Chapter 3

Affected Environment and Environmental Consequences

The following sections describe the existing character of the four subbasins by resource topic, followed by an assessment of the environmental consequences of the No Action and the Proposed Action alternatives. Reclamation has worked with NMFS and USFWS to develop a draft set of Best Management Practices (BMPs) for implementation of site-specific projects (Appendix B). These BMPs prescribe a wide range of measures from pre-construction surveys through post-construction monitoring to ensure the protection of natural and cultural resources and to minimize effects to the environment. The BMPs include specifications for when work is allowed within the stream channel of each subbasin to minimize the effects to fish habitat and ESA-listed fish species. Such work would be completed when streamflow is at the seasonal low and when it is least likely that ESA-listed fish are present. Design of all facilities will follow NMFS and IDFG standards regarding upstream and downstream fish passage for instream structures. The construction standards include provisions for sediment control plans, monitoring of construction, and required mitigation measures for disturbed streambanks. The BMPs include provisions for reporting on the progress of the project and its adherence to the BMPs to NMFS.

The draft BMPs in Appendix B were compiled to meet the production schedule for this programmatic EA. However, there are other comparable fish habitat improvement efforts underway in other parts of the Pacific Northwest that involve similar BMPs. Final BMPs developed as part of the ESA consultation and coordination described in Section 4.1.1 will be consistent with similar fish habitat improvement efforts in other parts of the Pacific Northwest. The discussion of environmental consequences assumes that BMPs would be fully implemented by Reclamation.

3.1 Climate and Air Quality

The following sections discuss the general climate and air quality of the Lemhi, Upper Salmon, Little Salmon, and Middle Fork Clearwater Subbasins.

3.1.1 Existing Conditions

Idaho's general climatic patterns are influenced by latitude, distance from oceanic moisture sources, presence of mountain orographic barriers, prevailing wind patterns, and variations in altitude. Weather data within each subbasin can vary drastically, particularly with elevation. Because Reclamation's implementation of Action 149 would occur at lower elevations in valleys where agriculture is concentrated, the following discussion concentrates on these sites.

Idaho's major moisture source is maritime air from prevailing westerly winds. The maritime influence is strongest in Northern Idaho where air arriving through the Columbia River Gorge carries more moisture than the prevailing westerly flow at lower latitudes. Eastern Idaho's climate is more continental in character than Western and Northern Idaho, which results in a greater range between winter and summer temperatures.

Table 3.1-1 displays climate data averages for weather stations located in each of the subbasins.

Table 3.1-1. Climate Data Summary for the Lemhi, Upper Salmon, Little Salmon, and Middle Fork Clearwater Subbasins.

Climate Parameter	Weather Station Location			
	Salmon, Lemhi Subbasin	Challis, Upper Salmon	Riggins, Little Salmon	Kooskia, Middle Fork Clear-water
Average Max. Temp (°F)	59.6	58.1	66.3	64.3
Average Min. Temp. (°F)	31.8	30.7	41.9	36.4
Average Total Precipitation (in)	10.0	7.5	16.8	24.2

Source: Western Regional Climate Center. Period of Record: Salmon (1967-2001), Challis (1931-2001), Riggins (1940-2001), Kooskia (1908-1987).

Air quality in the subbasins is excellent as there are few industrial sources of air pollution, small populations, and a general rural character. IDEQ monitors air quality for a variety of pollutants but primarily for particulate matter, carbon monoxide, sulfur dioxide, and nitrogen dioxide. Particulate matter is currently the most common pollutant in Idaho because particulate sources are widespread throughout the state. Common sources include windblown dust, re-entrained road dust, smoke (residential, agricultural, and forest fires), industrial emissions, and motor vehicle emissions. Each criteria pollutant has a National Ambient Air Quality Standard (NAAQS) that is set and periodically reviewed by the U.S. Environmental Protection Agency (EPA). The NAAQS represents a threshold concentration above which adverse effects on human health may occur. The NAAQS for each criteria pollutant is different, but a violation of the NAAQS for a pollutant results in the location of the violation being designated as non-attainment of the NAAQS for that pollutant.

Idaho's ambient air monitoring network includes only one regular station in the subbasins, in the town of Salmon at the north end of the Lemhi Subbasin. All the subbasins are currently in attainment of NAAQS. IDEQ staff have performed particulate monitoring in the town of Salmon since 1990 with one exceedance in 1997. IDEQ continues to monitor based on this potential for poor air quality due to woodstoves, prescribed fire, and wildfire.

3.1.2 Environmental Consequences

3.1.2.1 No Action Alternative

Improvements to anadromous fish habitat that would occur under the direction of various subbasin groups would have no effect on air quality in the four subbasins. Even the larger individual projects, such as removal of push-up dams and construction of new diversion structures, would require limited use of a backhoe or bulldozer. Use of heavy equipment for short periods would not degrade air quality and would not approach the limits of NAAQS for pollutant levels.

Cumulative Impacts

There would be no cumulative impacts to air quality from the No Action Alternative.

3.1.2.2 Proposed Action

Work on restoration efforts would proceed at a faster pace with Reclamation construction authority than under the No Action Alternative. However, the amount of construction that would occur would be limited and site-specific. These actions would not alter air quality in the subbasins and would not affect NAAQS pollutant levels.

Cumulative Impacts

There would be no cumulative impacts to air quality associated with the Proposed Action.

3.1.3 Mitigation

No adverse impacts are anticipated to air quality and no mitigation is necessary.

3.2 Noise

3.2.1 Existing Conditions

Noise is generally defined as the intensity, duration, and character of sounds from any and all sources. The character of the four subbasins is dominated by rural farms with large areas of adjacent National Forest lands. Noise levels are primarily from farm operations, low-level traffic on local highways, and human activity in the several small towns scattered in the subbasins. These noise levels vary with the season and time of day. For instance, traffic noise is greater during the summer months when tourists venture into these rural areas. Typical day/night average sound levels for agricultural crop land is around 45 dB (EPA 1974).

Noise is measured on a logarithmic scale; a 10 decibel (dB) increase in noise is typically perceived as a doubling of loudness. Noise from localized sources typically decreases by about 6 dB with each doubling of distance from source to receptor. Outdoor receptors within 1,600 feet of construction sites with an uninterrupted view of the construction site would experience noise of about 60 dB when noise on the construction site is about 90 dB. Typical construction noise levels are listed in Table 3.2-1.

Table 3.2-1. Typical Construction Equipment Noise Levels.

Equipment	Noise Level at 50 Feet
Backhoe	85 dB
Tractor	80 dB
Truck	91 dB
Chainsaw	76 dB

Source: EPA 1971.

Noise can be a concern when projects are located near sensitive receptor sites, such as schools or hospitals. Because the No Action Alternative and Proposed Action would implement restoration efforts on private agricultural lands not adjacent to schools or hospitals, sensitive receptor sites are not an issue

3.2.2 Environmental Consequences

3.2.2.1 No Action Alternative

Restoration efforts implemented by a variety of subbasin groups with technical input from Reclamation in the Lemhi and Upper Salmon Subbasins would have minor short-term effects to local noise levels. Implementation of restoration projects would involve the use of heavy equipment for short periods on the larger projects, such as removal of push-up dams and construction of new diversions. The operation of new structures or equipment such as fish screens would not affect ambient noise levels.

Cumulative Impacts

There would be no cumulative noise impacts associated with the No Action Alternative.

3.2.2.2 Proposed Action Alternative

The increased implementation pace anticipated with Reclamation's construction authority would not appreciably affect noise levels in the four subbasins. While more projects would be implemented under the Proposed Action compared to the No Action Alternative, these would occur over a 10-year period. Construction activity would be limited to the use of a backhoe or bulldozer for short time periods. The limited duration of individual restoration efforts would not substantially contribute to noise levels in the subbasins. There would be no noise effects from operation of new facilities.

Cumulative Impacts

No cumulative noise impacts would result from the Proposed Action.

3.2.3 Mitigation

Because no adverse impacts are anticipated, no mitigation measures are necessary.

3.3 Hydrology and Water Quality

3.3.1 Hydrology

3.3.1.1 Existing Conditions

Lemhi Subbasin

The Lemhi and Bitteroot Mountains flank the Lemhi River and represent the northernmost extent of basin and range terrain (IDEQ 1999). In this subbasin, high mountain peaks rise rapidly from broad, gentle valleys. Elevations range from approximately 4,100 to 11,000 feet above msl. The Lemhi River is a low-gradient, spring-fed system that flows through broad valley bottoms. The area receives approximately 3.6 to 14.8 inches of precipitation annually, mainly as snow or early spring rain (Lemhi Riparian Conservation Agreement Group 1998). The Hydrologic Unit Code (HUC) drainage area, number of major (named) streams, and stream miles for the Lemhi Subbasin are listed in Table 3.3-1.

Table 3.3-1. Drainage Areas, Numbers of Named Streams, and Total Stream Miles for the Lemhi, Upper Salmon, Middle Fork Clearwater and Little Salmon Subbasins.

Watershed	Hydrologic Unit Code (HUC)	Drainage Area (square miles)	Number of Named Streams	Total Stream Miles
Lemhi	17060204	1,270	124	1,330
Upper Salmon	17060201	2,410	219	3,251
Middle Fork Clearwater	17060304	320	Unavailable	Unavailable
Little Salmon	17060210	582	68	718

Source: NPPC (2001) and Nez Perce Tribe and NPPC (2002)

Streamflow records, including monthly and annual average flows, peak and minimum flows, periods of record, and drainage areas for three locations along the Lemhi River (Lemhi River near Lemhi, Lemhi River below L-5 Diversion, and Lemhi River at Salmon) are presented in Appendix C. The locations of these gaging stations, and all other historic active and inactive USGS gaging stations in the subbasin are shown in Figure 3.3-1. The average flow of the Lemhi River from 1955 to 2000 was 272 cfs at the gaging station location just below the mouth of Hayden Creek near the community of Lemhi. Farther downstream at the gaging station just below the L-5 Diversion, average flow of the Lemhi River was 321 cfs (1992 to 2000). At the confluence with the Salmon River, the average flow of the Lemhi River was 321 cfs (1928 to 1942). Peak flows generally occur in June, with the lowest flows in August. A hydrograph of the average monthly flow of the subbasins is provided in Figure 3.3-2.

The annual water yield for the Lemhi system has been estimated at approximately 1,100,000 acre-feet (IDEQ 1999). The average annual flow at Salmon is 180,000 acre-feet. The difference is lost to evaporation, vegetative transpiration, and underground flows. The hydrology of much of the Lemhi River has been changed dramatically since the mid-1840s because of channelization and diversion of tributary streams that resulted in a lack of connectivity to the floodplain. During irrigation season most of the water is diverted off-channel through diversion headgates and either used for flood or sprinkler irrigation. As of 1995, approximately 37,000 acres of land in the subbasin were irrigated. IDWR records indicate there are approximately 7,869 active surface water rights and water right claims in the subbasin, totaling about 4,704,500 acre-feet (IDWR March 22, 2002). IDFG has identified approximately 209 dams and diversions within the Lemhi Subbasin (IDFG 2002); locations of these dams and diversions are shown in Figure 3.3-1. In 2000, IDWR identified 83 diversions along the mainstem of the Lemhi, with measured flows ranging from less than 1 cfs to 60 cfs (IDWR 2002). Estimated return flows provide 8 to 14 cfs per mile to the Lemhi River. The Lemhi River and nearly all of its tributaries are entirely or significantly diverted for irrigation purposes between late April and the end of October (IDEQ 1999). Many of the tributaries only reach the river during spring runoff.

Upper Salmon Subbasin

The Upper Salmon Subbasin is a glacial carved mountain and valley system composed of steep, narrow drainages with V-shaped valleys (IDEQ 2002). Elevations range from 4,640 to 11,700 feet above msl. The floodplain of the Upper Salmon River itself is fairly broad in comparison to the canyonlands in the lower Salmon River farther downstream. The area receives approximately 7.4 to 14.5 inches of annual precipitation, mainly as snow or early spring rain. The HUC drainage area, number of major (named) streams, and stream miles for the Upper Salmon Subbasin are listed in Table 3.3-1.

