansion
10. Hagerman NFH

Nez Perce Tribe
23. Pittsburg Landing SF
24. Captain Johns SF
25. Big Canyon SF

Oregon Department of Fish and Wildlife
12. Imnaha SF
13. Little Sheep Creek SF
14. Wallowa FH SF
15. Big Canyon SF
16. Lookingglass FH
17. Irrigon FH

Washington Department of Fish and Wildlife
18. Cottonwood Creek SF
19. Tucannon FH SF
20. Curl Lake SF
21. Dayton Pond SF
22. Lyons Ferry FH (salmon and trout)

Walla Walla, Mainstem Snake, Tucannon Rivers and Asotin Creek Subbasins

The Lyons Ferry Complex (LFC) serves LSRCP needs in the Walla Walla, Mainstem Snake, Tucannon Rivers and Asotin Creek subbasins and is comprised of the Lyons Ferry Fish Hatchery (FH), Tucannon Fish Hatchery (FH), and three fall chinook acclimation facilities in southeast Washington and western Idaho. The LFC facilities rear, acclimate and release fish to compensate for 18,300 Snake River fall chinook, 1,152 Tucannon River spring chinook, 4,656 Snake River summer steelhead, and 67,500 angler days of recreation on resident fish.

Lyons Ferry FH is located at the confluence of the Palouse and Snake rivers at river kilometer (Rk) 90, and lies between Lower Monumental and Little Goose dams. It has pathogen free 100% well water of near constant temperature and a capacity of 60,000 gallons per minute (gpm). The hatchery has adult trapping and holding facilities for returning fall chinook and summer steelhead broodstock. There are two separate incubation buildings (one for steelhead and one for spring and fall chinook) and early life rearing troughs and raceways for all species. Three 2.1 acre ponds serve for smolt rearing (fall chinook and summer steelhead).

Tucannon FH is located at Rk 58 on the Tucannon River and has an adult steelhead and salmon collection trap, standard hatching troughs and raceways, and an earthen rearing pond for rearing juvenile rainbow trout. The hatchery has well, spring, and river water to use for various rearing strategies. The adult collection trap has been used primarily to trap returning spring chinook salmon for broodstock, though in 1998, WDFW also used the trap to assess summer steelhead returns. Tucannon FH rears rainbow trout, and acclimates and releases juvenile spring chinook.

The Pittsburg Landing on the Snake River, Capt. John Rapids on the Snake River, and Big Canyon (Clearwater River) sites were constructed for acclimation and release of fall chinook reared at Lyons Ferry FH. The Pittsburg Landing and Big Canyon facilities consist of portable 20-foot circular tanks, whereas the Capt. Johns facility is a permanent lined pond. All three facilities use pumped water from the adjacent rivers and provide acclimation for 450,000 yearling fall chinook smolts and up to 2,000,000 subyearling fall chinook.

Walla Walla Subbasin

The LSRCP program for steelhead and trout began in the Walla Walla Basin in 1983, no LSRCP salmon compensation occurs in the basin. The LSRCP program has been guided by the following objectives: 1) Establish broodstock(s) capable of meeting egg needs, 2) Maintain and enhance natural populations of native salmonids, 3) Return adults to the LSRCP area which meet goals, and, 4) Improve or re-establish fisheries. Most recently the LSRCP program has also been directed by the ESA listings of salmon and steelhead and the need to contribute to the recovery of those listed populations. Trout production to provide recreational fishing opportunity comes to the basin primarily from Tucannon Fish Hatchery (TFH).

LFH is located at the confluence of the Palouse and Snake rivers at Rk 90, and lies between Lower Monumental and Little Goose dams. LFH has pathogen free 100% well water of near constant temperature and a capacity of 60,000 gpm. The hatchery has adult trapping and holding facilities for returning fall chinook and summer steelhead broodstock. There are two separate incubation buildings (one for steelhead and one for spring and fall chinook) and early life rearing troughs and raceways for all species. There are also three 2.1 acre ponds for smolt rearing (fall chinook and summer steelhead). In 2000 WDFW constructed new facilities for captive brood spring chinook propagation which is now being funded by BPA under the Columbia Basin Fish and Wildlife Plan (FWP). LFH provides all of the steelhead smolts for release in the Walla Walla Basin.

Tucannon Fish Hatchery is located at Rk 58 on the Tucannon River, has an adult steelhead and salmon collection trap, standard hatching troughs and raceways, and a earthen rearing pond for rearing juvenile rainbow trout. The hatchery has well, spring and river water to use for various rearing strategies. The adult collection trap has been used primarily to trap returning spring chinook salmon for broodstock, though in 1998, WDFW also began using the trap to assess the summer steelhead return. TFH rears rainbow trout, and acclimates and releases juvenile spring chinook.

Summer Steelhead

The annual production goal of 250,000-300,000 LFH stock smolts at 4 fish/lb is split between an acclimated release and direct stream releases from LFH. Annual steelhead production of 175,000 smolts has been released directly into the Walla Walla River from LFH. Historically up to 30,000 smolts were also released into Mill Creek, but beginning in 1998, that release was curtailed. The Dayton AP is located at Rk 87 on the Touchet River and annually acclimates 100,000-125,000 smolts between February and May. Smolt releases are to provide adult returns to the Walla Walla subbasin (1,500 fish) for harvest augmentation as part of the total Washington LSRCP steelhead goal of 4,656 adult returns. Stocks of summer steelhead used for these releases since 1984 include Wells (1983-86), Wallowa (1984-89) and LFH (1987-present).

As a result of the ESA listing for the ESU and Washington's desire to recover depressed populations, WDFW drafted an HGMP for experimental development of a local endemic broodstock for the Touchet River. This program will be evaluated for five years and the results analyzed with the comanagers to determine whether it will continue. Estimates of adult returns to the Walla Walla basin from hatchery smolt releases range from 1,000 to 5,900 fish for a run year. A thriving sport fishery has been re-established on the hatchery fish, which are all marked to allow for selective harvest. No harvest of wild steelhead is allowed.

Evaluation work has been ongoing throughout the program's history. Evaluation actions monitor adult escapement and wild juvenile population abundance through spawning ground surveys, electrofishing and snorkel surveys, adult trapping, and creel surveys.

Both juvenile and adult indicators of abundance have declined in recent years. Further studies that have been conducted estimated the number of non-migrating juvenile steelhead (residuals) in the Touchet River and found that between 9% and 17% of released fish residualized. Data from the studies support changes in acclimation pond management and size at release to minimize the potential negative interactions of hatchery smolts with wild salmonids. Evaluations will continue to monitor steelhead releases and harvest, and focus on ways to minimize effects of the compensation program on natural populations, such as size and time of release or other release strategies that may decrease the potentially negative interactions between hatchery and wild fish. In addition, expanded genetic evaluation of hatchery and naturally produced steelhead has begun in association with the co-managers to more fully describe the genetic stock structure within the subbasin. Areas of concern include straying rates of hatchery stock steelhead into tributary rivers, the degree of incidental hooking mortality on natural adults, whether hatchery steelhead are contributing to the decline in wild populations, and whether a more appropriate stock for compensation and proposed supplementation in the basin is available.

Future Plans

As part of the Middle Columbia ESU, Walla Walla basin steelhead were listed as threatened. A further and more accurate enumeration of wild steelhead escapement has begun on the Touchet River, and WDFW led co-managers in the development of an HGMP for Touchet endemic steelhead. This five year study will assess the development of a local endemic broodstock to be used in the LSRCP program in the subbasin. Reduced production within the subbasin was proposed by the state and agreed to with the co-managers. However for long term managment, formal renegotiation must occur as part of the Columbia River Fish Management Plan.

Rainbow Trout

Catchable size trout (3 fish/lb.) are reared at both LFH and TFH for release. Approximately 10,000 fish were historically released into tributaries of the Walla Walla River annually. However, with the advent of ESA listings for steelhead and bull trout in the late 1990s, and the adoption of Washington’s Wild Salmonid Policy, this practice has ceased. The LSRCP funded an evaluation of the persistence of planted rainbow trout and residual hatchery steelhead, and thie potential effect on wild salmonids. This study helped managers understand the degree of residualism from direct and acclimated hatchery steelhead releases, and also led to the decision to discontinue trout planting in anadromous fish bearing streams of SE Washington.

Spring Chinook

No spring chinook compensation was identified for the Walla Walla subbasin as part of the LSRCP. However the CTUIR has proposed and initiated the reintroduction of spring chinook into the subbasin. LSRCP funded evaluations will monitor the presence/absence of spring chinook where necessary, and share the data with co-managers.

Mainstem Snake River

The LSRCP program for steelhead and trout was begun in 1982 and for salmon in 1984. The LSRCP program has been guided by the following objectives: 1) Establish broodstock(s) capable of meeting egg needs, 2) Maintain and/or enhance natural populations of native salmonids, 3) Return adults to the LSRCP area which meet goals, and 4) Improve or re-establish fisheries. Most recently the LSRCP program has also being directed by the ESA listings of salmon and steelhead and the need to contribute to the recovery of those listed populations. The Lyons Ferry Complex is comprised of Lyons Ferry and Tucannon hatcheries (see Walla Walla basin for a brief description), and a system of WDFW and Tribal operated acclimation ponds throughout SE Washington. These facilities rear and release fish to compensate for 18,300 Snake River fall chinook, 1,152 Tucannon River spring chinook, 4,656 Snake River summer steelhead, and 67,500 angler days of recreation on resident fish. Management intent for each species is different and will be discussed in each species section below. No rainbow trout or spring chinook are released directly into the Snake River.

<u>Fall Chinook Salmon</u>

Lyons Ferry represents the sole fall chinook salmon compensation effort under LSRCP in the Snake River basin, (Nez Perce Tribal Hatchery will become operational in 2002 or 2003) and utilizes native stock Snake River fall chinook for the program. These fish are part of the Snake River fall chinook ESU and have been identified by NMFS as the appropriate stock for recovering the population.

While planning and designing the LSRCP facilities in the 1970s, the steep fall chinook decline caused concern that these fish might become extinct before mitigation facilities could be completed to maintain and enhance the run. A fall chinook egg bank program was conceived and initiated in 1976 to preserve genetic material for compensation of 18,300 adults. Production releases from LFH began in the mid 1980's with fish from the egg bank program. Recent releases and returns have increased while maintaining the genetic integrity of the stock.

Current management objectives for LFH are driven by the ESA and the Columbia River Fish Management Plan. Those are to: 1) Maintain genetic integrity of LFH / Snake River stock, 2) Produce 900,000 yearling smolts (450,000 on-station release: 450,000 for three equal releases at Pittsburg Landing, Capt. John, and Big Canyon acclimation sites above Lower Granite Dam), and produce subyearlings as possible for release above Lower Granite Dam, and 3) Reduce stray hatchery fish escaping above Lower Granite Dam to maintain the genetic integrity of Snake River fall chinook. The desire to produce subyearlings for the program, even though their survival is lower than for yearlings, is to mimic the natural life history of Snake River fall chinook.

Evaluation of the program has included 1) tagging all releases and monitoring adult returns to LFH and LGR, 2) determining the most effective release strategy between barging or direct stream releases, 3) determining adult fall back rate at IHR and LGR and providing the recommendations for the best trapping location of broodstock, and 4) experiments with cryopreserved semen. Evaluation work conducted in the early 1980's showed a nearly 11 fold survival advantage of releasing yearling smolts versus subyearling smolts at LFH. This work has supported management decisions to release yearling smolts to increased available broodstock, with subyearling released occurring after baseline production is achieved. Ongoing evaluations are being conducted by the NPT and USFWS with fall chinook released above LGR, while WDFW monitors hatchery operations and adult returns to the lower Snake River below LGR.

Future Plans

The WDFW has released subyearlings from LFH for the past three years, concurrently with the subyearling releases above LGR from Tribal facilities. WDFW is proposing continued LFH subyearling releases as a management option for consideration by the co-managers rather than solely above LGR. Low broodstock numbers have been an obstacle to program success which has been influenced by the following: 1) a small founding population, 2) low smolt to adult survival of sub-yearling and yearling fall chinook in the main stem corridor, and 3) removing stray Columbia River chinook from the broodstock during the late 1980s and early 1990s. However, recent increases in total smolt releases have had a positive effect on the number of adults returning to the Snake River basin. Spawning practices at LFH and trapping operations at LGR have maintained the genetic integrity of the stock. Production and Monitoring and Evaluation for FY 2002 will not change significantly from past years, but will continue to focus on maximizing smolt-to-adult survival, and maintaining stock integrity.

Summer Steelhead

Annually, approximately 60,000-120,000 hatchery summer steelhead smolts have been reared and released into the Snake River near LFH. The original intent of these releases was to build broodstock returns to LFH to support the mitigation program, return adults which met the LSRCP goal, and reestablish successful steelhead fisheries. Although maintaining populations of wild steelhead in the basin was and is a management intent of the co-managers, no specific supplementation goals for Snake River populations was identified. Stocks of fish released into the river generally have been Wells (1983-86), Wallowa (1984-89) and Lyons Ferry (1987-present), with incidental releases of Clearwater, Oxbow and Skamania stocks occurring infrequently in the past. However, during the life of the LSRCP program, wild populations throughout the Snake River basin generally declined (except for run years 1999 and 2000).

The LSRCP program is successfully returning adult hatchery origin steelhead which meet or exceed LSRCP goals, and these fish have created and supported successful sport fisheries within the Snake River basin and some of its tributaries. Releases of summer steelhead for the Washington portion of the Snake River decreased in 2000, but currently have not been agreed to through the CRFMP negotiation process. Decreases of the LFH stock into the Snake were from a management response following the NMFS determination that the LFH stock constitutes jeopardy to the listed natural populations (April 2, 1999 Biological Opinion issued by NMFS). Concurrent with this mitigation success has been increasing concern with possible effects of hatchery returns on wild populations as they return to their release site, or stray into adjacent subbasins, which support natural populations.

Future Plans

Past evaluations have focused on increasing survival of hatchery reared steelhead and assessing contribution of LFH released fish to Columbia and Snake basins fisheries. Areas of concern include straying rates of hatchery stock steelhead into tributary rivers, the degree of incidental hooking mortality on natural adults, whether hatchery steelhead are contributing to the decline in wild populations, and whether a more appropriate stock for compensation and proposed supplementation in the basin is available. Evaluations will continue to monitor Snake River steelhead releases and harvest, and focus on ways to minimize effects of the compensation program on natural populations, such as size and time of release or other release strategies that may decrease the potentially negative interactions between hatchery and wild fish. Further, the evaluations program will continue to assess the potential for mitigation fisheries (identified in the original LSRCP legislation, and consistent with the NWPPC recognition of the value of "Harvest Hatcheries") where possible. In addition, expanded genetic evaluation of hatchery and naturally produced steelhead has begun to more fully describe the genetic stock structure within the basin, and possibly the availability of an acceptable locally adapted broodstock for use in the program.

Tucannon River Subbasin

Lyons Ferry (LFH) and Tucannon (TFH) hatcheries (see descriptions in Walla Walla subbasin) currently perform activities associated with anadromous and resident fish within the Tucannon River Basin. Besides those two hatchery facilities, TFH also operates Curl Lake acclimation pond (Rk 66) which has been used for summer steelhead and spring chinook smolt releases. Curl Lake is about 2.4 acres in surface area, and has a natural bottom with average depth of ten feet. Species of interest in the basin include spring and fall chinook salmon, summer steelhead, and resident rainbow trout. While the LSRCP program does not address bull trout, as a ESA listed species within the subbasin, incidental information is also collected on that species and provided to other WDFW researchers. These facilities rear and release fish to compensate for 18,300 Snake River fall chinook, 1,152 Tucannon River spring chinook, 4,656 Snake River summer steelhead and 67,500 angler days of recreation on resident fish for the Snake River basin. All of WDFW's spring chinook, and portions of the steelhead and rainbow trout mitigation take place in the Tucannon River. Management intent for each species is different and will be discussed in each species section below.

Fall Chinook

A small population of fall chinook salmon, both naturally and hatchery produced, spawn and the juveniles briefly rear in the lower Tucannon River. Evaluation efforts have included spawning ground surveys (16-61 redds annually since 1984), and some limited smolt trapping. Success of these spawners and juveniles is unknown. Hatchery supplementation of fall chinook from LFH in the Tucannon River does not occur at the present time, though it has been proposed in the Tribal Recovery Plan. The habitat in the lower Tucannon River and its tributaries has been heavily degraded by past agricultural and grazing practices. These practices have led to channel instability, and high sedimentation of the substrate, both of which potentially limit fall chinook production.

Future Plans

WDFW proposed a study to determine the impact of these potentially limiting factors, and to expand our monitoring efforts (adult and juvenile production), but it has not been funded. Incidental information on fall chinook is collected as part of the spring chinook and steelhead evaluations. Hatchery supplementation plans should be delayed until fall chinook production potential and success in the Tucannon River can be determined.

Rainbow Trout

Over the years, the number of trout released directly into the Tucannon River have been reduced from 40,000 to 3,000 (1986-2000) and moved downstream, out of the ESA listed spring chinook and natural steelhead rearing areas. Trout originally destined for the river have been planted in area lakes instead, to continue to provide angler opportunity, yet protect threatened chinook and steelhead**.** However, with the advent of ESA listings for steelhead and bull trout in the late 1990s, and the adoption of Washington's Wild Salmonid Policy, this practice has ceased. The LSRCP funded an evaluation of the persistence of planted rainbow trout and residual hatchery steelhead, and their potential effect on wild salmonids. This study helped managers understand the degree of residualism from direct and acclimated hatchery steelhead releases, and also led to the decision to discontinue trout planting in anadromous fish bearing streams of SE Washington.

Spring Chinook

Two production programs are currently active within the subbasin; LSRCP supplementation, and a BPA funded (Project # 200001900) captive broodstock project. On an annual basis, about 100 spring chinook salmon are trapped at Tucannon Fish Hatchery (TFH) for broodstock to produce 132,000 smolts at 15 fish/lb under the LSRCP supplementation program. Trapped adults are hauled to LFH where they are spawned and their progeny reared for one year. All fish are then marked and transported back to TFH for rearing and release.

The intent of the hatchery supplementation program is to: 1) rebuild this critically low run of ESA listed spring chinook, 2) to protecting the genetic integrity of the stock by using a locally adapted broodstock, limiting full second generation hatchery fish, and providing an adequate population size, and 3) to eventually provide harvest opportunities on the 1,152 compensation fish originally identified under LSRCP. The hatchery evaluation program has determined that naturally produced spring chinook in the Tucannon River are below replacement level and will not recover unless limiting factors (juvenile and adult passage, habitat degradation, etc.) are rectified. Rebuilding, protecting the genetic integrity, and providing harvest opportunities on the stock may not be possible under current conditions.

Recent program changes as a result of evaluation studies have included: 1) releasing smaller hatchery smolts to more closely mimic naturally produced fish in returning age composition, 2) moving juvenile release points upstream of the hatchery (Curl Lake acclimation pond or direct stream release) to offset the shift in redd distribution in relation to the adult trap, and 3) collecting all returning fish for broodstock during low return years. Age composition has shifted to more older age fish (more typical of wild fish), and collecting all broodstock in low run years has prevented total brood year failures because of natural disasters in the Tucannon River.

Future Plans

Adult returns are not complete for other implemented changes, and predicted low returns in the next few years may limit our evaluation of these activities. Predicted low returns for the next few years will also limit the success of the program in meeting our management objectives. Naturally produced fish will likely remain below replacement and hatchery broodstock goals may not be met, further hampering our efforts.