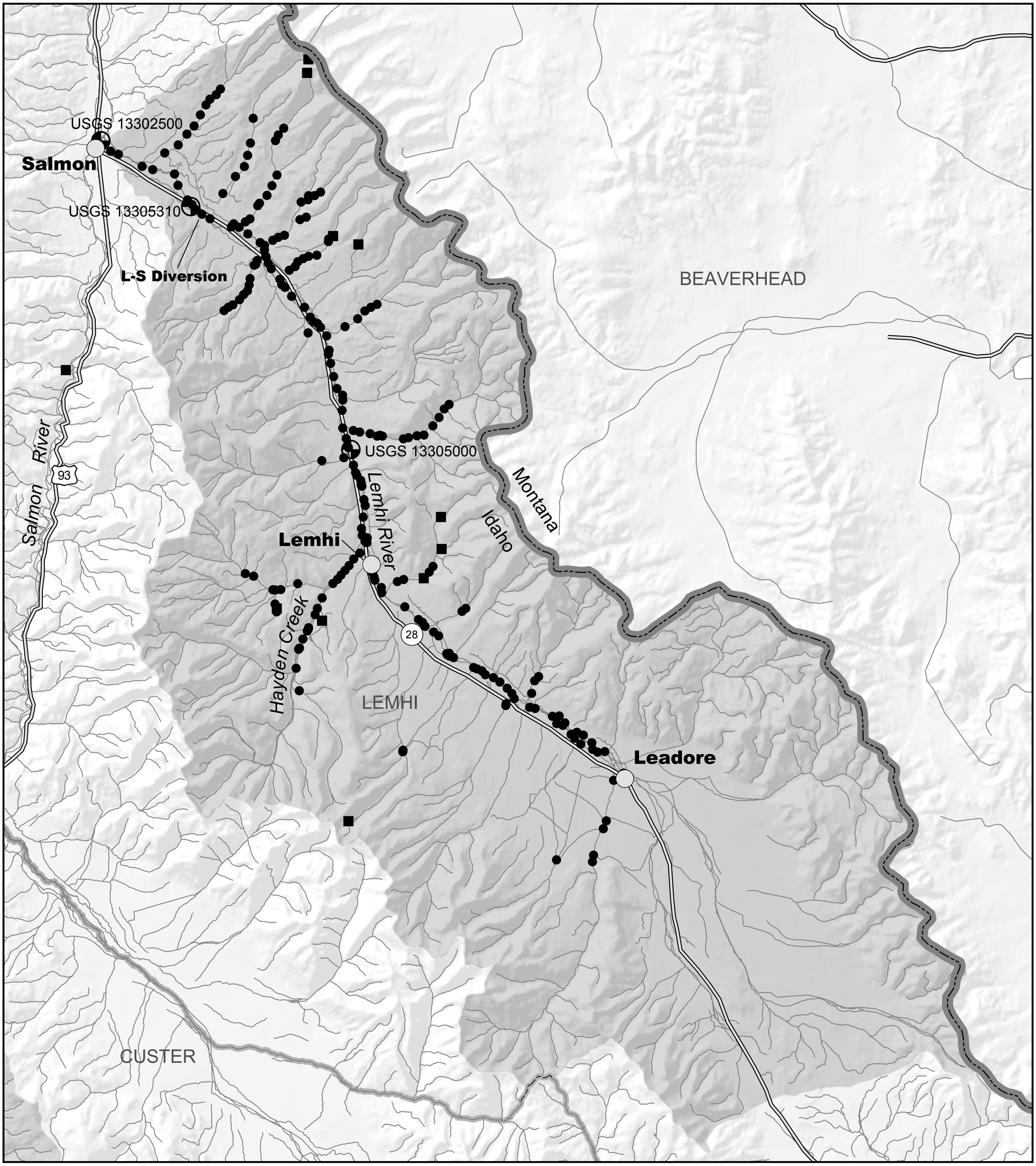
Streamflow records, including monthly and annual average flows, peak and minimum flows, periods of record, and drainage areas for three locations along Salmon River (Salmon River below Yankee Fork, East Fork Salmon River near Clayton, and Salmon River near Challis) are presented in Appendix C. The locations of these gaging stations and all other historic active and inactive USGS gaging stations in the subbasin are shown in Figure 3.3-3. The average flow of the Salmon River (1928 to 1939 and 1973 to 1981) was 532 cfs at the gaging station near Clayton. Downstream, the average flow of the Salmon River (1921 to 2000) was 977 cfs at the gaging station below Yankee Fork. Farther downstream, the average flow of the Salmon River (1928 to 1972) was 1,473 cfs at the gaging station near Challis. Near the mouth of the subbasin, average annual flows may increase to approximately 1,500 cfs (NPPC 2001). The largest contributing drainage to the Salmon River within the subbasin is the East Fork of the Salmon River, with an average flow of 235 cfs from 1928 to 1939 and 1973 to 1981 (IDEQ 2002). Streamflow regimes are typical of central Idaho mountain streams, with peak flows in late spring to early summer from snowmelt runoff. Low flow occurs in late summer through the winter. Substantial variability exists from year to year because of fluctuating precipitation and temperatures. A hydrograph of the average monthly flow for the Salmon River near Challis is provided in Figure 3.3-2.

Based on the monthly flow at the gaging station near Challis, the Upper Salmon Subbasin produces an estimated 892,000 acre-feet over the course of the irrigation season (April 15 – October 31). IDWR records indicate there are approximately 2,091 active surface water rights and water right claims in the subbasin, totaling about 1,796,000 acre-feet (IDWR 2002). As of 2000, approximately 45,000 acres of land in the subbasin were irrigated. Based on IDWR's field headgate requirements, the estimated 45,000 acres irrigated in the subbasin need 149,750 acre-feet per year (IDWR 2002). IDFG has identified approximately 165 dams and diversions within the Upper Salmon Subbasin (IDFG 2002); locations of these dams and diversions are shown in Figure 3.3-3.

Several tributaries to the Upper Salmon River are entirely or significantly diverted for irrigation purposes between late April and the end of October (IDEQ 2002).

Middle Fork Clearwater Subbasin

The Middle Fork Clearwater Subbasin generally has moderately sloping terrain, with local elevations ranging from 1,221 to 4,300 feet above mean sea level (msl) (Nez Perce Tribe and NPPC 2002). The change in elevation follows a change in topography from west to east, progressing from plateau to foothills to mountainous terrain. The area receives approximately 23 to 75 inches of annual precipitation, depending on location and elevation. Precipitation varies seasonally, with little occurring during the summer months. The vast majority of the subbasin lies below 4,000 feet in elevation, making it subject to mixed winter precipitation and the possibility of rain-on-snow events. The confluence of the Lochsa and Selway Rivers at Lowell, Idaho forms the Middle Fork Clearwater River, which flows west before joining the South Fork Clearwater at the town of Kooskia, Idaho to form the mainstem Clearwater River. The Middle Fork Clearwater River derives most of its flow from the Lochsa and Selway Rivers. The combined drainage area for the Lochsa and Selway Rivers is 3,090 square miles. The Middle Fork Clearwater Subbasin drains an additional 320 square miles. The Hydrologic Unit Code (HUC), number of major (named) streams, and stream miles for the Middle Fork Clearwater River are listed in Table 3.3-1.



- Diversion
- Dam
- Stream Gauge
- Subbasin
- Town
- State Boundary
- County Boundary
- Open Water
- Stream
- Highway

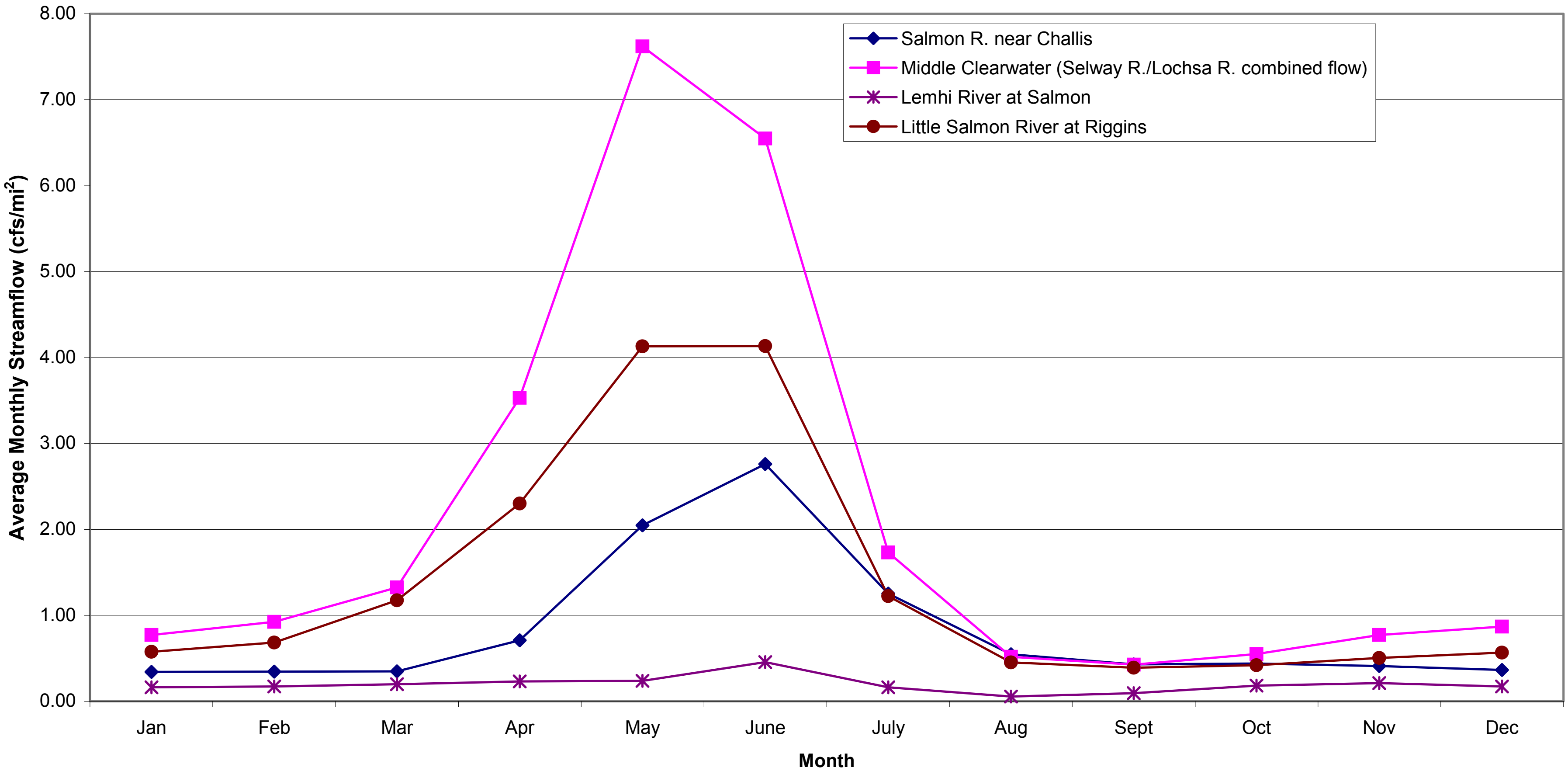
FIGURE 3.3-1
Hydrologic Features
Lemhi Subbasin

0 1 2 4 Miles

Source: IDFG, USBR, USGS, EDAW Inc, 2002.
P:\1e41001 Lemhi\GIS\mxd\Figure3.3-1.mxd

Back of Figure 3.3.1. Hydrologic Features Lemhi Subbasin

Figure 3.3-2. Hydrographs of Average Monthly Streamflow for Lemhi, Upper Salmon, Middle Fork Clearwater, and Little Salmon Subbasins



Back of Figure 3.3-2. Hydrographs of Average Monthly Streamflow (back).

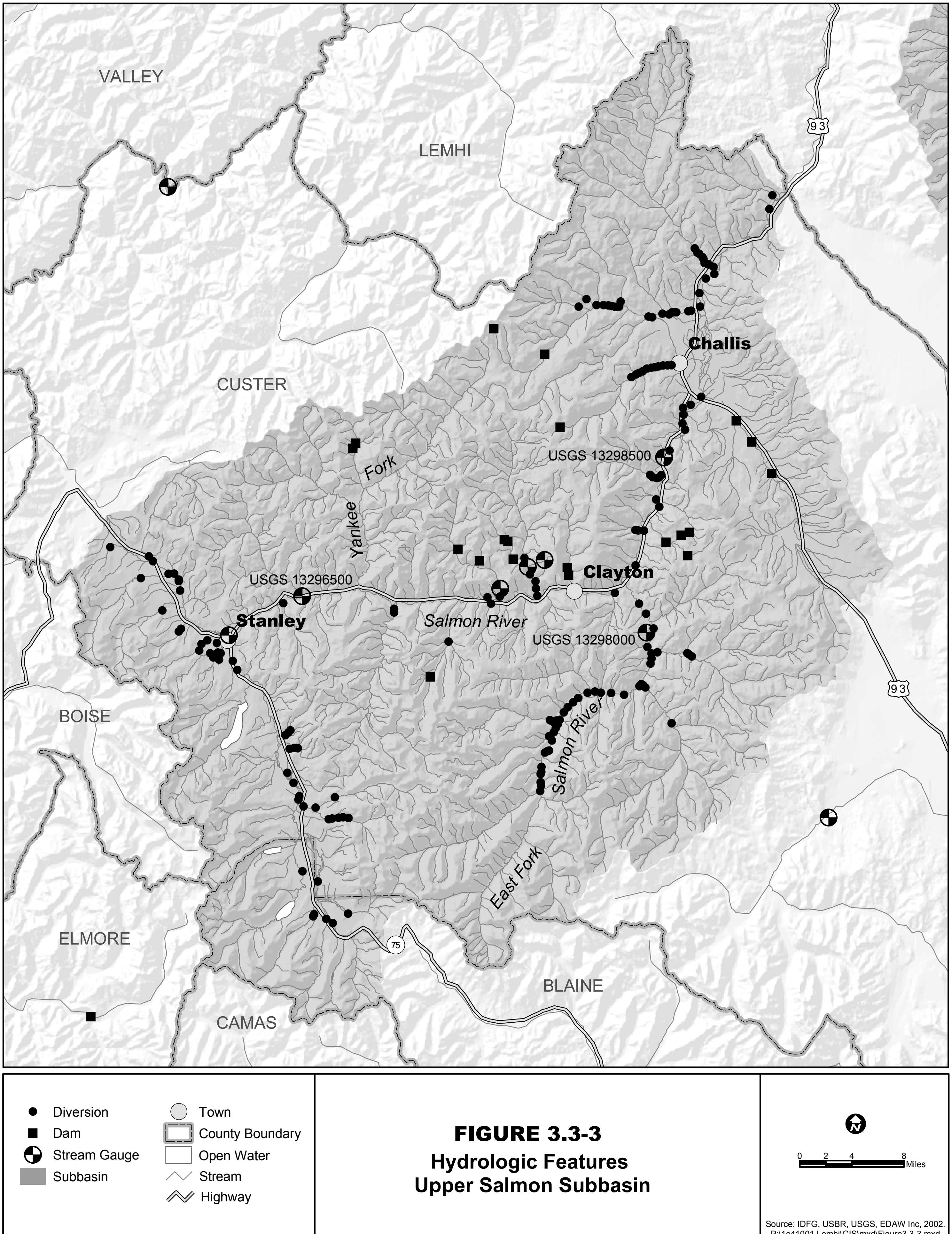


FIGURE 3.3-3
Hydrologic Features
Upper Salmon Subbasin

Source: IDFG, USBR, USGS, EDAW Inc, 2002.
P:\1e41001 Lemhi\GIS\mxd\Figure3.3-3.mxd

Back of Figure 3.3-3. Hydrologic Features Upper Salmon Subbasin

Streamflow records, including monthly and annual average flows, peak and minimum flows, periods of record and drainage areas for the Lochsa and Selway Rivers and the mainstem Clearwater River (downstream of the confluence with the Southfork of the Clearwater) near Kamiah, Idaho, are presented in Appendix C. The locations of these gaging stations are shown in Figure 3.3-4. No active or inactive gaging stations are located in the subbasin other than the Lochsa and Selway stations. Based on the combined flow data for the Lochsa and Selway Rivers near Lowell for 1911 to 2000, the average annual flow of the Middle Fork Clearwater River is 6,605 cfs. Records indicate that peak flows generally occur in May and June (Nez Perce Tribe and NPPC 2002). Base flows most often occur during August and September. In lower elevation areas, occasional thunderstorms occurring from late spring through summer may result in flash floods that produce annual peak flows in localized areas. A hydrograph of the average monthly flow for the Middle Fork Clearwater River based on the combined flows of the Selway and Lochsa Rivers is provided in Figure 3.3-2.