The WDFW initiated a captive broodstock program in 1997 after identifying a potentially serious genetic bottleneck which might result from severely depressed chinook runs. A Master Plan was completed for the NWPPC as part of their 3-Step process to assess new production needs within the basin. A project proposal was submitted to BPA and received funding in FY2000 and FY2001. The construction of new facilities at LFH for the captive broodstock program was completed in 1999 and 2000, primarily with funds from the LSRCP program.

Juveniles will be collected from the 1997-2001 brood years to build the captive broodstock program. In 1997, WDFW and the co-managers believed that extreme intervention (captive broodstock) was called for to prevent extinction. This captive broodstock project is short-term (ending in 2008) to reduce the potential negative genetic risks posed by captive broodstock programs, and will be operated in conjunction with the current supplementation program.

Monitoring and evaluation of the spring chinook program will include; documenting adult run size to the Tucannon River, trapping and identifying the incidence of stray Columbia and Snake river spring chinook, and removing them from the system where possible to maintain the genetic integrity of the population, estimating juvenile survivals by age class and smolt out-migration, documenting smolt size and time of release, and tagging and comparing the performance of supplementation production with captive broodstock (BPA Project # 2000001900) production.

Summer Steelhead

On an annual basis, approximately 160,000 hatchery summer steelhead smolts produced from LFH have been released into the Tucannon River. Hatchery steelhead smolts were released from Curl Lake acclimation pond (Rk 66) from 1985-1997, and direct stream released at Rk 39 or 28 since 1998 to present. Effects of steelhead residuals on the natural population of ESA listed spring chinook were studied in the early 1990 (Martin et al. 1993) Through acclimation pond management (Curl Lake), the number of steelhead that residualized in the river was reduced, providing protection to the chinook and steelhead populations. However, concurrent studies found that the direct stream releases of steelhead lower in the river produced higher smolt-to-adult survival rates than fish released from the acclimation pond. While more steelhead would be expected to residualize in the river from direct releases, they are generally out of the spring chinook and natural steelhead rearing area, and provide additional sport harvest opportunities. It was further concluded that lower river releases may also reduce natural and hatchery interactions on the spawning grounds, providing a further benefit to the recently listed natural steelhead.

With the proposed (Busby et al. 1996) and eventual ESA listing of Snake River summer steelhead and the adoption of Washington State's Wild Salmonid Policy (WDFW 1997), plans to develop a locally adapted broodstock and possibly reduce existing hatchery stock releases into the river were discussed with the co-managers. Development an HGMP began and a Draft was completed and submitted to NMFS for acceptance in early 2001 (see Subbasin Summary). A five year assessment of the success of culturing the endemic brood will follow.

The original intent of steelhead releases was to provide a successful steelhead sport fishery in the Tucannon River by returning adults which met the LSRCP goal, and to maintain and enhance natural populations of native steelhead. Stocks of fish released into the mainstem Snake River generally have been of Wells (1983-86), Wallowa (1984-86) and Lyons Ferry (1987-present) origin, with an incidental release of Pahsimeroi stock occurring in 1990 (Schuck et al. 1993). However, during the life of the LSRCP program, wild populations throughout the Snake River basin generally declined (except for run years 1999 and 2000).

<u>Future Plans</u>

While the LSRCP program has been successfully in returning adult hatchery-origin steelhead which meet or exceed LSRCP goals to the Tucannon River, and supported sport fisheries throughout the Snake and Columbia rivers, more changes will likely be required to address ESA concerns. Releases of summer steelhead into the Tucannon River decreased in 2000, but currently have not been agreed to through the CRFMP negotiation process. The decrease was a management response following the NMFS determination that the LFH stock constitutes jeopardy to the listed natural populations (April 2, 1999 Biological Opinion issued by NMFS).

Evaluations have focused on numerous issues including; increasing survival of hatchery reared steelhead, increasing juvenile out-migration success and reducing residualism, determining the effectiveness of acclimation ponds in reducing residualism and increasing survival (Viola and Schuck 1995), assessing contribution of LFH released fish to Columbia and Snake basin fisheries, monitoring natural populations status, assisting other management agencies in assessing the potential effects of supplementation (Waples 1993), determining whether a more appropriate stock for compensation and proposed supplementation in the subbasin is available and drafting an HGMP for the development of a local Tucannon River endemic steelhead broodstock. Other areas of concern that have received less attention include straying rates of hatchery stock steelhead into tributary rivers, the degree of incidental hooking mortality on natural adults, and whether hatchery steelhead are contributing to the decline in wild populations. Evaluations will continue to monitor Snake River steelhead releases and harvest, and focus on ways to minimize effects of the compensation program on natural populations, such as size and time of release or other release strategies that may decrease the potentially negative interactions between hatchery and wild fish. Further, the evaluations program will continue to assess the potential for mitigation fisheries (identified in the original LSRCP legislation, and consistent with the NWPPC recognition of the value of "Harvest Hatcheries") where possible. In addition, expanded genetic evaluation of hatchery and naturally produced steelhead has begun to more fully describe the genetic stock structure within the basin, and possibly the availability of an acceptable locally adapted broodstock for use in the program.

Asotin Creek Subbasin

Species of interest in the creek include spring chinook salmon, summer steelhead, and resident rainbow trout. In general, no active supplementation or fishery enhancement releases of hatchery fish occur in Asotin Creek. Evaluations focus on monitoring the status of populations of steelhead and spring chinook through spawning ground surveys, and snorkel and electrofishing juvenile surveys. WDFW intends to continue the surveys and results of these surveys will be compared with data from surveys in other LSRCP affected rivers.

Spring Chinook

No hatchery supplementation of spring chinook has occurred in Asotin Creek, though the natural population has been monitored. Since 1986, 10 total redds have been documented, and between 1991-96 only 3 were counted. Since 1997 no spring chinook redds have been located and the population is believed extirpated.

Future Plans

Since the Asotin Creek spring chinook population is small and relatively insignificant, no immediate recovery action has been planned by NMFS or WDFW. The Tribal co-managers have proposed the outplanting of surplus adult chinook from Rapid River stock and Imnaha river stock. No outplants have occurred to date. Depending on implementation and success of the Tucannon River captive broodstock program, WDFW has proposed reintroduction of spring chinook using captive brood fish. Agreement with co-managers will continue to be discussed before any action is taken.

Summer Steelhead
Approximately 30,000 hatchery summer steelhead smolts produced from LFH were released into Asotin Creek near the mouth between 1983-1996, after which WDFW discontinued the releases. Natural populations (documented through redd counts and juvenile population surveys) appear to be stable and have increased during run years 1999 and 2000.

Future Plans
With the recent ESA listing of Snake River summer steelhead and the adoption of Washington State's Wild Salmonid Policy, WDFW has proposed Asotin Creek as a refuge area for summer steelhead within the Snake River Basin. However, the Tribal Recovery Plan calls for more active supplementation, with development of a local broodstock and increased hatchery releases. More discussions regarding steelhead management in Asotin Creek will take place between the co-managers. No hatchery reared steelhead releases are planned for Asotin Creek for the future.

Rainbow Trout
Small numbers of rainbow trout from TFH were historically planted into Asotin Creek to provide recreational harvest opportunities to local fisherman.

Future Plans
Since WDFW has proposed Asotin Creek as a refuge area for summer steelhead, trout plants were discontinued in 2000

Clearwater River Subbasin

Two LSRCP hatchery programs are currently employed in the basin, Clearwater Anadromous Fish Hatchery (FH) (operated by the IDFG) and Dworshak National Fish Hatchery (NFH) (operated by the USFWS). Both are located within the Nez Perce Reservation at the confluence of the North Fork Clearwater and the mainstem Clearwater rivers near Orofino, Idaho. LSRCP adult return goals for these two facilities combined are 14,000 steelhead and 21,000 spring chinook salmon. Kooskia NFH, located on the Middle Fork of the Clearwater River and operated by the USFWS, is not part of the LSRCP, but is operated jointly with Dworshak. The LSRCP steelhead program in the basin only involves Clearwater FH, although Dworshak NFH also produces steelhead for Dworshak Dam mitigation. A portable acclimation facility at Big Canyon Creek on the lower Clearwater River began acclimation of Snake River fall chinook salmon from the LSRCP facility at Lyons Ferry FH in 1997. The goal of this facility is to return spawning adult fall chinook salmon to the lower Clearwater River to rebuild the natural population

Fall Chinook
The Big Canyon Creek fall chinook acclimation facility is programmed to receive 150,000 yearling fall chinook salmon each year from Lyons Ferry FH, and a component of subyearlings in years where adult returns are high and subyearlings are available. During 1997, the facility acclimated and released about 149,000 yearlings, followed by an extra release of 51,000 yearlings, and then a component of 253,000 subyearlings. Due to a poor

return in 1997, one release of 61,000 yearlings was made at the Big Canyon facility in 1998. In 1999, 232,000 yearlings and 352,000 subyearlings were transferred to Big Canyon for acclimation and release. During 2000, a total of 136,000 yearlings and 899,000 subyearlings were transferred to the facility for acclimation and release.

Future Plans

Estimated releases from the facility in 2001 include 116,000 yearlings and 500,000 subyearlings (also see above Mainstem Snake subbasin section.).

Spring/summer Chinook Salmon

Chinook salmon populations in the Clearwater River subbasin were extirpated after the construction of Lewiston Dam in 1927. During the 1960s, management actions focused on reestablishing naturally reproducing chinook salmon populations in the basin and restoring historic fisheries. Lewiston Dam was removed from 1972 to 1973. It was the extirpation and subsequent reintroduction of non-endemic stock that prompted NMFS's decision to not include the Clearwater spring chinook salmon in their listing package. In 1971, the North Fork Clearwater River, one of the most productive chinook salmon and steelhead streams in the state, was impounded and eliminated from natural production of anadromous fish by the construction of Dworshak Dam. Wild/natural steelhead and chinook salmon populations in the entire basin are currently depressed.

IDFG and NPT anadromous management action in the Clearwater River basin emphasizes rebuilding/maintaining existing natural spawning populations of chinook salmon and steelhead. The mainstems of the Clearwater, South Fork, North Fork, and lower Middle Fork will continue to be managed for exploitation of hatchery steelhead. Development of strategies to provide fishing opportunity on surplus hatchery chinook salmon will also be emphasized.

The Clearwater Subbasin Plan (completed in 1990) recommends a number of strategies to restore salmon and steelhead populations in each of the large anadromous watersheds (Lochsa, Selway, South Fork, Middle Fork and mainstem Clearwater rivers) in the Clearwater River subbasin. The plan focuses on implementing habitat improvement programs, supplementation of spring and fall chinook salmon, increasing post-release survival of hatchery smolts, maintaining the Selway as a wild fish management area for steelhead and developing a local brood source for Lochsa River steelhead supplementation. The Tribal Recovery Plan (CRITFC 1995) similarly recommends a number of habitat improvement actions as well as supplementation programs to restore natural production in the Clearwater River subbasin.

In 1982, the existing Dworshak National Fish Hatchery (NFH) was expanded to include spring chinook salmon trapping, spawning, and rearing. Thirty raceways were added to Dworshak NFH as part of the LSRCP. These raceways were designed to rear approximately 45k spring chinook salmon smolts each or a total of about 1.4 million at 20/lb. This production is what was estimated to meet the adult return goal of 9,135 to the river above Lower Granite Dam, based on an expected 0.65% smolt-to-adult return rate.

The other objective for the project is to provide a sport and tribal chinook salmon fishery in the Clearwater River.

When the spring chinook salmon program was initiated at Dworshak NFH, fish were obtained from a number of sources, including: Little White Salmon (1983 & 85), Leavenworth (1983-86), and Rapid River (1987-88) hatcheries. Since 1989, the program has primarily utilized fish that return to Dworshak as the source of brood stock.

Evaluation of the program has concentrated primarily on monitoring smolt releases and adult returns to estimate and document smolt to adult return rates using coded-wire tags. Since 1991, PIT tags have been used to document smolt travel times and estimate survival rates to various Lower Snake River dams. Several evaluation projects have been conducted specifically to improve adults returns to Dworshak NFH. These projects resulted in changes in production such as segregated rearing of juveniles based on level of BKD infection and reduced rearing densities from ~45,000 to ~35,000 fish per raceway (thereby reducing the total release numbers to ~ 1.05 million), and a slight increase in release size to approximately 18-20/lb. Improvements have also been made in the smolt release strategies, including releasing smolts in late March or early April rather than late April or early May, timing releases so that they occur on an increasing hydrograph, and releasing smolts during the late afternoon and early evening.

Dworshak NFH has met or exceeded its production goal of over 1 million spring chinook salmon smolts seven out of the last 11 years. Off-site releases were used with Dworshak-reared fish to help start up the Clearwater FH satellite facilities. The average smolt-to-adult return rate is 0.11% (range 0.0047% - 0.2947%), well below the predicted 0.65% smolt-to-adult return rate. The Dworshak NFH program has provided a sport and tribal fishing season in 5 years, with 1997 producing over 1,600 spring chinook salmon, a smaller season in 1998, and a combined Tribal and Sport harvest of 5,081 adults in 2000. Another good fishing season is anticipated for 2001. These fisheries are extremely popular with local and out of area fishermen

Kooskia NFH was opened in 1968 to mitigate for losses due to Federal water projects. It is presently managed in conjunction with Dworshak NFH. Kooskia NFH is unable to hold adult chinook salmon from time of arrival until spawning. Therefore, adults are inventoried as they enter the adult holding pond and are then transferred to Dworshak NFH, which provides adult holding space. Currently, Kooskia NFH is being used for the incubation and early rearing of both Dworshak and Kooskia stocks to take advantage of the colder water temperatures available there. The colder water temperatures allows for a longer incubation period and reduces the rate of growth at the fry stage making it easier to attain the targeted release size without manipulating diet.

Production releases for Kooskia NFH were initially programmed for 800,000 smolts, but due to constraints with summer water availability, 600,000 is full production. Releases are made directly from the hatchery into Clear Creek and adults are recaptured at Kooskia. Adults classified as natural are allowed to migrate upstream above the hatchery weir to spawn naturally. Startup brood stock for the Kooskia program was primarily Lower

Columbia River and Rapid River, but since 1989 has exclusively utilized Kooskia releases that returned to the hatchery trap.

Evaluation of the program, like Dworshak NFH, has concentrated on monitoring smolt releases and adult returns to estimate and document smolt to adult return rates using coded wire tags. PIT tags have been used to document smolt travel times and estimate survival rates to various Lower Snake River dams. For the past 5 years, Kooskia NFH has been part of the Idaho Supplementation Studies research project to evaluate the usefulness of supplementing the natural spring chinook salmon population in Clear Creek using hatchery fish from Kooskia NFH.

Clearwater FH is the most recent addition to the LSRCP program in the Snake River basin. The hatchery was completed and became operational in 1990, and serves only incubation and early rearing functions. Adults are trapped and spawned and juvenile fish reared and released at the FH's three satellite facilities. These satellites include Powell (located on the Lochsa River) and Red River and Crooked River (both located in the South Fork Clearwater River). Juvenile-fish pond capacities at each of the sites are Powell – 334,000, Red River – 334,000, and Crooked River – 700,000. The Clearwater FH total juvenile release target of 1.3695 million fish was intended to return about 12,000 adult spring chinook salmon back to the project area. Appendix B of the CRFMP describes spring chinook salmon production at Clearwater FH as 1.37 million smolts released to tributaries. Dworshak NFH production is described as 1.2 million smolts with a long-term program goal of 50% release at the hatchery and 50% release to tributaries. IDFG did not sign the 1987 CRFMP and the plan expired in 1998. A new plan is currently being renegotiated.

Juvenile fish releases made at the three satellite facility sites cover two management-program periods. Releases of progeny from BY1977 through 1989 spawnings represent releases made under the Columbia Basin Development Program. BY1991 and subsequent releases represent fish that had been incubated and/or reared at Clearwater FH. Brood year 1990 releases had been reared at Dworshak NFH pending completion of Clearwater FH. BY1984 through 1994 smolt releases at the Crooked River satellite ranged from 200,000 to 340,00 each year, excluding BY's1991 and 1994. Adult returns in 1991 and 1994 were too low to meet hatchery egg take targets. The strong BY1993 return allowed for the release of an additional 400,000 presmolts in the fall of 1995 and the release of about 216,000 Rapid River stock juveniles. Adult returns between 1995 and 2000 ranged from 6 (1995) to 1,157 (2000) at the Crooked River trap. In 1997 Red River and Crooked River stocks were combined as one stock (S.F. Clearwater stock) due to straying between the two tributaries.

Rearing pond improvements at the Red River satellite, for the LSRCP program, were completed in 1986. Very few juveniles have been released at the Red River satellite, beginning with BY1990, because of extremely low adult returns to the facility. The progeny of brood years 1991 – 1993 adult returns were released as presmolts to support supplementation research activities. In response to the low adult returns, the BY1994 release strategy was changed to a smolt release to take advantage of greater in-hatchery survival to release. Adult returns between 1995 and 2000 ranged from 4 (1995) to 315

(2000) at the Red River facility. In 1997 Red River and Crooked River stocks were combined as one stock (S.F. Clearwater stock) due to straying between the two tributaries.

The Powell satellite trapping and rearing facilities were completed in 1989. Powell site smolt releases for brood years 1984 – 1994 ranged from 50,000 to 350,000 fish annually. The BY1988 release included an additional 200,000 Dworshak NFH smolts. Extremely poor adult returns in 1991 resulted in the release of only about 8,000 smolts from that cohort. Fall presmolt releases from the Powell site have been made in some years; numbers of fish released in those years ranged from 307,000 to 358,000. Adult returns between 1995 and 2000 ranged from 14 (1995) to 1,602 (2000) at the Powell facility. In 1998 IDFG research initiated adult trapping on Crooked Fork Creek (Lochsa Tributary) to assess hatchery straying. Beginning in 1998, hatchery fish trapped at the Crooked Fork Creek trap were transported to the Powell facility.

The combined adult chinook salmon returns to the three satellite weirs to date have not achieved the LSRCP compensation goal of 12,000 fish. The largest return to date (2000, 3,074 chinook salmon trapped including natural-origin and hatchery returns) consisted of mostly 4-year-old fish, the progeny of BY1996 spawners that had migrated to the ocean in 1998. Juvenile releases have never achieved their numeric targets; hence, it is unrealistic to expect adult returns to meet the goal for each facility.

Future Plans

IDFG plans to continue managing the LSRCP hatchery program to reestablish extirpated populations, assess supplementation as a tool for recovery, and provide fishery opportunity when feasible. However, given poor smolt survival through the existing hydrosystem, management actions will be constrained over at least the next 5 to 10 years due to low adult returns. CRFMP negotiations will define changes in the program.

Summer Steelhead

Clearwater FH was planned to rear up to 350,000 pounds of steelhead smolts (2.8 million fish) annually, with an annual adult return goal of 14,000 fish above Lower Granite Dam. Dworshak B-strain steelhead were used as the brood stock for Clearwater FH. This stock was indigenous to the North Fork Clearwater River. Since 1992, steelhead eggs collected at Dworshak NFH have been shipped as eyed eggs to Clearwater FH for incubation and rearing. Juvenile steelhead are released at the Crooked River and Red River satellites, at Kooskia NFH, and into the South Fork Clearwater River. Since steelhead operations began at Clearwater FH, 700,000 smolts have been released annually instead of the planned 2.8 million. The proportional adult return goal would be 3,500 adults. Adult steelhead return data are complete for 5 brood years, and the returns were less than anticipated. Appendix B. of the CRFMP describes steelhead production at Clearwater FH as 1.7 million smolts released to tributaries.