Major flood events in the Middle Fork Clearwater Subbasin have occurred in 1919, 1933, 1948, 1964, 1968, 1974, and the winter/spring of 1995/1996. Table 3.3-2 presents the flows recorded at the Lochsa and Selway gaging stations during these events, except for 1919 where no records are available.

Table 3.3-2. Discharge (in cfs) at the Lochsa and Selway Gaging Stations near Lowell, Idaho During Major Flood Events in the Clearwater River.

Location	1933	1934	1938	1948	1957	1964	1974
Selway R. near Lowell	33,800	20,500	32,800	48,900	26,500	43,400	43,100
Lochsa R. near Lowell	34,800	22,500	24,500	34,600	21,100	35,100	32,000

Source: Nez Perce Tribe and NPPC 2002.

Based on the combined monthly flow at the Lochsa and Selway gaging stations, the Middle Fork Clearwater River produces an estimated 3,910,200 acre-feet over the course of the irrigation season (April 1 – October 31). Idaho Department of Water Resources (IDWR) records indicate there are approximately 667 active surface water rights and water right claims in the subbasin that total approximately 4,550,400 acre-feet (IDWR 2002). Information on low flow conditions and the location of diversions in the Middle Fork Clearwater Subbasin were unavailable.

Little Salmon Subbasin

The topography of the Little Salmon Subbasin is characterized by relatively narrow, steep V-shaped valleys and relatively narrow ridge systems. The Little Salmon Valley constricts noticeably downstream of New Meadows. This point, known as “the falls,” generally divides the upper and lower half of the subbasin. Elevations range from approximately 1,760 to 9,000 feet msl (Idaho Department of Water Resources 2001). The area receives approximately 16.5 to 24.8 inches of precipitation annually, mainly as snow or early spring rain. The HUC drainage area, number of major (named) streams, and stream miles for the Little Salmon River are listed in Table 3.3-1.

Streamflow records, including monthly and annual average flows, peak and minimum flows, periods of record, and drainage areas for three locations in the Little Salmon Subbasin (Mud Creek, Boulder Creek, and the Little Salmon River at Riggins) are presented in Appendix C. The locations of these gaging stations and all other historic active and inactive USGS gaging stations in the subbasin are shown in Figure 3.3-5. The average annual flow of the Little Salmon River for 1951 to 2000 was 798 cfs at the gaging station at Riggins. In general, peak flows in the Little Salmon River occur in

May or June, with the lowest flows in September. High flows are strongly dependent on snowmelt, and peaks are generally reached earliest in lower elevation catchments. A hydrograph of the average monthly flow for the Little Salmon River at Riggins is provided in Figure 3.3-2.

The Little Salmon Subbasin produces an average of 322,875 acre-feet over the course of the April 15 through October 31 irrigation season (Idaho Water Resources Board 2001). Approximately one-third of this water originates above the confluence of Round Valley Creek and Little Salmon River in the upper subbasin. The remainder originates downstream of the confluence of Round Valley Creek and Little Salmon River in the lower subbasin. IDWR records indicate that there are approximately 863 active surface water rights and water right claims in the subbasin, totaling approximately 452,500 acre-feet (IDWR 2002). IDFG has identified six dams within the Little Salmon Subbasin (IDFG 2002). Locations of the dams are shown in Figure 3.3-5. Information on low flow conditions and the location of diversions in the Little Salmon Subbasin were unavailable.

Approximately 92 percent (15,100 acres) of the total irrigated acres in the Little Salmon Subbasin are located in the upper subbasin, with about 8 percent (1,300 acres) of the irrigated acres located in the lower subbasin. Using the IDWR field headgate requirement of 3 acre-feet of water per acre per year of irrigation, the irrigated lands in the upper and lower basins need 45,300 acre-feet and 5,200 acre-feet per year, respectively, for a total of about 50,500 acre-feet per year in the subbasin. Some of this water, between 25 and 33 percent, is assumed to return to the system either through percolation into the groundwater or surface runoff. The majority of the 15,100 acres in the upper subbasin are irrigated with water from Twin Granite Reservoir (600 acre-feet capacity), Goose Lake Reservoir (6,550 acre-feet capacity), and Brundage Reservoir (7,330 acre-feet capacity). The reservoirs are usually filled in the spring during high flows, and water is released in the summer for irrigation when streamflows have decreased. Nearly all irrigation in the Little Salmon Subbasin is accomplished with surface water in gravity flood or gated pipe systems (Idaho Water Resources Board 2001). Other identified consumptive uses of surface water include livestock (approximately 56 acre-feet), domestic (approximately 4 acre-feet), and industrial (approximately 41.3 acre-feet).

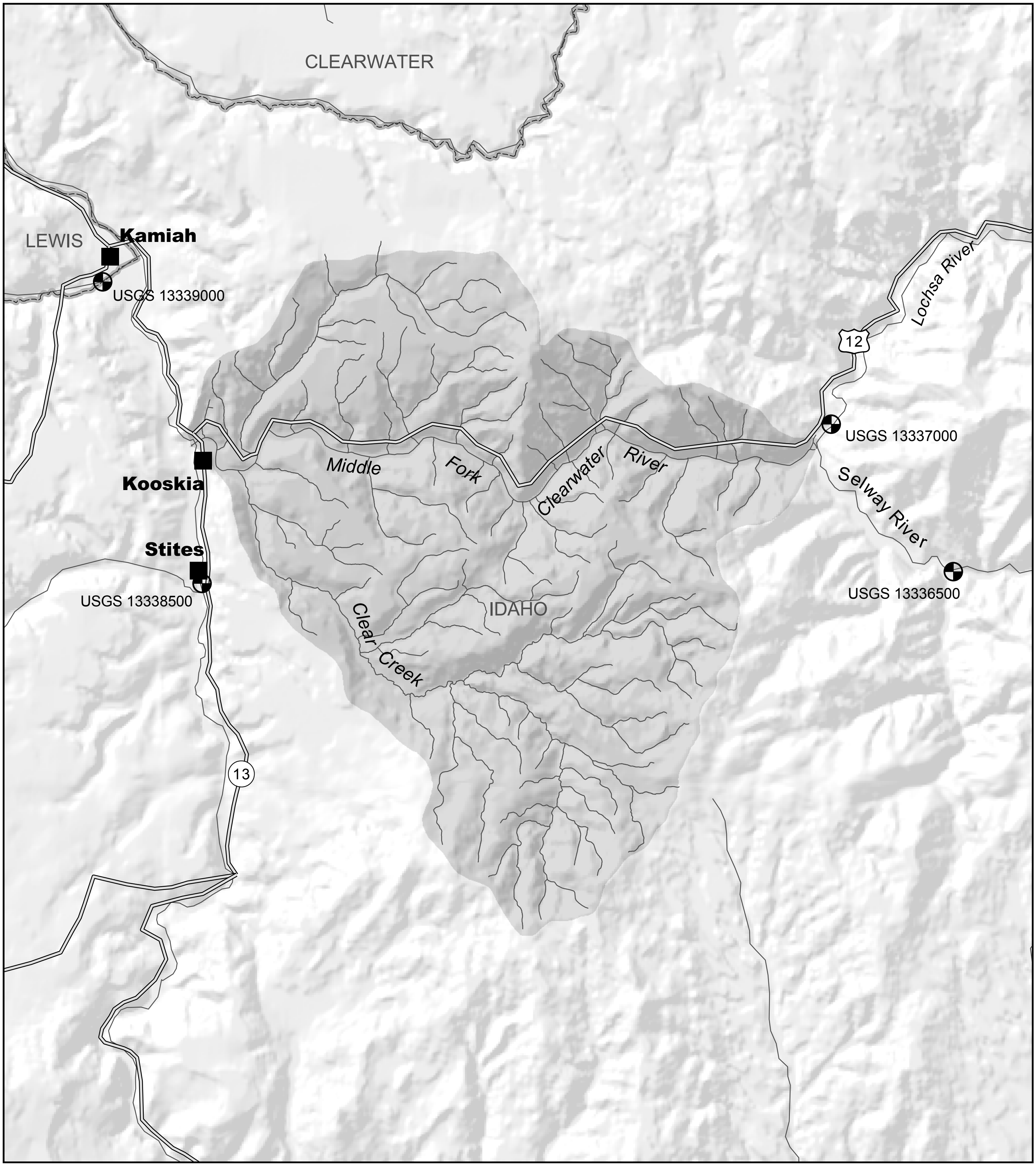
3.3.1.2 Environmental Consequences

No Action Alternative

Under the No Action Alternative, none of the fish passage, fish screens, or streamflow improvement projects would be constructed by Reclamation. Restoration efforts would proceed at the present pace under various subbasin groups, with Reclamation's technical assistance as requested in the Lemhi and Upper Salmon Subbasin. Therefore, the benefits or impacts on hydrology of streams in the four subbasins would occur at a slower pace than under the Proposed Action. Current hydrologic conditions and trends in each subbasin would continue. Flow would continue to be inadequate for anadromous fish in many of the subbasin stream reaches due to excessive withdrawals and inefficient diversions and headgate systems.

Cumulative Impacts

Under the No Action Alternative restoration efforts would occur at a slower pace than under the Proposed Action. Because of the number of diversions in the Lemhi and Upper Salmon Subbasins, continued lack of adequate flows could cause cumulative adverse effects to ESA-listed anadromous salmonids.



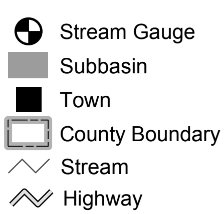
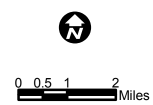


FIGURE 3.3-4
Hydrologic Features
Middle Fork Clearwater Subbasin



Source: IDFG, USBR, USGS, EDAW Inc, 2002.
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Back of Figure 3.3-4. Hydrologic Features Middle Fork Clearwater Subbasin

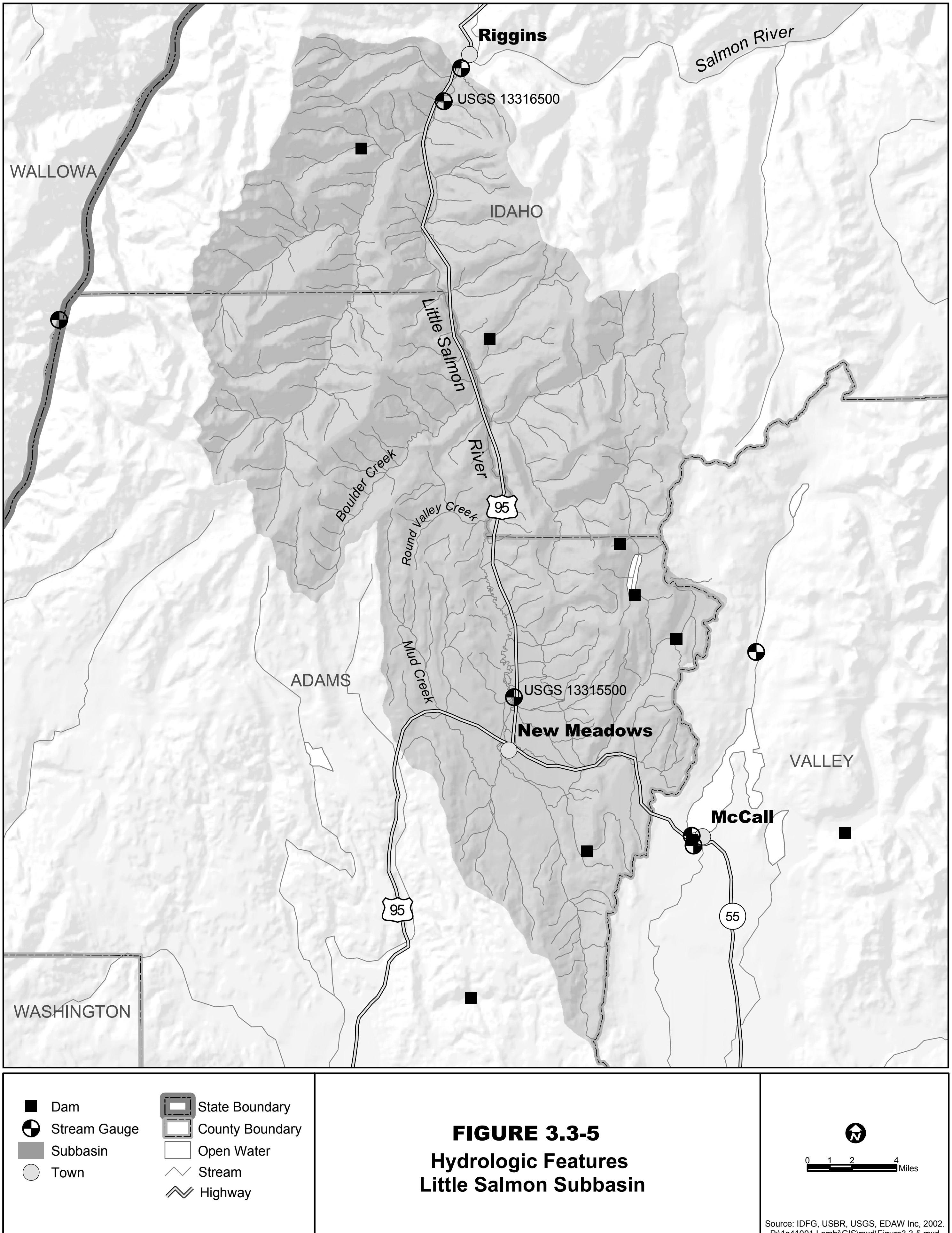

FIGURE 3.3-5
Hydrologic Features
Little Salmon Subbasin

Source: IDFG, USBR, USGS, EDAW Inc, 2002.
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Back of Figure 3.3-5. Hydrologic Features Little Salmon Subbasin

Proposed Action

Under the Proposed Action, the implementation of projects to protect and restore ESA-listed anadromous fish would continue in the four subbasins, with Reclamation's participation in funding and construction. Program objectives cover three categories of actions that would be implemented: (1) eliminate instream fish passage barriers, (2) correct fish screen deficiencies associated with irrigation practices on private lands, and (3) augment streamflows. The effects of each category of action on stream hydrology are described below. Because the specific types, individual locations, and number of willing participants in the habitat improvement projects within the four subbasins are not known at this time, the following discussion is programmatic in nature. Expected benefits to subbasin hydrology are noted where possible.

Fish Passage Barriers

Proposed fish passage barrier improvements that may impact stream hydrology include the consolidation of irrigation diversions, upgrade of headgates, and removal and replacement of push-up dams. Push-up dams would be replaced with new diversion structures with NMFS-approved upstream and downstream fish passage or the appropriate pump system. The potential for negative impacts which are caused by these improvements would be limited to short-term, local disturbances of the streambank and streambed during construction that could affect site-specific hydrology. Adherence to approved BMPs (e.g. sedimentation and erosion control, general construction practice) during construction would effectively minimize these disturbances.

The long-term impacts of correcting passage barriers would be positive. Removal of individual gravel push-up dams to improve passage would eliminate stream disturbances caused by dam maintenance. Push-up dams often fail during high flows and frequently require reconstruction. The repetitive failure and reconstruction of the push-up dams alter stream geomorphology and contribute to the fill-in of downstream low-flow channels. Elimination of gravel push-up dams would improve streambed stability and help maintain passable low-flow stream channels. Replacement of push-up dams with more efficient structures that provide fish passage would not affect seasonal peak flows or flooding potential. The effects of these replacements would likely increase the amount of flow during seasonal low flow periods.

Lemhi and Upper Salmon Subbasins. More than 370 dams and diversions and dewatered zones from irrigation withdrawals have been identified in the Lemhi Upper Salmon Subbasins (NPPC 2001). Consolidation of existing diversions and upgrade of headgates to improve fish passage within the affected subdrainages would improve instream flows during the irrigation season. The improved flows would reduce the number and extent of dewatered zones and would possibly reconnect stream segments. Many gravel push-up dams have also been identified in the Lemhi Upper Salmon Subbasins (NPPC 2001). Removal of these dams would improve streambed stability and help reestablish a more natural flow regime within affected streams.

Middle Fork Clearwater and Little Salmon Subbasins. The actual locations of diversions and dewatered zones within the Middle Fork Clearwater and Little Salmon Subbasins are not well documented. Recent conversations with USFS staff indicate that relative to the other subbasins, irrigated agriculture is not a widespread land use in the Middle Fork Clearwater Subbasin (pers. comm., Gerhardt, 2002). Nonetheless, the large number of surface water rights and water right claims are a good indication that many water diversions have been constructed within these subbasins. It is likely that many of these are small pump diversions. Consolidation of existing diversions and upgrade of headgates at strategic locations within these subbasins would, in all probability, increase flows and improve instream flow conditions during the irrigation season. Removal of any gravel push-up dams would improve streambed stability and help reestablish a more natural flow regime within affected streams.

Construction during headgate installation or consolidation of headgates could cause increased sediment to reach streams and adversely affect fish habitat or alteration of stream bank configuration, which could alter local stream hydrology. Adherence to BMPs that require implementation and monitoring of construction practices, erosion and sedimentation control plans, and rehabilitation of disturbed vegetation would minimize these potential effects. Replacement of pushup dams has a greater potential for affecting stream hydrology during removal and replacement of these instream structures. Implementation of BMPs would ensure that construction would occur at the most appropriate time to reduce potential impacts and that structures are designed to accommodate the local hydrology.

Headgate Improvements

Improvements such as the consolidation of irrigation diversions and upgrade of headgates would result in regulated water withdrawals with improved efficiency. Similar to streamflow improvement, these improvements would minimize withdrawals and increase instream flows. The additional water in the stream would improve stream conditions by widening the stream perimeter; increasing base flows, stream depths, and streambed areas; and increasing the range of instream flow velocities. The additional water in the stream would also reduce the extent and number of dewatered zones, reconnect streams previously captured by irrigation canals, and help maintain passable low flow channels in the summer and fall. Regulated withdrawals would also reduce streamflow fluctuations caused by excessive withdrawals. There is the potential for increased sedimentation in the stream during the construction period but implementation of the BMPs would significantly reduce this risk. The general impacts would be similar among the subbasins, but the Lemhi and the Upper Salmon have the greatest number of diversions and have a greater potential for improvement compared to the Middle Fork Clearwater and the Little Salmon Subbasins.

Fish Screens

Typically, fish screens are constructed in an irrigation canal or ditch, away from the point of diversion when the canal or ditch is dry and the stream is under low flow conditions. The only potential construction-related disturbance to the stream from this type of installation is a small, local disturbance to the streambank during installation of the fish return. In the long term, return flow volumes are small and do not create any significant impacts to the stream.

Placement of fish screens at the point of diversion is not common. For this type of fish screen, construction would be performed using approved BMPs that limit construction-related impacts to small, localized, short-term disturbances. In the long term, the presence of a fish screen and supporting abutments at the point of diversion could modify local stream hydraulics. However, there would be a long-term beneficial effect of installation of up-to-date fish screens. Such a design may be needed for particular instances. Reclamation would coordinate with NMFS regarding the design and placement of these structures. All other fish screens would adhere to NMFS criteria and short-term impacts would be negligible.

There are no unique impacts from placement of fish screens relative to any specific subbasin.

Streamflow Improvement

Methods of streamflow improvement that may impact stream hydrology include the acquisition of water rights, re-engineering existing diversions, and installing alternative irrigation diversion systems. The negative impact of constructing/re-engineering diversions would be limited to small, short-term, local disturbances of the streambank and streambed during construction. Short-term construction impacts could include blockage and alteration of streamflow during instream construction, excess sediment entering the stream channel, or temporary modification of streambanks. Adherence to approved BMPs (e.g. erosion control plans, staging, general construction practices) during construction would effectively minimize these disturbances. Streamflow improvement by acquisition of water rights would not negatively impact a stream.

The long-term impacts of the proposed flow improvements would be positive. Acquisition of water rights would directly increase instream flows by minimizing withdrawals. Re-engineering existing diversions or installing alternative irrigation diversion systems would improve water diversion efficiency, resulting in less flow to the ditch and outfall and more water in the stream. Additional water in the stream would improve stream conditions by widening the stream perimeter; increasing base flows, stream depths, and streambed areas; and increasing the range of instream flow velocities. The resulting increased wetted perimeter of the streambed and the increased flow and velocity would provide a greater amount of available habitat and a higher quality of habitat for fish. The additional water would reduce the extent and number of dewatered zones, reconnect streams previously captured by irrigation canals, and help maintain passable low flow channels in the summer and fall. All of the proposed streamflow improvement methods would help reduce streamflow fluctuations caused by excessive withdrawals, without impacting water rights.

Lemhi and Upper Salmon Subbasins. Thousands of water rights and water right claims exist within these subbasins. Acquisition of water rights, in conformance with Idaho State Law, re-engineering existing diversions, or installing alternative irrigation diversion systems at strategic locations within the subbasins would help reestablish a more natural flow regime in the affected streams, particularly during the irrigation season. These actions would minimize withdrawals and returns and improve instream flow conditions. These actions would also reduce the number and extent of dewatered zones.

Middle Fork Clearwater and Little Salmon Subbasins. The actual locations of diversions and dewatered zones within the Middle Fork Clearwater and Little Salmon Subbasins are not well documented. Acquisition of water rights, in conformance with Idaho State Law, re-engineering existing diversions, or installing alternative irrigation diversion systems at strategic locations within the subbasins would help reestablish a more natural flow regime in the affected streams, particularly during summer and fall. These actions would minimize withdrawals and returns and improve instream flow conditions.

Cumulative Impacts

Implementation of the Proposed Project would improve streamflow, particularly in the Lemhi and Upper Salmon Subbasins would result in beneficial cumulative impacts to ESU salmon and steelhead. Adult migrating fish would have improved access to spawning areas while juveniles would encounter reduced barriers to downstream movements, resulting in improved recruitment. As the number of projects implemented increase there would be a corresponding increase in accessibility for migrating adults and juvenile anadromous salmonids.

3.3.1.3 Mitigation

Negative impacts from the Proposed Action would be limited to the period of construction. During construction, contractors would be required to adhere to approved construction BMPs, NMFS screen criteria, and work windows to complete any improvements. Instream construction would be conducted at low flow periods and in consultation with NMFS to reduce potential impacts to ESA-listed fish. BMPs include provisions for monitoring and reporting to NMFS, restoration of disturbed areas, and appropriate staging of construction to minimize effects to the streambed and banks. These requirements would protect endangered species and establish conditions to limit or prevent disturbance to the streams. No additional mitigation is proposed.

3.3.2 Water Quality

3.3.2.1 Existing Conditions

Information on water quality issues within the four subbasins is characterized by relevant regulatory guidelines: adherence to water quality standards and the presence of impaired water bodies, the location of hazardous waste sites, and known point source discharges.

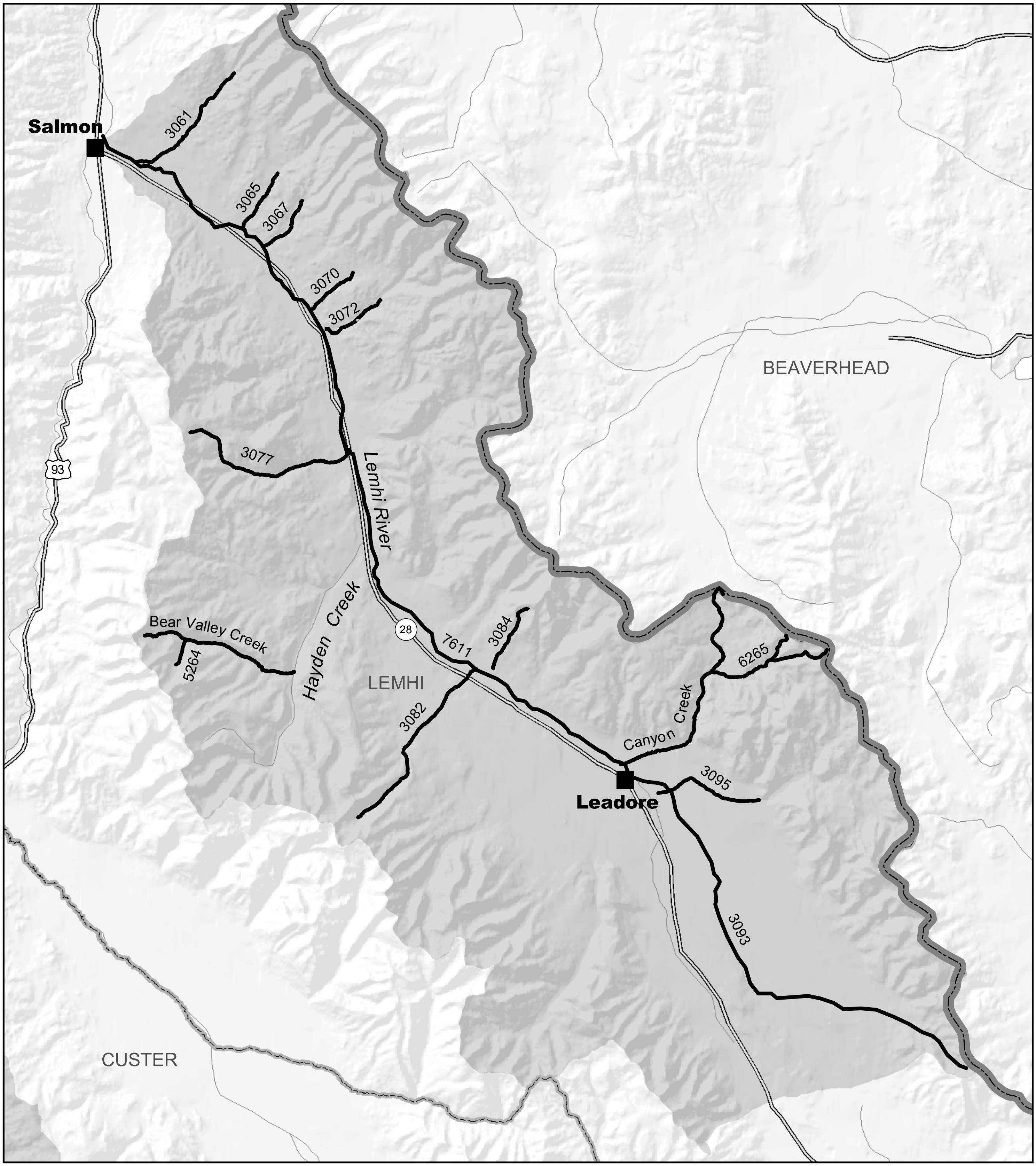
Beneficial Uses

IDEQ has the primary responsibility for water quality protection. Designated beneficial uses are presented in Idaho Administrative Code IDAPA 58.01.02.053. These designated uses for the four subbasins are presented in Appendix D. Another section of the Idaho Administrative Code (IDAPA 58.01.02.100) provides default uses to the many water bodies (stream or river segments, lakes, or ponds) that do not have designated beneficial uses. These default beneficial uses are to provide agricultural water supply, industrial water supply, and wildlife habitat. Beneficial uses for each subbasin are summarized in Table 3.3-3.