Future Plans
IDFG plans to continue managing the LSRCP hatchery program to reestablish extirpated populations, assess supplementation as a tool for recovery, and provide fishery opportunity when feasible. However, given poor smolt survival through the existing hydrosystem, management actions will be constrained over at least the next 5 to 10 years due to low adult returns. Maintaining the current steelhead fishery will continue to be an important use of LSRCP production for IDFG. Future decisions resulting from CRFMP negotiations will, in part, determine changes in future direction.

Grande Ronde River Subbasin

Original management objectives for the steelhead and salmon programs were to: 1) establish broodstocks to return enough adults to meet egg take goals, 2) restore sport and tribal fisheries, and 3) restore and maintain natural spawning populations, 4) protect genetic refuges in Joseph Creek (steelhead) and the Minam and Wenaha rivers, 5) meet LSRCP mitigation goals, and 6) minimize impacts on resident fish. Original monitoring and evaluation objectives were to: 1) determine which rearing/release strategies resulted in the maximum smolt-to-adult survival and minimum detrimental impacts on non-target species/populations, and 2) determine if mitigation goals were being met.

Spring Chinook Salmon

- The original mitigation goal for spring chinook salmon was 5,850 for the Grande Ronde River (see Table 3 above) with a corresponding smolt goal of 900,000. Lookingglass FH was designed as the main rearing facility for both the Grande Ronde and Imnaha river programs. Although the Big Canyon SF (Wallowa River) was to be a juvenile acclimation/adult collection site, its use for salmon has recently been discontinued. Other off-hatchery smolt releases were originally planned without acclimation and all adults were expected to be captured at Lookingglass FH or Big Canyon.

Lookingglass FH remains the primary rearing site not only for conventional but also for captive brood. Additional BPA-funded, NWPPC FWP facilities have been constructed and are being used to acclimate juveniles and collect adults. Development of the Northeast Oregon Hatchery Program involving the Grande Ronde River spring chinook salmon artificial propagation program is currently underway that will likely result in additional facilities for the LSRCP program.

Studies initiated soon after the Lookingglass FH program began indicated smolt rather than fall presmolt releases produced the best juvenile-to-adult survival rates. Other more significant changes to the program have resulted from a change in focus from mitigation to one of conservation. For example, ODFW curtailed off-hatchery releases in response to indications non-endemic fish were straying into non-targeted areas. In an attempt to provide suitable broodstock, they changed from Carson (lower Columbia) to Rapid River (Snake River), and finally to endemic Grande Ronde River stocks under ESA. Additional conservation objectives for the program are to: 1) prevent extinction and ensure population persistence to allow for the possibility of recover and 2) maintain genetic diversity between and within populations.

- In 1995, the co-managers instituted an emergency endemic stock captive brood program under LSRCP funding, which has since been funded under the NWPPC's FWP. The captive brood component of the program rears endemic juveniles to adulthood from three major spring chinook salmon tributaries: upper Grande Ronde and Lostine rivers and Catherine Creek. At Lookingglass FH parr captured from the stream are reared until smolting. Smolts are reared to adulthood at Manchester Marine Laboratory (seawater) and Bonneville Hatchery (freshwater rearing and all spawning). Embryos from the captive adults are then transferred back to LSRCP facilities for rearing (Irrigon or Lookingglass FH's). The conventional component of the program collects adults at weirs on the same three tributaries and transfers them to newly-built circulars at Lookingglass FH for holding and spawning.

Captive brood produced its first embryos in 1998 (~1,500 upper Grande Ronde River; ~38,000 Catherine Creek; ~35,000 Lostine River), and smolts were acclimated and released in 2000. Expected releases of BY99 captive fish include about 2,600 upper Grande Ronde, 139,000 Catherine Ck., and 135,000 Lostine R. smolts. The conventional component of the program has yet to contribute production (~26,000 Lostine R. smolts to be acclimated and released in the Lostine River in 2002). The conventional program's releases are designed to increase production when the populations increase and the demographic risk of extinction is reduced.

<u>Future Plans</u>
Additional conservation plans for FY2001 are to continue collecting juveniles (for captive) and adults (for conventional) with a total target of 250 returning adults per tributary (250,000 smolts). As the risk of extinction declines, the captive component will decrease and the conventional component will increase until the latter produces all of the smolts for the basin. Broodstock and target numbers for Lookingglass Creek have yet to be defined by co-managers.

<u>Summer Steelhead</u>
The Grande Ronde mitigation goal for steelhead is 9,264 with a corresponding smolt goal of 1,400,000 (at 5/lb. instead of original 8/lb.). The Wallowa steelhead stock has been used and it was developed from returns to lower mainstem Snake River dams with minor contributions from Big Canyon and Lookingglass creeks and Pahsimeroi Hatchery stock (Carmichael 1989).

For the upper Grande Ronde River (Oregon portion of the program: 870,000 smolts), adults are collected at Big Canyon and Wallowa FH. Embryos are incubated at Wallowa FH and then transferred to Irrigon FH for final incubation and most of the rearing. Smolts are acclimated at Wallowa FH, the Big Canyon SF, or released directly into the stream near the facility. For the lower Grande Ronde River (Washington portion of the program: 200,000 smolts), the Cottonwood SF serves as the juvenile acclimation/adult collection/spawning site. Incubation and rearing for the lower release occurs at Lyons Ferry FH.

In the upper Grande Ronde River, the LSRCP program has generally been able to meet smolt production targets, but unable to meet adult return goals, primarily due to lack in achieving smolt-to-adult survival rates.

The Washington portion of the program has generally met, and in some years greatly exceeded adult return goals. Adult return have allowed reopening and extensive development of a previously closed steelhead fishery in the Grande Ronde River, restoring a large portion of lost fishing opportunity in the Grande Ronde River in both states and in the lower Snake River.

The recent ESA listing of the Snake River steelhead ESU has caused both states to review their program in light of a jeopardy opinion by NMFS for the Wallowa stock of steelhead used in the LSRCP program. Straying of Wallowa stock steelhead into other rivers is a major concern. As a result, WDFW decreased releases from the Cottonwood Acclimation Pond to 200,000 smolts annually from the original 250,000, and increased size at release to 4.0-4.5fish/lb to increase the number of successful smolts. To assess straying problems, WDFW also initiated adult trapping in adjacent Grande Ronde tributary rivers in 2000. This effort will continue in the future.

- Results from monitoring and evaluation have provided valuable management information. Acclimation increased smolt-to-adult survival at Wallowa FH, but preliminary indications were that there was no advantage at other steelhead acclimation facilities. Results of size-at-release experiments suggested that fewer, larger smolts may attain similar adult returns. Since the listing of spring chinook salmon under the ESA, smolt releases have occurred in the mainstem Grande Ronde River below main salmon rearing areas in order to reduce the potential negative interactions. Evaluations of steelhead predation on listed salmon have suggested that hatchery steelhead eat listed salmon juveniles infrequently where the two distributions are overlap. In most areas, steelhead that fail to migrate shortly after release are removed in fisheries or fail to survive. Most population overlap is temporal, when natural chinook salmon smolts migrate in the spring past steelhead holding in the lower Grande Ronde River. No sampling has occurred in these areas but effects are expected to be minimal. The relative impacts of the steelhead program on the endemic salmon populations may increase when salmon populations are low, such as the current situation.

Efforts to identify population structure through genetic information for O. mykiss are underway. A sample collection strategy was developed and initiated in 1999 to allow DNA genetic analysis of stock structure for steelhead in Imnaha and Grande Ronde subbasins. Twenty areas were targeted for sample collections. These sample collections are scheduled to continue for at least four years (through 2002). A long-term genetics monitoring (perhaps with reduced effort) is expected to occur as long as supplementation of steelhead populations in the system occurs.

Future Plans

With the listing of Snake River steelhead under ESA, co-managers are discussing potential changes to the steelhead program. The most likely changes will be a shift in program emphasis to develop endemic stocks and reduction of Wallowa stock releases. Evaluation staffs from ODFW, WDFW, NPT and CTUIR began collecting tissue samples for genetic characterization of populations of wild steelhead throughout the subbasin in 1999. Those samples have begun to be analyzed and will be collected at least through 2001. The LSRCP program is committed to completing the analysis to determine how best to manage the subbasin's steelhead populations and whether appropriate "stocks" of steelhead exist that could be used to develop local broodstocks. These broodstocks would then be used to replace the Wallowa stock, if appropriate. LSRCP funded state and tribal evaluation and production staffs would be responsible for development of HGMPs within the basin to describe these new stock development and production programs. An assessment of what level of production with Wallowa stock would not constitute jeopardy may also need to occur simultaneously with local stock assessments.

Fall Chinook

No fall chinook compensation was described for the Grande Ronde River under the LSRCP. A recently proposed expansion of hatchery production in the subbasin (NEOH) has identified releases of Lyons Ferry reared subyearling fall chinook salmon from the Cottonwood AP facility. WDFW will be active in the process as NPT and their contractors evaluate the potential for fall chinook releases from this LSRCP facility.

Imnaha River Subbasin

Populations of chinook salmon have declined precipitously through the last three decades. Although historic escapement estimates are not available for summer steelhead, they are considered depressed. Imnaha chinook salmon were listed as threatened in 1992 and steelhead in 1997. The basin historically supported Tribal and recreational fisheries for chinook salmon. The chinook recreational fishery was closed in the mid-1970's and Tribal fisheries have been severely curtailed or eliminated altogether.