IDEQ uses State water quality criteria to ensure that beneficial uses are supported. If a stream or other water body does not meet specific water quality criteria, it is considered as not supporting its beneficial use; these streams are listed on the State's 303(d) list and require preparation of a pollution assessment called a total maximum daily load (TMDL) and a recovery or implementation plan for correcting the pollution problem.

Idaho's 1998 303(d) List

This 303(d) list/report is required by the Federal Clean Water Act (CWA) pursuant to Section 303(d). States are required to submit an updated list every 2 years to the EPA, which manages the program. This list represents a comprehensive status review of water quality in Idaho. Streams, rivers, lakes, and reservoirs are evaluated for this list. Waters on this list are termed "water quality limited" when they exceed water quality standards related to designated beneficial uses. Figures 3.3-6 through 3.3-9 show the location of 303(d) water bodies NPDES sites in the subbasins.



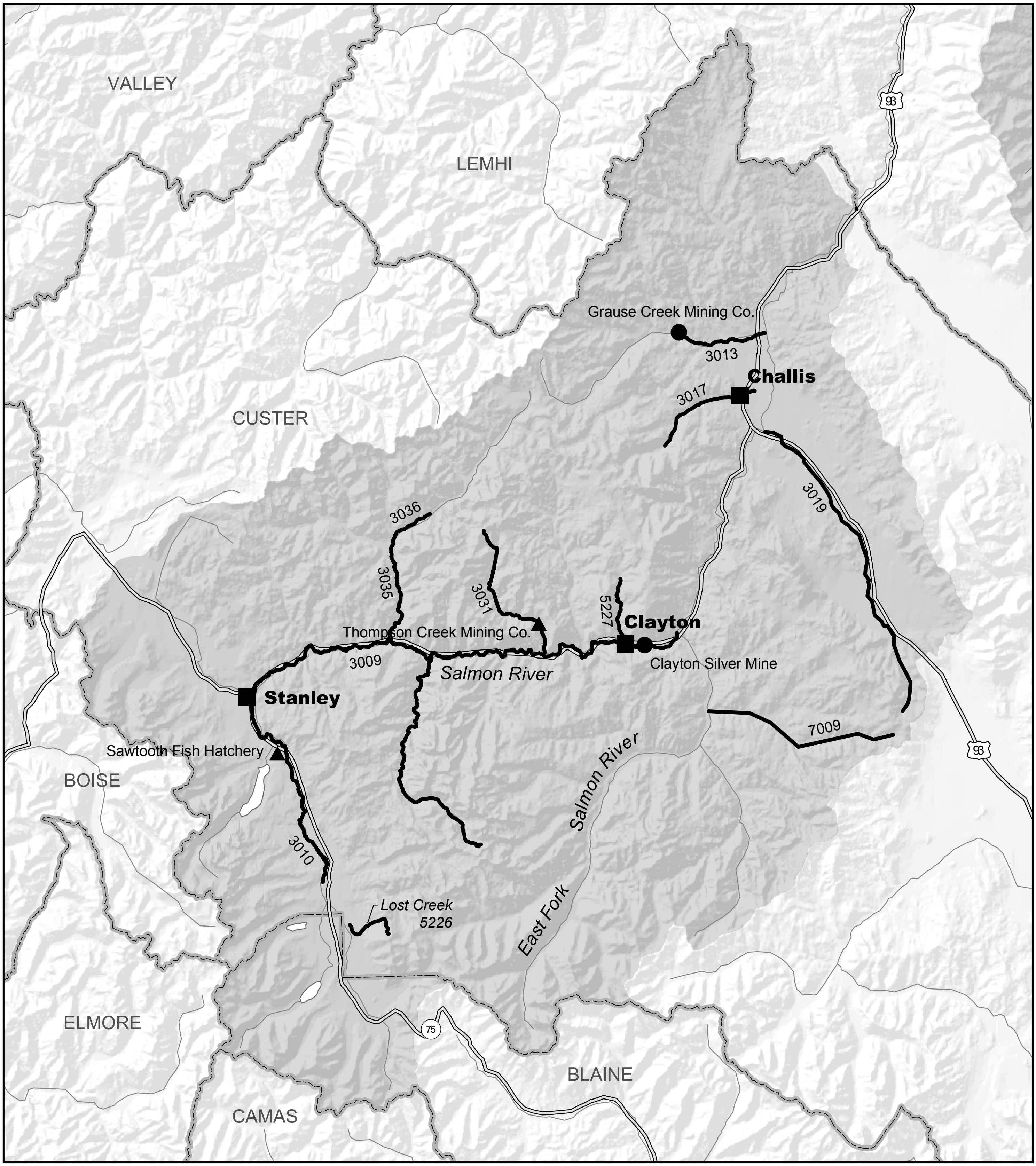
303d
Subbasin
Town
County Boundary
State Boundary
Open Water
Stream
Highway

FIGURE 3.3-6
CWA 303d Listed Water Bodies
Lemhi Subbasin

0 1 2 4 Miles

Source: IDFG, USBR, EDAW Inc, 2002.
P:\1e41001 Lemhi\GIS\mxd\Figure3.3-6.mxd

Back of Figure 3.3-6. CWA 303(d) Listed Water Bodies Lemhi Subbasin



NPDES Site	County Boundary
CERCLA Site	Open Water
303d	Stream
Subbasin	Highway
Town	