The LSRCP was initiated in the Imnaha subbasin in 1982. The production and mitigation goals for chinook salmon are 490,000 smolts (24,500 lbs.) to return 3210 adults (0.65% smolt-to-adult survival), whereas the goals for steelhead are 330,000 smolts (66,000 lbs.) to return 2,000 adults (0.61% smolt-to-adult survival) steelhead. The implementation of the LSRCP has been guided by the following management objectives: 1) establish adequate broodstock to meet production goals, 2) restore and maintain natural spawning populations, 3) reestablish historic Tribal and recreational fisheries, 4) establish total adult returns that meet LSRCP goals, 5) operate the hatchery programs so that genetic and life history characteristics of hatchery fish mimic wild fish, and 6) minimize impacts on resident stocks of game fish. A comprehensive research, monitoring, and evaluation program has been underway since 1984 to: 1) estimate annual adult returns and smolt-to-adult survival, 2) evaluate the influence of various release strategies on survival and life history, 3) evaluate natural and hatchery chinook smolt performance and survival within the subbasin and through the Snake River, 4) compare life history and genetic characteristics of natural and hatchery fish, 5) determine and compare progeny-to-parent ratios of natural and hatchery fish, and 6) determine success of restoring recreational fisheries.

Spring/summer Chinook Salmon

Two facilities are used for the chinook production program. The Imnaha River adult collection and smolt acclimation facility is operated as a satellite of Lookingglass FH. Adults are collected at the Imnaha weir and are held or transported to Lookingglass FH, where they are held and spawned. LFH serves as the incubation and rearing facility. Following rearing for about 14 months, smolts are transported back to the acclimation facility where they are held for one month prior to release.

The Imnaha River chinook salmon propagation and research program are operated under Section 10 ESA permit authorization and Nez Perce Tribe/ODFW co-management agreement. The program is currently focused on natural population recovery and genetic conservation. Wild chinook adults were initially collected for broodstock beginning in 1982. Wild fish comprised the majority of the broodstock until 1989 when significant numbers of hatchery fish began to return. Currently, hatchery and natural fish are used for broodstock each year. Broodstock management is guided by a sliding scale management plan that places emphasis on minimizing demographic risk at escapement levels below a minimum adult spawner escapement (threshold) and minimizing genetic risk of the hatchery program at escapement levels above threshold. The proportion of natural fish that are retained for broodstock, the proportion of natural spawners that are hatchery origin, and the proportion of broodstock that must be natural origin varies depending on escapement levels.

Smolt production levels have been highly variable and typically well below the goal of 490,000 because of the abundance of natural fish and broodstock management criteria. Smolt-to-adult survival rates have been below the goal of 0.65% with a maximum value of 0.58% for the 1988 broodyear. Substantial smolt mortality occurs from release through the mainstem river corridor, which is a major constraint on smolt-to-adult survival. Life history and genetic characteristics are similar for hatchery and natural fish, with the exception of age composition at return. Hatchery fish return a greater proportion of age 3 males and fewer age 5 fish. Progeny-to-parent ratios for natural fish have been below replacement (1.0) since the 1983 broodyear and have averaged 0.5. In contrast, the ratio for hatchery fish has been above 1.0 in most years and has averaged 4.0. Model results indicated that there are presently a greater number of total fish and natural spawners in the basin, attributable to the hatchery program. ODFW has made a substantial number of adaptive management changes to improve the program including: reduced emphasis on smolt production goals and increased emphasis on genetic conservation, gene banking, implementation of sliding scale management plan, aggressive fish health protection, low density rearing, and more natural smolt size-at-release (25/lb.).

Future Plans

ODFW plans to continue managing the chinook salmon hatchery program with the sliding scale management plan to prevent extinction, enhance natural production, and assess supplementation as a tool for recovery. The program will be operated under ESA authorization and future decisions resulting from CRFMP negotiations will, in part, determine changes in future direction. Co-managers also plan to place increased emphasis on conservation hatchery management, genetic analysis (DNA), continued gene banking, improved rearing (possibly in the Imnaha River subbasin), and rearing natural size smolts in a natures environment. The Northeast Oregon Hatchery project is designing new facilities to meet program requirements and conservation objectives.

Summer Steelhead

Three facilities are used for the steelhead production program. The adult collection/smolt acclimation facility is located in the Imnaha River subbasin on the Little Sheep Creek, a tributary to the Big Sheep Creek. Adults are collected and spawned at Little Sheep Creek, embryos are initially incubated at Wallowa Hatchery and then transported to Irrigon Hatchery. Final incubation and rearing to the smolt stage occurs at Irrigon FH. Following 10 – 13 months of rearing, smolts are transferred back to the acclimation facility for 30 days of acclimation prior to release. All smolts are marked with adipose fin clip.

Wild summer steelhead were initially collected from Little Sheep Creek for broodstock beginning in 1982. Although wild fish are used annually for broodstock, hatchery fish have comprised more than 80% of the returns since 1987 and wild fish have made up only a small proportion of the broodstock. Smolt production goals have generally been achieved in all years except 1997. Until 1998, releases had only occurred at the Little Sheep Creek facility and in the mainstem Imnaha River. In 1998, fry were planted in other tributaries. Smolt-to-adult survival rates have varied, but have typically been below the goal of 0.61%. Life history and genetic characteristics of adult hatchery and natural fish have remained similar. A consumptive steelhead recreational fishery was re-opened in 1986 after being closed since 1974. Catch rates in the Imnaha River are high and better than historic values. Imnaha hatchery steelhead contribute to fisheries throughout the Columbia Basin. Despite meeting many production goals, the following obstacles to achieving management objectives remain: low smolt-to-adult survival, apparently low carrying capacity of Little Sheep Creek, low abundance of natural fish in the Little Sheep Creek and lack of information on steelhead population dynamics in the Imnaha River.

Evaluation of stock status of wild steelhead in the Imnaha River subbasin were initiated in 2000 with operation of an adult escapement weir in Lightning Creek. This effort has been expanded to Cow Creek in 2001. Efforts to identify population structure through genetic information for O. mykiss are underway. A sample collection strategy was developed and initiated in 1999 to allow DNA genetic analysis of stock structure for steelhead in Imnaha and Grande Ronde subbasins. Twenty areas were targeted for sample collections. These sample collections are scheduled to continue for at least four years (through 2002). A long-term genetics monitoring (perhaps with reduced effort) is expected to occur as long as supplementation of steelhead populations in the system occurs.

Future Plans

The steelhead program will continue to be managed to enhance natural production, as well as maintain recreational fisheries. The long term direction for this program will be developed as part of the CRFMP process, as well as input provided as a result of listing Imnaha steelhead as threatened under ESA. The Northeast Oregon Hatchery master planning project is assessing the steelhead supplementation programs in the Imnaha subbasin and identifying options for development of a conservation hatchery program.

Salmon River Subbasin

Populations of naturally produced chinook salmon in the Salmon River Subbasin have declined precipitously through the last four decades. The basin historically supported significant tribal and recreational fisheries for chinook salmon but these fisheries have been severely curtailed or eliminated since the 1970s. All naturally produced Salmon River Subbasin (SaRB) chinook salmon were listed as threatened in 1992. There are also listed hatchery components at the LSRCP hatcheries in the SaRB. Less information is known about the historical abundance of steelhead in the basin. However, naturally produced steelhead populations are currently severely depressed throughout the Snake River basin. The Middle Fork and South Fork Salmon River drainages are currently managed by IDFG for wild steelhead production. For the past twenty years steelhead sport fishing opportunity has been restricted to the mainstem Salmon River and Little Salmon River, and harvest has been restricted to hatchery fish bearing an adipose fin-clip beginning with returns from the 1984 smolt release.

The implementation of the LSRCP program has been guided by the following management objectives: 1) restore and maintain natural spawning populations, 2) re-establish historic recreational and tribal fisheries, 3) establish total adult returns that meet LSRCP goals, 4) operate the hatchery programs so that genetic and life history characteristics of hatchery fish mimic wild fish, and 5) minimize impacts on resident stocks of game fish. Strong emphasis has been placed by IDFG on maintaining selective fisheries with the steelhead program. An extensive monitoring and evaluation program is conducted in the basin to document hatchery practices and evaluate the success of the hatchery programs at meeting LSRCP and state management objectives.

Spring/summer Chinook Salmon

The LSRCP for chinook salmon in the Salmon River basin consists of two facilities, the Sawtooth FH with its East Fork Salmon River SF, and the McCall FH with its South Fork Salmon River (SFSR) SF. Both hatcheries and satellites are operated by IDFG. Sawtooth FH, located on the upper Salmon River (RM 384) near the town of Stanley, Idaho, became operational in 1985. Adult trapping, spawning and juvenile rearing occur at Sawtooth FH. The East Fork Salmon River SF (RM18) serves only adult trapping and spawning functions for chinook salmon; all rearing is performed at Sawtooth FH. McCall FH, completed in 1980, is located in McCall, Idaho, in the Payette River basin. The hatchery produces summer chinook salmon for release into the upper South Fork Salmon River (RM70). This is the only summer chinook salmon program operated within the LSRCP.

The LSRCP hatchery program is attempting to provide in-kind mitigation for spring/summer chinook salmon losses associated with the construction of the four lower Snake River hydroelectric projects. The mitigation and production goals for Sawtooth FH are 2.98 million smolts at 20 fish per pound or 2.3 million smolts at 15 fish per pound. The original design was to release 1.3 million smolts in the upper Salmon River to return 11,310 adults to above Lower Granite Dam at 0.87% smolt to adult return (SAR) and release 700,000 smolts into the East Fork Salmon River to return 6,090 adults to above Lower Granite Dam. The remaining 300,000 smolts, for a total of 2.3 million, were to be released in Valley Creek in the upper Salmon River basin and the Yankee Fork Salmon River. Appendix B of the CRFMP describes spring chinook salmon production at Sawtooth FH as 2.3 million smolts, with 60% released at the hatchery and 40% released to tributaries. IDFG did not sign the CRFMP and the plan is currently being renegotiated.