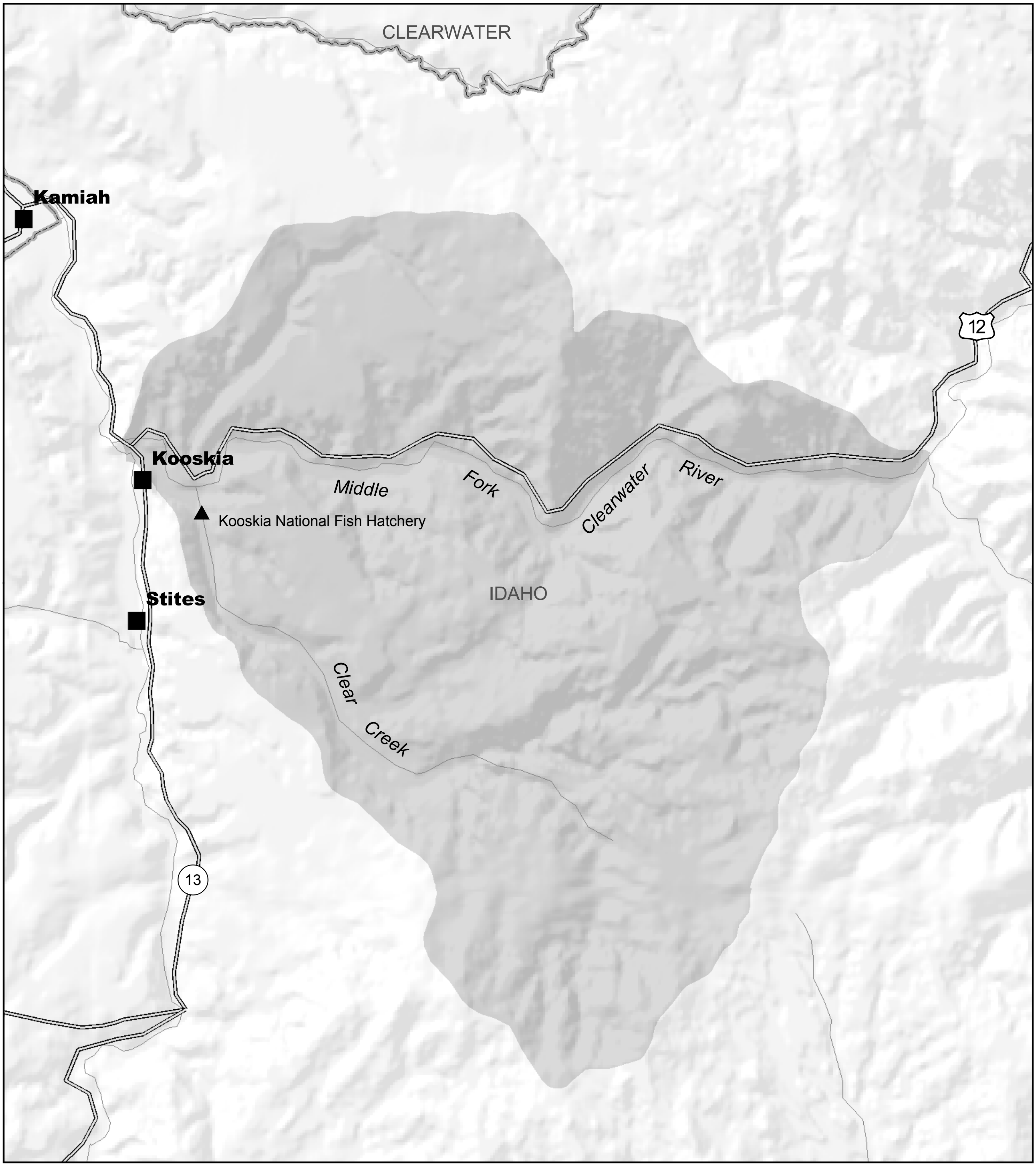
FIGURE 3.3-7

CWA 303d Listed Water Bodies
Upper Salmon Subbasin

0 2 4 8 Miles

Source: IDFG, USBR, EDAW Inc, 2002.
P:\1e41001 Lemhi\GIS\mxd\Figure3.3-7.mxd

Back of Figure 3.3-7. CWA 303(d) Listed Water Bodies Upper Salmon Subbasin



NPDES Site
Town
Subbasin
County Boundary
Open Water
Stream
Highway

FIGURE 3.3-8
NPDES Site
Middle Fork Clearwater Subbasin

0 0.5 1 2 Miles

Source: IDFG, USBR, EDAW Inc, 2002.
P:\1e41001 Lemhi\GIS\mxd\Figure3.3-8.mxd

Back of Figure 3.3-8. NPDES Site Middle Fork Clearwater Subbasin

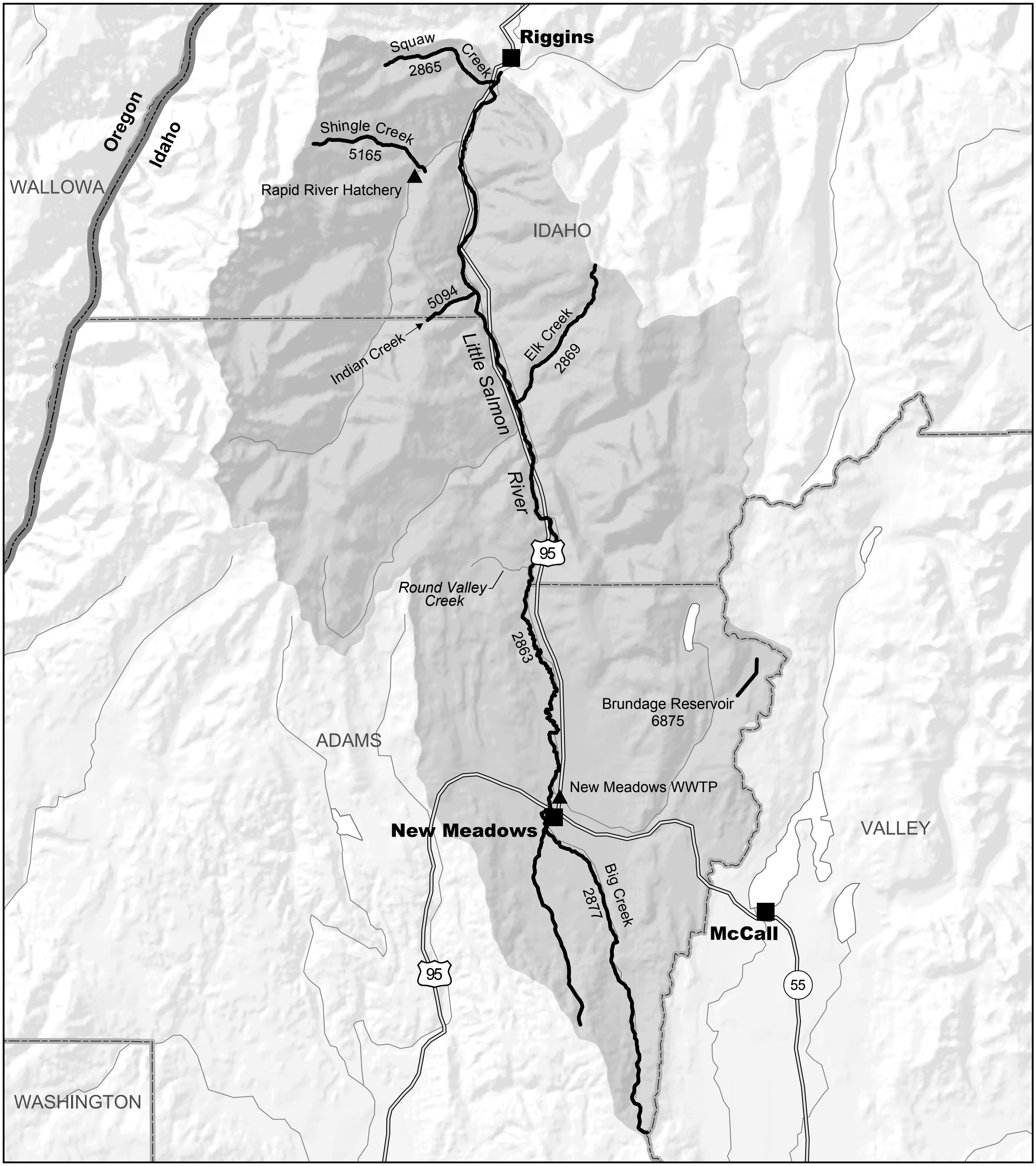


FIGURE 3.3-9
CWA 303d Listed Water Bodies
Little Salmon Subbasin

Source: IDFG, USBR, EDAW Inc, 2002.
P:\1e41001 Lemhi\GIS\mxd\Figure3.3-9.mxd

Back of Figure 3.3-9. CWA 303(d) Listed Water Bodies Little Salmon Subbasin

Table 3.3-3. 303(d)-listed Water Bodies in the Lemhi, Upper Salmon, Middle Fork, Clearwater, and Little Salmon Subbasins.

Water Body	WQLS	Boundaries	Beneficial Use	Pollutant	Str. Mile
Lemhi					
Kirtley Creek	3061	Headwaters to Lemhi River		TEMP	
Bohannon Creek	3065	Headwaters to Lemhi River		TEMP	
Wimpey Creek	3067	Headwaters to Lemhi River		TEMP	
Wimpey Creek	3067	BLM boundary to Lemhi River	COLD, SS, SCR	NUT, SED	6.62
Sandy Creek	3070	Headwaters to Lemhi River		TEMP	
Kenney Creek	3072	Headwaters to Lemhi River		TEMP	
McDevitt Creek	3077	BLM boundary to Lemhi River	COLD, SS, SCR	SED	2.83
Mill Creek	3082	Forest boundary to Lemhi River	COLD, SS, SCR	QALT, NUT, SED	5.35
Little Eighteen Mile Creek	3084	Headwaters to Lemhi River		TEMP	
Eighteen Mile Creek	3093	Headwaters to Lemhi River		TEMP	
Hawley Creek	3095	First Diversion to Eighteen Mile Creek	BASE	NUT, SED	6.09
Short Creek	5264	Headwaters to Bear Valley Creek		UNKN	1.83
Cruikshank Creek	6265	Headwaters to Canyon Creek		UNKN	3.21
Lemhi River	7611	Headwaters to Salmon River		TEMP	
Lemhi River	7611	Confluence of Texas and Eighteen Mile Cr. to mouth	COLD, SS, PCR DWS, SRW	BAC	57.29
Upper Salmon					
Salmon River	3009	Redfish Lake Creek to EF Salmon River	COLD, SS, PCR DWS, SRW	SED, TEMP	44.45
Salmon River	3010	Hellsroaring Creek to Redfish Lake Creek	COLD, SS, PCR DWS, SRW	SED	13.34
Challis Creek	3013	Forest Boundary to Salmon River	BASE	QALT, NUT, SED	9.35
Garden Creek	3017	Forest Boundary to Salmon River	BASE	NUT, SED	14.39
Warm Spring Creek	3019	Headwaters to Sink	BASE	NUT, SED	21.56
Thompson Creek	3031	Scheelite Jim mill site to mouth	COLD, SS, SCR	MTU, SED	1.02
Yankee Fork	3035	Jordan Creek to Salmon River	COLD, SS, PCR DWS, SRW	HALT, SED	9.00
Yankee Fork	3036	Fourth of July Creek to Jordan Creek	COLD, SS, PCR DWS, SRW	HALT, SED	2.92
Lost Creek	5226	Headwaters to sink	BASE	UNKN	4.45
Kinnikinic Creek	5227	Sawmill Creek to Salmon River	BASE	UNKN	2.99
Road Creek	7009	Headwaters to EF Salmon River	BASE	UNKN	15.77
Middle Fork Clearwater					
No listed water bodies					
Little Salmon					
Little Salmon River	2863	Round Valley Creek to Salmon River	COLD, SS, PCR, DWS, SRW	UNKN	24.89
Squaw Creek	2865	Headwaters to Little Salmon River	COLD, SS, SCR	UNKN	5.61
Elk Creek	2869	Headwaters to Little Salmon River	BASE	SED	7.41
Big Creek	2877	Headwaters to Little Salmon River	BASE	NUT, SED, TEMP	15.12
Indian Creek	5094	Headwaters to Little Salmon River	BASE	SED	2.46
Shingle Creek	5165	Headwaters to Rapid River	BASE	SED	5.45
Brundage Reservoir	6875		BASE	TEMP	0.00

Notes:
BASE—Base Beneficial Uses
COLD—Cold Water Communities
DWS—Domestic Water Supply
EF—East Fork
PCR—Primary Contact Recreation
SCR—Secondary Contact Recreation
SRW—Special Resource Water
SS—Salmonid Spawning
BAC—Bacteria
HALT—Habitat Alteration
MTU—Metals (Unknown)
NUT—Nutrients
QALT—Flow Alteration
SED—Sediment
UNKN—Unknown
WQLS—Water Quality Limited Segment

Source: http://www2.state.id.us/deq/water/water1.htm#surface_water , EPA 2002

Table 3.3-3 lists the water bodies within the four subbasins that are water quality limited (i.e., violate State water quality standards). IDEQ has not listed many water bodies for temperature exceedences because of the State's present efforts to modify temperature criteria to more appropriately represent cold, cool, and warm water bodies throughout the State. EPA has created a list of Idaho streams that currently exceed the temperature criteria. The National Pollutant Discharge Elimination System (NPDES) permit program controls water pollution by regulating point source discharges into waters of the United States. Point sources are discrete conveyances such as pipes or human-made ditches. Common permitted dischargers include sewage treatment facilities, hatcheries, and mining facilities. Table 3.3-4 summarizes the permitted facilities by subbasin (EPA 2002).

Table 3.3-4. Summary of Permitted Facilities[1].

Subbasin	Owner	Name	NPDES #	Permit End Date[2]
Upper Salmon	Thompson Creek Mining Co	Molybdenum Mine	ID0025402	01/29/2007
Upper Salmon	IDFG	Sawtooth Fish Hatchery	ID0026441	10/21/1991
Clearwater	USFWS	Kooskia National Fish Hatchery	ID0000817	10/23/1995
Little Salmon	Idaho Power Co	Rapid River Hatchery	ID0022373	10/23/1995
Little Salmon	City of New Meadows	Wastewater Treatment	ID0023159	11/18/1991

[1]EPA 2002 (http://yosemite.epa.gov/r10/water).
[2]Facilities with permit end dates that have passed are operating under extensions.

The following is a brief summary of the water quality conditions for each of the four subbasins.

Lemhi Subbasin

The Lemhi Subbasin is comprised of 66 water body units. Beneficial uses include cold water biota, salmonid spawning, primary contact recreation, domestic water supply, secondary contact recreation, and special resource water (see Appendix D).

Fifteen stream reaches within the Lemhi Subbasin are listed as limited according to the 1998 Section 303(d) list. The mainstem of the Lemhi River is listed for bacteria exceedences and comprises 57 miles of the approximate 83 linear streams miles listed as polluted in the subbasin. The remaining 26 miles are composed of six smaller side drainages to the Lemhi and have excessive sedimentation, high levels of nutrients, or both. The Mill Creek Subbasin also is listed for having excessive flow alterations (see Table 3.3-3). EPA included eight Lemhi subbasin water bodies for exceeding Idaho's cold water temperature criteria (see Table 3.3-3).

Upper Salmon Subbasin

The Upper Salmon Subbasin is comprised of 135 water body units. Beneficial uses include cold water biota, salmonid spawning, primary contact recreation, secondary contact recreation, domestic water supply, and special resource water (Appendix D). Twelve water bodies are listed as limited according to the 1998 Section 303(d) list. The mainstem of the Upper Salmon River constitutes 44 miles of the approximate 139 linear miles of stream listed as polluted. The most common pollutant is sedimentation. Other criteria exceedences in the subbasin include nutrients, habitat alteration, and flow alteration. See Table 3.3-3 for names of specific reaches and their listed pollutants.

EPA has listed Squaw Creek for exceeding Idaho's cold water temperature criteria (See Table 3.3-3). There are two NPDES permitted sites in the subbasin (Table 3.3-4, Figure 3.3-7): the Thompson Creek Mine and the IDFG Sawtooth Hatchery.

Two Superfund sites are located within the Upper Salmon Subbasin: Grouse Creek Mining, Inc., and Clayton Silver Creek Mine and Associates Properties. No sites were identified within the other three subbasins. Water quality of adjacent tributaries is adversely affected by these sites.

Middle Fork Clearwater Subbasin

The Middle Fork Clearwater River is comprised of 11 water body units (Appendix D). Beneficial uses include cold water biota, salmonid spawning, primary contact recreation, domestic water supply, and special resource water. None of the water bodies are listed as water quality limited according to the 1998 Section 303(d) list. The Kooksia National Fish Hatchery is the only NPDES permitted site in the subbasin.

Little Salmon Subbasin

The Little Salmon Subbasin is comprised of 16 water body units. Beneficial uses include cold water biota, salmonid spawning, primary contact recreation, domestic water supply, and special resource waters (Appendix D). Seven water bodies are listed as water quality limited according to the 1998 Section 303(d) list; the most common water quality issue is excessive sedimentation. The mainstem of the Little Salmon River is listed for an unknown pollutant and constitutes 25 miles of the approximate 61 linear miles of stream listed in the subbasin. Big Creek is also listed for having high levels of nutrients. Brundage Reservoir is one of the few water bodies listed by the State for temperature exceedences (see Table 3.3-3).

EPA has listed Big Creek for exceeding Idaho's cold water temperature criteria (Table 3.3-3). There are two NPDES permitted sites in the subbasin (Table 3.3-4, Figure 3.3-9): the Idaho Power Company Rapid River Hatchery and the City of New Meadows wastewater treatment facility.

3.3.2.2 Environmental Consequences

No Action

Under the No Action Alternative, it is assumed that fish barrier, screening, or streamflow improvement projects would be implemented by local entities with technical assistance from Reclamation, particularly in the Lemhi and Upper Salmon Subbasins. Therefore, the current water quality issues and trends would continue based on present land practices. Improvements in water quality would occur at a slower pace than under the Proposed Action. This assumes that IDEQ's 303(d) related actions and TMDL activities would be the primary focus to resolve water quality problems.

Cumulative Impacts

There would be no cumulative impacts from the No Action Alternative. Because of the slower pace of restoration efforts under the No Action Alternative compared to the Proposed Action, there would be a corresponding lag in improvements to water quality in the subbasins.

Proposed Action

Fish Passage Barriers

Push-Up Dams. Replacement of push-up dams would have some positive and negative impacts. The long-term benefit would be the elimination of the seasonal disturbance of stream sediments by in-stream heavy equipment creating the push-up dams. This would also reduce repeated sediment impacts on spawning gravels and macroinvertebrates. Short-term, one-time construction-related impacts would occur at the new permanent diversion sites that replace the push-up dams. Heavy equipment shaping the diversion channel would remove bank vegetation, disturb soils, and disturb streambed sediments. This disturbance, typically below the normal high water mark, would be insignificant in relation to push-up dam maintenance. Push-up dam maintenance can occur several times within the irrigation season. Each time maintenance is done overall water quality within the stream deteriorates from measured sediment mobilization. Overall stream sediments increase, disrupting cold-water biota and salmonid spawning.

Headgate Improvements

Improvements such as the consolidation of irrigation diversions and the upgrade of headgates would improve the amount of streamflow, which would have positive effects on water quality. Construction activity would occur at the margin of the stream and would have a relatively low potential for reducing water quality during construction. Reclamation would implement BMPs during construction that include provisions for a soil and erosion plan, limits on clearing and grading, seasonal work windows, and restoration of disturbed areas. There likely would be greater increase in water quality in the Lemhi and Upper Salmon Subbasins because of the number of diversions that are present compared to the Middle Fork Clearwater and Little Salmon Subbasins.

Fish Screens

Placing fish screens on water diversions would have no long-term impacts on water quality. Fish screens would be placed in irrigation canals away from the stream channel. There would be a negligible disturbance to vegetation from installation of smolt-return pipes, and no water quality effects.

Streamflow Improvement

Over the long term, water quality would improve proportionate to the increase in instream flows as a result of augmenting summer flows. The benefits would include reduced daytime summer water temperatures, reduced sediment and nutrients, increased dissolved oxygen (DO) levels, reduced algae production, improved cold water biota (macro-invertebrates), and improved salmonid spawning.

Water temperatures would be reduced with the deeper pools and increased stream velocities. Sediment, nutrients, and bacteria would be reduced by the curtailment of agricultural return flows. DO levels would increase with reduced temperatures and increased water velocities. Algae production would be reduced as a result of lower water temperatures and less nutrient loading from agricultural return flows. Cold water biota would improve by increasing macroinvertebrate species diversity and abundance. Species diversity and abundance are known to increase with lower water temperatures, reduced sediment and nutrients, and maintained minimum streamflows. Salmon spawning would be improved by higher redd survival as a result of improved DO levels, lower sedimentation, and lower water temperatures.

Subbasins with stream reaches violating State water quality standards would likely see measurable water quality improvements with streamflow improvement. Benefits from streamflow improvement for the streams on the State's 303(d) list could enable the streams to be removed from this list. Table 3.3-5 indicates stream reaches in the subbasins with the greatest potential benefits from stream augmentation. There is one stream reach in the Lemhi and one in the Upper Salmon Subbasin that specifically listed for "flow alteration" (Table 3.3-5) that augmentation would directly address. Other listed reaches would also benefit.

There would be no long-term or short-term adverse impacts resulting from augmenting summer flows.

Table 3.3-5. 303d Listed Water Bodies with Greatest Potential Benefits from Flow Augmentation.

Water Body			
Lemhi	**WQLS**	**Boundaries**	**Pollutant**
Kirtley Creek	3061	Headwaters to Lemhi River	*TEMP
Bohannon Creek	3065	Headwaters to Lemhi River	*TEMP
Wimpey Creek	3067	BLM boundary to Lemhi River	NUT, SED *TEMP
Sandy Creek	3070	Headwaters to Lemhi River	*TEMP
Kenney Creek	3072	Headwaters to Lemhi River	*TEMP
McDevitt Creek	3077	BLM boundary to Lemhi River	SED
Mill Creek	3082	Forest boundary to Lemhi River	QALT, NUT, SED
Little Eighteen Mile Creek	3084	Headwaters to Lemhi River	*TEMP
Eighteen Mile Creek	3093	Headwaters to Lemhi River	*TEMP
Hawley Creek	3095	First Diversion to Eighteen Mile Creek	NUT, SED
Lemhi River	7611	Confluence of Texas & Eighteen Mile Cr. to mouth	BAC
Lemhi River	7611	Headwaters to Salmon River	*TEMP
Upper Salmon			
Salmon River	3009	Redfish Lake Creek to E. F. Salmon River	SED, TEMP
Salmon River	3010	Hellsroaring Creek to Redfish Lake Creek	SED
Challis Creek	3013	Forest Boundary to Salmon River	QALT, NUT, SED
Garden Creek	3017	Forest Boundary to Salmon River	NUT, SED
Warm Spring Creek	3019	Headwaters to Sink	NUT, SED
Thompson Creek	3031	Scheelite Jim mill site to mouth	MTU, SED
Yankee Fork	3035	Jordan Creek to Salmon River	HALT, SED
Yankee Fork	3036	Fourth of July Creek to Jordan Creek	HALT, SED
Squaw Creek	6265	Headwaters to mouth	*TEMP
Middle Fork Clearwater			
No listed water bodies			
Little Salmon			
Elk Creek	2869	Headwaters to Little Salmon River	SED
Big Creek	2877	Headwaters to Little Salmon River	NUT, SED, *TEMP
Indian Creek	5094	Headwaters to Little Salmon River	SED
Shingle Creek	5165	Headwaters to Rapid River	SED

Notes:
BAC—Bacteria
NUT—Nutrients
QALT—Flow Alteration
SED—Sediment
WQLS—Water Quality Limited Section
* pollutants added to 1998 IDEQ's 303(d) list by EPA

Source: http://www2.state.id.us/deq/water/water1.htm#surface_water

Cumulative Impacts

Water quality improvements in the subbasins associated with the Proposed Action would likely have positive cumulative impacts to aquatic resources in the subbasins. The opportunities for improvement are particularly high in the Lemhi and the Upper Salmon Subbasins, which have a high number of irrigation diversions.

As individual actions are implemented there would be incremental increases in water quality including increased flows, higher stream velocities, increased dissolved oxygen, reduced water temperatures, and increased populations of cold water invertebrates. These improvements to water quality would have corresponding, direct benefits to anadromous salmonids in the subbasins. Improvements in streamflow would be particularly beneficial in those stream reaches identified as water quality or temperature limited.

3.3.3 Mitigation

In general, negative effects to water quality from the Proposed Action would be localized, short-term, and limited to the period of construction. During construction, contractors would be required to adhere to approved construction BMPs, NMFS screen criteria, and work windows to complete any improvements. BMPs specifically require the implementation and monitoring of an erosion and sedimentation control plan that would minimize sediment input to the stream from construction practices. The BMPs also specify limits on excavation and fill, footprint size, and riparian buffer disturbances. In addition, disturbed areas would be rehabilitated to the original contour and planted with native vegetation if needed. Any instream construction would be completed during the low flow period with minimally invasive practices to minimize the potential for increasing sedimentation and reducing water quality. The BMPs also specify that Reclamation consult with NMFS regarding project-specific in-water construction periods. These requirements would protect endangered species and establish conditions to limit or prevent disturbance to the streams. No additional mitigation is proposed.

3.4 Vegetation/Wetlands/Floodplains

3.4.1 Existing Conditions

The native flora of the Mountain Snake Province subbasins are composed of a diverse array of vegetative communities. The climates of the subbasins have great influence on the vegetation associations. The Little Salmon and Middle Fork Clearwater are located farther west than the other subbasins and therefore are more heavily influenced by the Pacific maritime climate. The Upper Salmon and Lemhi Subbasins are generally drier and experience colder winters. In addition, the plant communities of each subbasin reflect the moisture and elevation combinations throughout the basins. There are approximately 14 different vegetation associations (including rock) among the Mountain Snake Province subbasins (Table 3.4-1). In addition to native vegetation associations, irrigated agriculture lands (primarily pastures) are prevalent in the valleys of the subbasins. Across all the subbasins, evergreen forests and shrublands are the most abundant vegetative communities (NPPC 2001).

The Upper Salmon and Lemhi Subbasins have forested lands which are dominated by scrub and shrublands. Wyoming big sagebrush (*Artemisia tridentate wyomingensis*) and mountain big sagebrush (*Artemisia tridentate vaseyana*) are common shrubs in both subbasins. The Upper Salmon has the least amount of forest, especially Douglas-fir, which is an important component of the mid-elevations of the other subbasins (NPPC 2001, 2002). Additionally, the Upper Salmon is largely evergreen shrublands, lodgepole pine forests, and higher elevational communities such as subalpine evergreen woodland and mixed subalpine forests (NPPC 2001). Evergreen shrubland and evergreen dwarf-shrublands make up the majority of the vegetation communities in the Lemhi (NPPC 2000).

Table 3.4-1. Vegetation Associations found in the Mountain Snake Province Subbasins, Idaho.

Vegetation Association	Lemhi	Upper Salmon	Middle Fork Clearwater	Little Salmon
Alpine Meadow	X	X	X	
Bluebunch Wheatgrass Grassland			X	X
Douglas-fir Forest	X	X	X	X
Grand Fir Forest		X	X	X
Idaho Fescue Grassland			X	X
Low Sagebrush Dwarf-Shrubland		X		
Mountain Big Sagebrush Shrubland	X	X		X
Ponderosa Pine Woodland				X
Rock	X		X	
Subalpine Fir Forest		X	X	X
Subalpine Fir Forest and Woodland	X	X	X	X
Whitebark Pine-Limberpine Forest and Woodland	X	X		
Wyoming Big Sagebrush-Mountain Big Sagebrush Shrubland	X	X		

Source: NPPC 2001

The Middle Fork Clearwater is also heavily forested, with about 75 percent forest cover (NNPC 2002). The Middle Fork Clearwater is similar to the Little Salmon in terms of having a diverse mix of forested communities, including Douglas-fir, ponderosa pine, grand fir (*Abies grandis*), lodgepole pine (*Pinus contorta*), and western redcedar (*Thuja plicata*) (NPPC 2002).

The Little Salmon Subbasin is the most forested, with 91 percent of the land area in forested habitat (Hamm et al. 1997). These forests are composed primarily of ponderosa pine (*Pinus ponderosa*), a forest type that does not occur in the Lemhi or Upper Salmon (NPPC 2001). Mixed subalpine and Douglas-fir (*Pseudotsuga menziesii)* forests make up the majority of the other vegetative communities in the Little Salmon Subbasin (NPPC 2001). The Little Salmon Subbasin has the largest area of bluebunch wheatgrass (*Agropyron spicatum*) and Idaho fescue (*Festuca idahoensis*) communities among the Mountain Snake Province subbasins.

Wetlands cover small portions of the Mountain Snake Province subbasins areas but are important in terms of vegetative diversity. Wetlands occur in association with small ponds filled by spring run-off, wet meadows, springs, seeps, bogs, small lakes, and riparian areas. Wetlands in the Middle Fork Clearwater Subbasin are habitat to the Clearwater phlox (*Phlox idahonis*), which is endemic to only a few wet meadows within this subbasin (NPPC 2002).

Noxious weeds are widespread throughout the subbasins, with about 19 species considered a threat to the vegetative communities of the Mountain Snake Province subbasins (NPPC 2001, 2002). Common species include cheatgrass (*Bromus tectorum*), yellow starthistle (*Centaurea solistitialis*), spotted knapweed (*Centaurea maculosa*), and common crupina (*Crupina vulgaris*). Spotted knapweed is the most widespread and is found in all Mountain Snake Province subbasins.

3.4.2 Environmental Consequences

3.4.2.1 No Action Alternative

Under the No Action Alternative, ongoing restoration efforts would continue in the subbasins with technical assistance provided by Reclamation in the Lemhi and Upper Salmon Subbasins. Disturbance to riparian vegetation would be expected in the larger projects that included the use of heavy equipment such as backhoes or bulldozers. In most cases, there is some access to push-up dams because ranchers must periodically maintain these structures. Where vegetative clearing would occur, it would be kept to a minimum. The effects of vegetation removal and subsequent restoration would be relatively short term and minor. Long-term effects to vegetation would be beneficial. Riparian vegetation and streamside wetlands would benefit from increased streamflow due to more efficient water withdrawal systems. Replacement of push-up dams would preclude the need to use heavy equipment in the stream for dam maintenance and eliminate repeated vegetation disturbance associated with this practice.

Cumulative Impacts

There would be no cumulative impacts to vegetation from the No Action Alternative.

3.4.2.2 Proposed Action

Implementation of restoration efforts under the Proposed Action would have similar effects to those described under the No Action Alternative, but the pace and scope of implementation would be greater under the Proposed Action. Modifying headgates or installing fish screens would have minimal effects to vegetation because these features are generally in disturbed settings. Any vegetation removal or disturbance would be restored. Reclamation would be able to implement a greater number of restoration efforts in the subbasins, which would result in higher levels of short-term riparian vegetation disturbance, particularly for push-up dam removal. However, Reclamation, in consultation with NMFS and USFWS, has developed BMPs to minimize the amount of vegetative clearing, restore disturbed areas with native vegetation, and monitor these sites to protect endangered species and ensure restoration success. In addition, the faster pace of implementation under the Proposed Action would provide greater long-term benefits to riparian vegetation and streamside wetlands by increasing streamflow, removing push-up dams and reducing the need for instream maintenance and the corresponding vegetation disturbance.

Cumulative Impacts

No cumulative impacts to vegetation are anticipated from the Proposed Action.

3.4.3 Mitigation

Because the BMPs for limiting vegetation disturbance and for restoration are incorporated into the project and no adverse impacts are anticipated, no mitigation is necessary.

3.5 Fish

3.5.1 Existing Conditions

A variety of resident and anadromous fish are present in the four subbasins addressed in this EA. Table 3.5-1 lists the fish taxa present, the subbasins in which they reside, and any special-status designations. There are 24 taxa of fish inhabiting the Middle Fork Clearwater Subbasin, 19 in the Little Salmon Subbasin, 24 in the Upper Salmon Subbasin, and 19 in the Lemhi Subbasin. None of the species discussed in this section are ESA-listed when they occur in Mountain Snake Province subbasins. Species listed under the Federal Endangered Species Act (ESA) are addressed in Section 3.7, Threatened and Endangered Species*,* and are not addressed in this section. Threatened and endangered species include: Snake River spring/summer chinook salmon (*Oncorhynchus tshawytscha*) ESU except in the Middle Fork Clearwater River; Snake River fall chinook salmon ESU; Snake River sockeye salmon (*O. nerka*) ESU; Snake River steelhead (*O. mykiss*) ESU; and Columbia River Basin bull trout (*Salvelinus confluentus*) distinct population segment (DPS). Bull trout critical habitat is also described in Section 3.7. The spring/summer chinook stock for the Middle Fork Clearwater River is addressed in this section because it is not a Federally listed stock under the ESA. Distributions of west-slope cutthroat trout and ESA-listed species are shown in Figures 3.5-1 through 3.5-4.