Sawtooth FH consists of typical incubation and rearing facilities. Incubation and early rearing is performed indoors utilizing pumped well water. Final rearing to fish release is done in outside raceways utilizing raw river water. Raceways are not utilized for early rearing because of the presence of *Myxobolus cerebralis,* which can cause whirling disease, which has lowered the total production capacity. Smolts are directly released or trucked to the offsite locations.

Smolt releases into the upper SaRB (including the East Fork) reached or exceeded the target release number for only three brood years since hatchery start-up. The number of spring chinook salmon smolts released from Sawtooth FH have generally averaged well below target release numbers annually. No smolts have been released into the East Fork Salmon River since the release of BY1993 fish in 1995. Lack of adults has been the constraint. Trapped hatchery and natural adults are utilized for both hatchery production and natural spawning upstream of the weirs according to guidelines influenced by the Idaho Supplementation Studies Design (Bowles and Leitzinger 1991) and a NMFS Section 10 permit.

Hatchery adult spring chinook salmon returns to the upper Salmon River weir and East Fork Salmon River weir, combined, have never met the return goal. In the best years, the combined return to the two weirs was about 20% of the goal. It must be noted that the returns documented here are to the hatchery weirs, and that the compensation goal is to the project area, i.e. above Lower Granite Dam. However, no recreational fisheries and no Nez Perce tribal fisheries have occurred on these fish between Lower Granite Dam and the weirs. Shoshone-Bannock tribal fisheries have been very constrained.

McCall FH consists of typical incubation and early rearing facilities and two large covered ponds for final rearing. The original design was to release one million smolts at 15 fish per pound into the SFSR to return 8,000 adults to above Lower Granite Dam at 0.87% SAR. Juvenile fish are trucked back to and direct-stream released into the upper SFSR. Adult brood stock trapping and spawning operations occur at the SFSR satellite facility, located downstream of the “headwaters” natural production area of Stolle Meadows.

Smolt releases into the South Fork Salmon River generally have reached the release target of one million smolts. Adult summer chinook salmon trapped at Snake River dams formed a large component of the original brood stock. In 1982, the first mature four-year-old fish from the initial releases returned to the trapping facility and contributed to the egg take. As mature adults began to return from the earliest releases, these fish and some naturally produced fish were incorporated into the brood stock. In a few years (BY's1989-91, 1994, 1995) adult returns from hatchery releases were insufficient to meet egg take targets. The 1993, 1997, and 1999 adult returns were sufficient to provide not only the entire smolt target, but considerable subsmolt production (eggs, parr, presmolts) which was negotiated between the state, tribal, and federal management entities for additional supplementation in the SFSR. Trapped hatchery and natural adults are utilized for both hatchery production and natural spawning upstream of the weirs according to guidelines influenced by the Idaho Supplementation Studies Design (Bowles and Leitzinger 1991) and a NMFS Section 10 permit. The Nez Perce Tribe has proposed managing listed chinook salmon in the SFSR based on minimum adult salmon spawner escapement goals, a no net decline strategy, with hatchery and natural salmon managed as one group to enhance natural production and maintain genetic diversity.

Adult summer chinook salmon returns to the South Fork Salmon River weir from hatchery releases have never met the adult return goal. In the best year (2000), returns were 85% of the goal. It must be noted that the returns documented here are to the South Fork Salmon River weir, and that the compensation goal is to the project area, i.e. above Lower Granite Dam. However, no recreational fisheries have occurred on these fish between Lower Granite Dam and the weir, except in 1997 and 2000 when limited recreational fisheries occurred. There have been limited tribal fisheries in some years.

Future Plans

The chinook salmon hatchery program will continue to be managed prevent extinction, enhance natural production, assess supplementation as a tool for recovery and provide fishery opportunity when feasible. Co-managers plan to place an increased emphasis on conservation hatchery management, genetic analysis (DNA) of natural and hatchery chinook salmon, continued gene banking efforts, and rearing natural size smolts in a Natural Rearing Enhancement System (NATURES) environment with acclimated/volitional releases. Facilities need to be reviewed to evaluate what modifications or new facilities are necessary to meet program objectives and conservation requirements. The Nez Perce Tribe has proposed specific recommendations for chinook salmon management in the South Fork Salmon River (Kucera 1998). The Shoshone-Bannock Tribes have proposed specific recommendations for production management actions throughout the Salmon River subbasin, including hatchery practice and facility reform.

An experimental captive rearing program was initiated under the LSRCP Program for three chinook salmon populations in the upper Salmon River basin in response to the critically depressed status of the populations and the need to develop captive propagation technologies for conservation. As noted with captive brood programs in Oregon, these captive rearing programs are now funded under the NWPPC's FWP. Achieving adequate smolt-to-adult survival for the captive rearing program's objectives is severely constrained by poor smolt migration survival to the ocean.

Summer Steelhead

There are two steelhead hatcheries that rear steelhead for the LSRCP program in the Salmon River drainage, Magic Valley FH and Hagerman NFH. Currently, the programs rear only smolts and all steelhead are adipose fin-clipped for exploitation in recreational fisheries. The LSRCP has no steelhead supplementation program in the SaRB. Since 1995, however, the Shoshone-Bannock Tribes have provided the volitional release of fry from side stream incubators using surplus LSRCP steelhead eyed-eggs (approximately 3 million) and NWPPC FWP funding. The primary objective of the Shoshone-Bannock Tribes is to increase early life stage survival from eyed egg to fry, while eliminating hatchery environment life history effects and attempting to maximize the chances for establishing successful natural reproduction.

Magic Valley FH, operated by Idaho Department of Fish and Game, has an LSRCP goal of returning 11,660 adult steelhead back to the Snake River Basin upstream from Lower Granite Dam. Hagerman NFH, operated by the U.S. Fish and Wildlife Service, has an LSRCP goal of returning 13,600 adult steelhead back to the Snake River Basin upstream from Lower Granite Dam. The smolt design capacity for Magic Valley and Hagerman for the Salmon River drainage is 631,500 pounds (3.4 million steelhead smolts). Over the last five years, the number of steelhead smolts released from the two hatcheries averaged 3 million smolts. Some of the reduction in release numbers was precipitated by salmon listings. Appendix B. of the CRFMP describes total smolt production at the two hatcheries as releasing up to 3.3 million smolts into the Salmon River and tributaries.

Both hatcheries are located in the Hagerman Valley of the Snake River Basin. Smolts are trucked to release sites in the mainstem Salmon River or the Little Salmon River. Over the last 5 years, an average of 48% of the smolts have been released near weirs where returning adults could be collected. No smolts from the LSRCP program are released between the Little Salmon River and the North Fork of the Salmon River to minimize straying into Salmon River Canyon tributaries, and between the South and Middle forks of the Salmon River, which are managed by the IDFG as refugia for wild, native steelhead.

Progeny of hatchery-reared A-run steelhead returns to adult traps located in the Pahsimeroi River (Idaho Power Company mitigation program), the upper Salmon River (LSRCP program), and the Snake River (Idaho Power Company mitigation program) are reared at the two hatcheries. Hatchery returns to Pahsimeroi and the upper Salmon River are utilized in the upper Salmon drainage, and hatchery returns to the Pahsimeroi and the Snake rivers are utilized in the lower Salmon River drainage, including the Little Salmon River. The origin of the A-run brood stock in the 1960s was steelhead destined for tributaries cut off by the Hells Canyon Dam complex on the Snake River, mixed with indigenous steelhead at the various trap sites. Progeny of Dworshak Hatchery B-run returns to adult traps located in the East Fork Salmon River (LSRCP), Slate Creek on the upper Salmon River (LSRCP), and the North Fork of the Clearwater River (Corps of Engineers mitigation) have been reared mainly at Magic Valley FH.

Squaw Creek pond is a recently constructed facility that was funded primarily by NMFS on Thompson Creek Mine property near Clayton, Idaho. Smolts reared by LSRCP were first released from the pond in 1998. Adult steelhead will be trapped when they return. The primary functions are to reduce release of residual steelhead into the environment and use the residual steelhead in other programs.

Recreational steelhead fisheries have been allowed in the SaRB on a consistent basis in recent history. LSRCP-reared steelhead released in the SaRB contributed to a five-year average of 63,500 (82% A-run) hatchery steelhead counted at Lower Granite Dam although the stated adult goals have not been met (USFWS 1998). An average of 26,500 hatchery steelhead, including steelhead reared by LSRCP, was harvested in the recreational fishery in the SaRB over the last five years. LSRCP steelhead also contributed to limited tribal fisheries in the SaRB, as well as both recreational and tribal fisheries from the mouth of the Columbia River upstream.

Future Plans

Maintaining the current steelhead fishery will continue to be an important use of LSRCP production for IDFG. The LSRCP program will be operated under ESA authorization and future decisions resulting from CRFMP negotiations will, in part, determine changes in future direction. A key change for BY1999 steelhead production in the SaRB will be reprogramming of 200,000 steelhead smolts of Oxbow (Snake River) parentage for a supplementation release (no adipose fin-clip) in the Little Salmon drainage as a result of federal and tribal negotiation with the states.

Lack of information on steelhead population dynamics and genetic structure in the Salmon River is a constraint. Planning options for development of conservation facilities required to implement steelhead recovery programs while maintaining recreational fisheries is a major challenge.

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Appendix E. Blue Mountains Demonstration Area Project Proposals, FY 2001

BLUE MOUNTAINS DEMONSTRATION AREA FY2001 PROJECT PROPOSALS

Project Type	Project #	Watershed	Project	Partners	Target
Fish and Wildlife Projects	168	Catherine	Little Catherine Restore	20.0	5 miles-I
	385 Forest	Catherine	Cove Fish Passage	0.0	1 str.-I
	154	Meadow	Meadow/Peat Restore	20.0	6 miles-I
	379 Forest	Meadow	McIntrye Rd	?	5 miles-P
	164	Indian/Clark	Little Indian Rehab	34.0	8.5 miles-I
	177	GR Hilgard	Green Sugar Restoration	3.0	10 acres-I
	533 Forest	GR Hilgard	Tree Inoculation	0.0	170 acres-I
	302 Forest	GR Hilgard	Great Gray Owl Viewing	0.0	300 acres-I
	160	ALL	Aspen Inventory	2.0	No funds
	535 Forest	ALL	National Lynx Survey	0.0	23,000 ac
	537 Forest	ALL	Lynx Survey	0.0	12,000 ac
	209	U Joseph	Elk Cr Structures	0.0	6 miles-P
	213 Forest	U Joseph	U. Joe Improve	0.0	1.5mi/20 ac-I
	141 Forest	U Joseph	CCS Education	?	I & E
	150 Forest	U Joseph	Redd Count	ODFW	90 mi.-I
	145 Forest	L Joseph	Fall Chinook Monitor	ODFW	100 mi.-I
	175	L Joseph	Little Joe Stewardshp	0.0	10 str-I
	New	Wildcat/Mud/L Joe	Riparian Improvement	?	30 ac/2 mi-I
	606 Forest	Wildcat/Mud	Wallowa Res. Weeds	?	
	215 Forest	Wildcat/Mud	Wildcat Improve	0.0	2 mi/18 ac-I
	183	Lostine	Lostine River Rest.	0.0	5 ac-I
	300 Forest	Lostine	Moonwort Monitoring	1.0	
	602 Forest	ALL	Lynx Survey	0.0	18,000 ac-I
Assessments/Planning	157	Meadow	Meadow Cr WA	15.0	1 WA
	186	Lostine	Lostine WA	0.0	No funds
	180	All	Blue Mountains LUCID	0.0	1 report
	210	All	Blue Mountains Rip Map	5.0	1 report

BLUE MOUNTAINS DEMONSTRATION AREA FY2001 PROJECT PROPOSALS

Project Type	Project #	Watershed	Project	Partners	Target
	214	All	Midscale Assessment	40.0	
Road Projects	199	Wildcat	Biomass Rd Closure II	0.0	10 miles-I
	194	L Joseph	Wapiti Rd Closure II	0.0	3 miles-I
	193	L Joseph	Wapiti Rd Obliteration II	0.0	4 miles-I
	153	Meadow	Waucup Cr CMP	11.0	1 str.-I
	166	Catherine	Rd 7785 Restoration	0.0	5 miles-I
	167	Catherine	Buck Creek Bridge	0.0	1 str.-I
	New	Meadow	McIntrye Road	0.0	5 miles-P
	171	Beaver/Rock	4305270 Culvert Replace	24.5	7 miles-I
	155	Meadow	Rd 2100330 Connection	0.0	1 mile-I
Recreation and Trails	167	Catherine	Buck Creek Bridge	0.0	1 str-I
	176	UG Ronde	Sheep Cr Bridge	0.0	No funds
	185	Lostine	Trail Drainage-Lostine	0.0	5 miles-I
	189	U Wallowa	Trail Drainage-U Wallowa	0.0	8 miles-I
	175	L Joseph	Little Joe Stew	0.0	30 mi/3 sites-I
	185	Lostine	Trail Drainage-Lostine	0.0	10 miles-I
Forest Harvest and Thinning	211	Wildcat	Buck Stewardship	0.0	140 ac-I
	212	Wildcat	Thinning Warm/Dry	0.0	300 ac-I
	444 Forest	L Joseph	Wapiti	0.0	250 ac-I
	489 Forest	L Joseph	Lone Dog	0.0	2000 ac-I
	439 Forest	L Joseph	Hungry Bob	0.0	300 ac-I
	496 Forest	L Joseph	Baldwin	0.0	1500 ac-P
	430 Forest	Wildcat	Biomass 2	0.0	549 ac-I
	429 Forest	Wildcat	Biomass 1	0.0	539 ac-I
	492 Forest	Wildcat	Wolf Veg	0.0	1800 ac-P
	437 Forest	U Joseph	Haypen	0.0	300 ac-I
	407 Forest	U Wallowa	Wallowa Lake HR	0.0	100 ac-I
	440 Forest	Minam	Minam II PF	0.0	1500 ac-I
	624 Forest	GR Hilgard	Sprinkle	0.0	3000 ac-P

BLUE MOUNTAINS DEMONSTRATION AREA FY2001 PROJECT PROPOSALS

Project Type	Project #	Watershed	Project	Partners	Target
		GR Hilgard	Grn Pelican 3 cabin	0.0	500 ac-
	434 Forest	Beaver	Drymelon	0.0	500 ac-I
	435 Forest	UG Ronde	Flyridge	0.0	500 ac-I
	331 Forest	UG Ronde	Blue Springs Cabin Fuels	0.0	200 ac-P
	442 Forest	Meadow	Tin Trough	0.0	500 ac-I
	138	Meadow	McMeadow Cr Restoration	20.0	1300 ac-P
	139	Meadow	Dark Canyon Restore	0.0	2300 ac-P
	140	Meadow	Burnt Pickle Restore	0.0	1500 ac-P
	156	Meadow	Texas Heat	0.0	1800 ac-P
	207	Meadow	Starkey Exp Herbivory	158.0	72 ac-P
	169	Catherine	5160 thinning	0.0	550 ac-I
Watershed Treatments	183	Lostine	Wilderness Restoration	1.0	5 ac-P
	184	Lostine	Noxious Weed Control	0.0	90 ac-I
	191	Minam	Noxious Weed Control	0.0	25 ac-I
	192	Minam	Weed Hay Station	1.0	I & E
	188	U Wallowa	Noxious Weed Control	0.0	1 ac-I
	181	ALL	Riparian Monitoring	0.0	
	208	L Joseph	Swamp Cr Restoration	10.0	50 ac-I
	175	L Joseph	Little Joe Stewardshp	0.8	10 str.-I
	195	L Joseph	Noxious Weed Control	0.0	366 ac-I
	New	Wildcat/L Joe	Riparian Improvement	?	30 ac/2 mi-I
	212	Wildcat	Thinning Warm/Dry	0.0	500 ac-I
	198	Wildcat	Noxious Weed Control	0.0	360 ac-I
	202	U Joseph	Noxious Weed Control	0.0	240 ac-I
	204	GR Rondowa	Noxious Weed Control	2.0	220 ac-I
	216	ALL	Native Grass Seed Coll	0.0	n/a
	138	Meadow	McMeadow Cr Restoration	20.0	985 ac-P
	139	Meadow	Dark Meadow Restore	9.0	750-ac-P
	140	Meadow	Burnt Pickle Restore	0.0	265 ac-P
	158	Meadow	Starkey Off-Site Water	4.0	100 ac-I
	170	Beaver/Rock	Lynx Thinning Monitoring	5.0	n/a

BLUE MOUNTAINS DEMONSTRATION AREA FY2001 PROJECT PROPOSALS

Project Type	Project #	Watershed	Project	Partners	Target
	163	Indian/Clark	Lynx Thinning Monitoring	0.0	No funds
	165	Catherine	Yellow Star Control	9.0	Wyden
	173	UG Ronde	Starkey Leafy Spurge	1.4	Wyden
	162	ALL	Integrated Veg Mgmt	5.0	2000 ac-I
	215	ALL	Native Grass Seed Coll	0.0	n/a
Timber Management	196	L Joseph	Lone Dog	0.0	3.5 mmbf-I
	197	L Joseph	Baldwin	0.0	1.5 mmbf-P
	200	Wildcat	Wolf	0.0	1.0 mmbf-P
	201	Wildcat	Muddy Sled	0.0	1.5 mmbf-P
	203	U Joseph	Rice	0.0	1.5 mmbf-P
	213	U Joseph	Rice Stand Exams	0.0	
	182	ALL	WAV RD-EVG Database	0.0	
	505 Forest	Lostine	Big Sage Veg Mngt	0.0	3.0 mmbf-P
	491 Forest	Wildcat	Buck	0.0	3.3 mmbf-I
	568 Forest	Catherine	Little Bear	0.0	3.5 mmbf-I
	569 Forest	Catherine	Sandy Bottle	0.0	4.0 mmbf-I
	567 Forest	Beaver	Whiskey	0.0	4.5 mmbf-I
	480 Forest	Meadow	Dark Meadow	0.0	2.0 mmbf-P
	138	Meadow	McMeadow Cr Restoration	0.0	2.0 mmbf-P
	140	Meadow	Burnt Pickle Restore	0.0	3.0 mmbf-P
	178	GR Hilgard	Sprinkle TS/Restoration	0.0	3.0 mmbf-P
	179	GR Hilgard	Five Pts TS/Restoration	5.0	
	187	Lostine	Big Sage Veg Mngt	0.0	see above
	141	Meadow	Meadow-EVG Database	0.0	
	182	ALL	WAV RD-EVG Database	0.0	see above
	196	L Joseph	Lone Dog	0.0	see above
	197	L Joseph	Baldwin	0.0	see above
	200	Wildcat	Wolf	0.0	see above
	201	Wildcat	Muddy Sled	0.0	see above
	491 Forest	Wildcat	Buck	0.0	see above

BLUE MOUNTAINS DEMONSTRATION AREA FY2001 PROJECT PROPOSALS

Project Type	Project #	Watershed	Project	Partners	Target
	203	U Joseph	Rice	0.0	see above
	213	U Joseph	Rice Stand Exams	0.0	see above
	505 Forest	Lostine	Big Sage Veg Mngt	0.0	see above
	568/553 Forest	Catherine	Little Bear	0.0	see above
	569 Forest	Catherine	Sandy Bottle	0.0	see above
	567 Forest	Beaver	Whiskey	0.0	see above
	480 Forest	Meadow	Dark Meadow	0.0	see above
	138	Meadow	McMeadow Cr Restoration	0.0	see above
	483 Forest	Meadow	Burnt Pickle	0.0	see above
	178	GR Hilgard	Sprinkle TS/Restoration	0.0	see above
	179	GR Hilgard	Five Pts TS/Restoration	5.0	see above

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