Major threats to anadromous and other fisheries include watershed management activities such as logging, road building, agriculture, and streamside development that result in higher temperature, base flow limitations, flow variation, sedimentation, lack of instream cover, and connectivity/passage problems. Every potential threat mechanism is not applicable to every species; therefore, threats to individual species are listed under each species' discussion.

Essential Fish Habitat (EFH) provisions of the Magnuson-Stevens Act (MSA) required heightened consideration of a fish habitat in resource management decisions. EFH is defined in Section 3 of the MSA as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity." NMFS interprets EFH to include aquatic areas and their associated physical, chemical, and biological properties used by fish that are necessary to support a sustainable fishery and the contribution of the managed species to a healthy ecosystem. The MSA and its implementing regulations at 50 CFR 600.920(j) require that before a Federal agency may authorize, fund, or carry out any action that may adversely effect EFH, it must consult with NMFS and, if requested, the appropriate Regional Fishery Management Council. The purpose of consultation is to develop a conservation recommendation that addresses all reasonably foreseeable adverse effects to EFH.

Further, the action agency must provide a detailed response in writing to NMFS and the appropriate Council within 30 days after receiving an EFH conservation recommendation. The response must include measures proposed by the agency to avoid, minimize, mitigate, or offset the impact of the activity on EFH. If the response is inconsistent with conservation recommendations of NMFS, the agency must explain its reasons for not following the recommendations, including the scientific justification for any disagreements over the anticipated effects of the proposed action and the measures needed to avoid, minimize, or mitigate such effects.

Only certain species are addressed in this section in detail based on six criteria: (1) they are of special importance because of listing by state or Federal agencies as species of concern; (2) they have

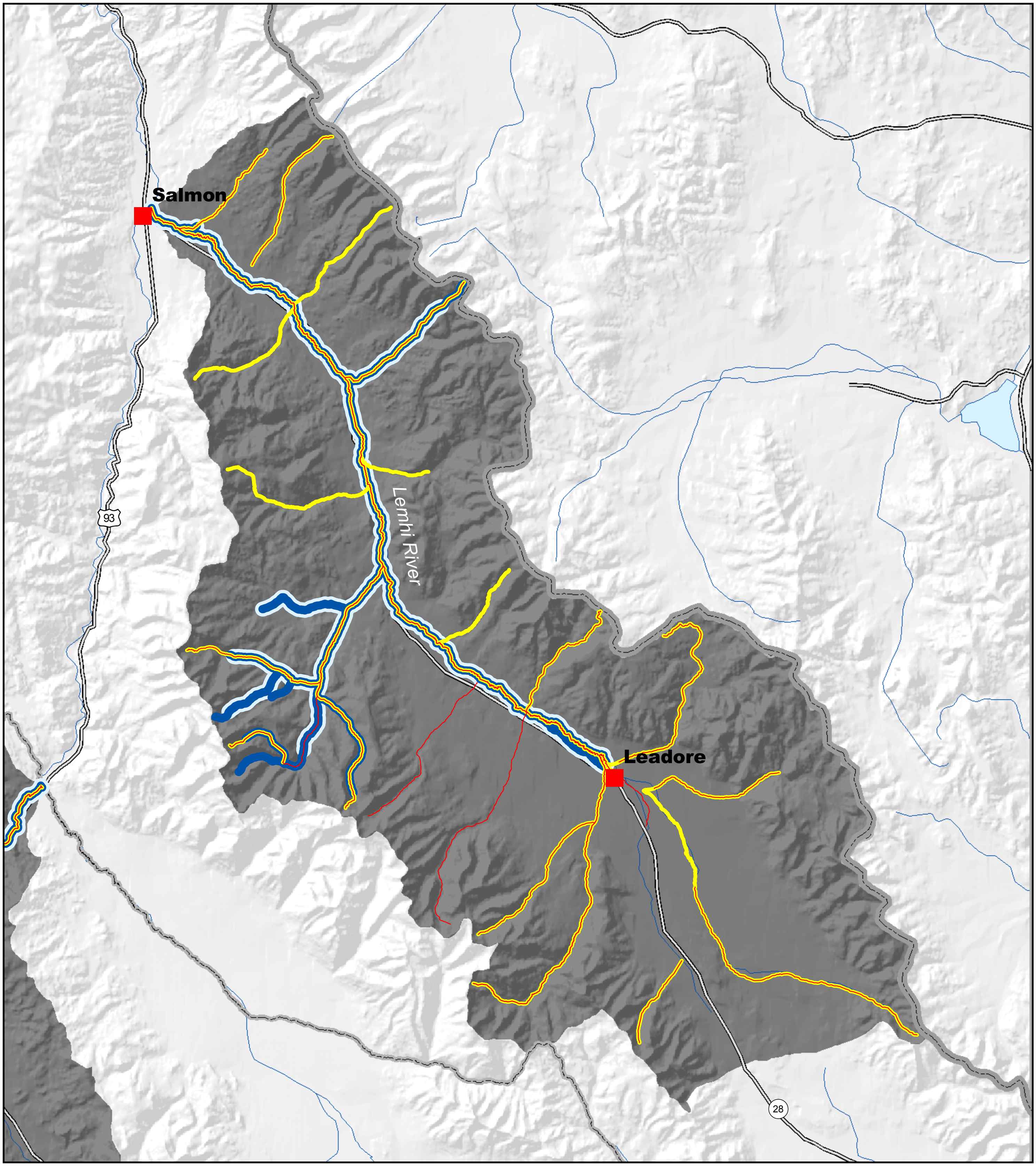
Table 3.5-1. Fish Species Present in the Lemhi, Upper Salmon, Middle Fork Clearwater, and Little Salmon Subbasins.

Species Common Name	Scientific Name	Special Status [1]	Anadromous (A) or Resident (R)	Native (N), Exotic (E), or Reintroduced (R)	Presence by Subbasin: Lemhi	Upper Salmon	Middle Fork Clearwater	Little Salmon
Pacific lamprey	*Lampetra tridentata*	SE	A	N	X [5]	X	X	
Chinook salmon (spring/summer) ESU[2]	*Oncorhynchus tshawytscha*	FT, ST	A	N/R	X	X	X [3,4]	X
Sockeye salmon ESU[2]	*Oncorhynchus nerka*	FE, SE	A	N		X		
Kokonee salmon	*Oncorhynchus nerka kennerlyi*		R	E		X		
Steelhead ESU[2]	*Oncorhynchus mykiss*	FT, SSOC	A	N	X	X	X	X
Redband trout	*Oncorhynchus mykiss*	SSOC	R	N	X	X	X	X
Rainbow trout	*Oncorhynchus mykiss*		R	E	X	X	X	X
Coho salmon	*Oncorhynchus kisutch*		A	R			X[4]	
Westslope cutthroat trout	*Oncorhynchus clarki lewisi*	FSOC, SSOC	R	N	X	X	X	X
Bull trout	*Salvelinus confluentus*	FT, SSOC	R	N	X	X	X	X
Brook trout	*Salvelinus fontinalis*		R	E	X	X	X	X
Golden trout	*Salmo aguabonita*		R	E		X		
Lake trout	*Salvelinus namaycush*		R	E		X		
Arctic grayling	*Thymallus arcticus*		R	E	X	X	X	
Mountain whitefish	*Prosopium williamsoni*		R	N	X	X	X	X
Chiselmouth	*Acrocheilus alutaceus*		R	N	X		X	
Peamouth	*Mylocheilus caurinus*		R	N			X	
Longnose dace	*Rhinichthys cataractae*		R	N	X	X	X	
Speckled dace	*Rhinichthys osculus*		R	N	X	X	X	X
Leopard dace	*Rhinichthys falcatus*		R	N				X
Redside shiner	*Richardsonius balteatus*		R	N	X	X	X	
Largescale sucker	*Catostomus machrocheilus*		R	N	X	X	X	X
Bridgelip sucker	*Catostomus columbianus*		R	N	X	X	X	X
Mountain sucker	*Catostomus platyrhynchus*		R	N		X		X
Sandroller	*Percopsis transmontana*	SSOC	R	N			X	
Mottled sculpin	*Cottus bairdi*		R	N	X	X	X	X
Shorthead sculpin	*Cottus confusus*		R	N	X	X	X	X
Paiute sculpin	*Cottus beldingi*		R	N			X	X
Torrent sculpin	*Cottus rhotheus*		R	N		X	X	X
Slimy sculpin	*Cottus cognatus*		R	N				X
Northern pikeminnow	*Ptychocheilus oregonensis*		R	N	X	X		X

[1] FE = Federal Endangered
FT = Federal Threatened
FSOC = Federal Species of Concern
SE = State of Idaho Endangered
ST = State of Idaho Threatened
SSOC = State of Idaho Species of Concern

[2] Unless specified otherwise, this species is a member of a Snake River ESU.
[3] Excluded from the ESU encompassing the Snake River spring/summer chinook ESU in the Snake River Basin
[4] Reintroduced
[5] Occurred historically, but current status is unknown

Source: NPPC 2001



Bull Trout
Westslope Cutthroat
Steelhead
Spring/Summer Chinook
Stream
Subbasin
Open Water
State Boundary
County Boundary
Highway
Town

* Line thickness does not represent quantity

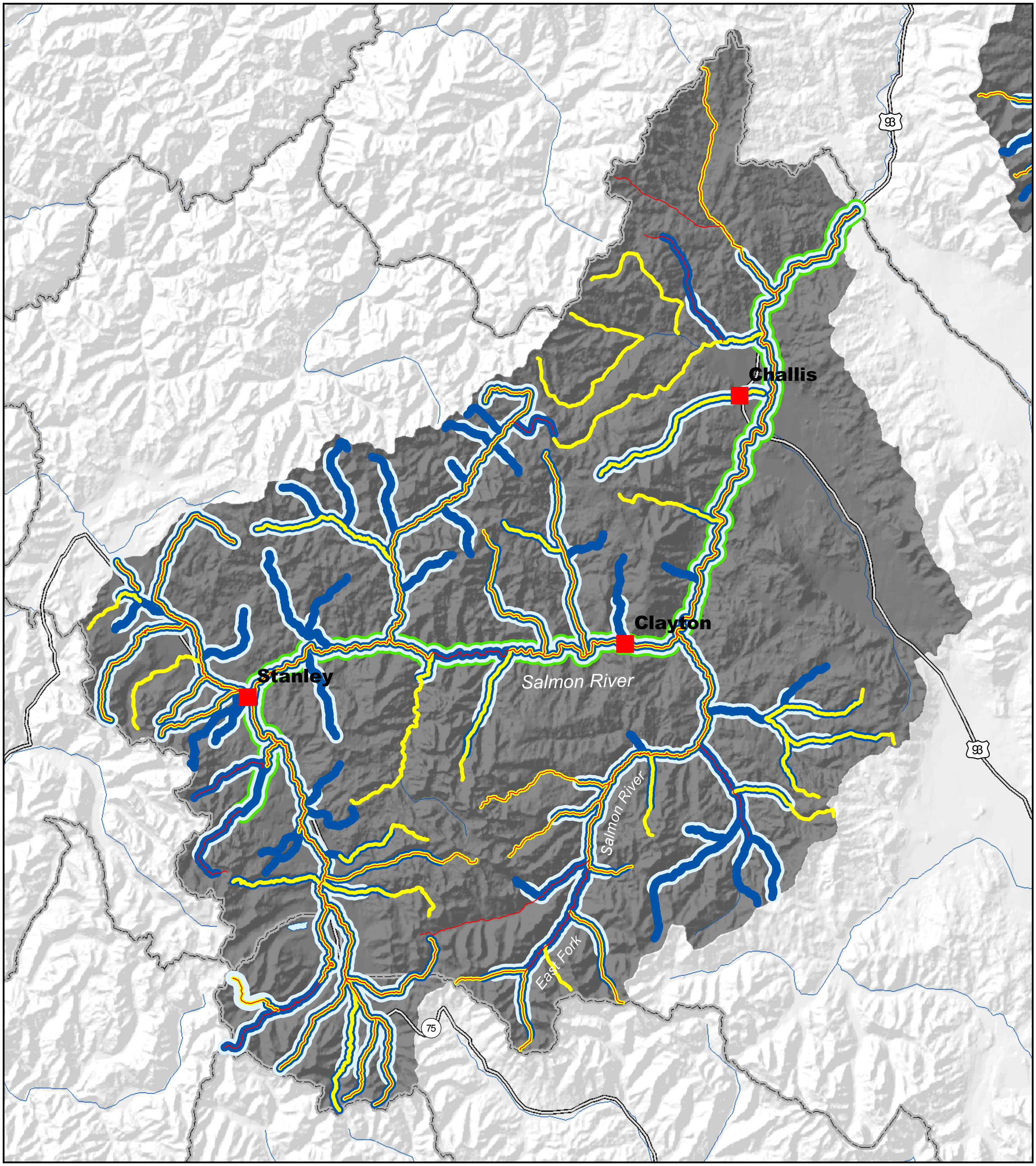
FIGURE 3.5-1

Selected Fish Species Distribution Lemhi Subbasin

0 1 2 4 Miles

Source: USBR, IDFG, EDAW Inc, 2002.
P:\1e41001 Lemhi\GIS\mxd\Figure3.5-1.mxd

Back of Figure 3.5-1. Selected Fish Species Distribution Lemhi Subbasin



Bull Trout	Stream
Westslope Cutthroat	Subbasin
Steelhead	Open Water
Spring/Summer Chinook	County Boundary
Sockeye	Highway
	Town

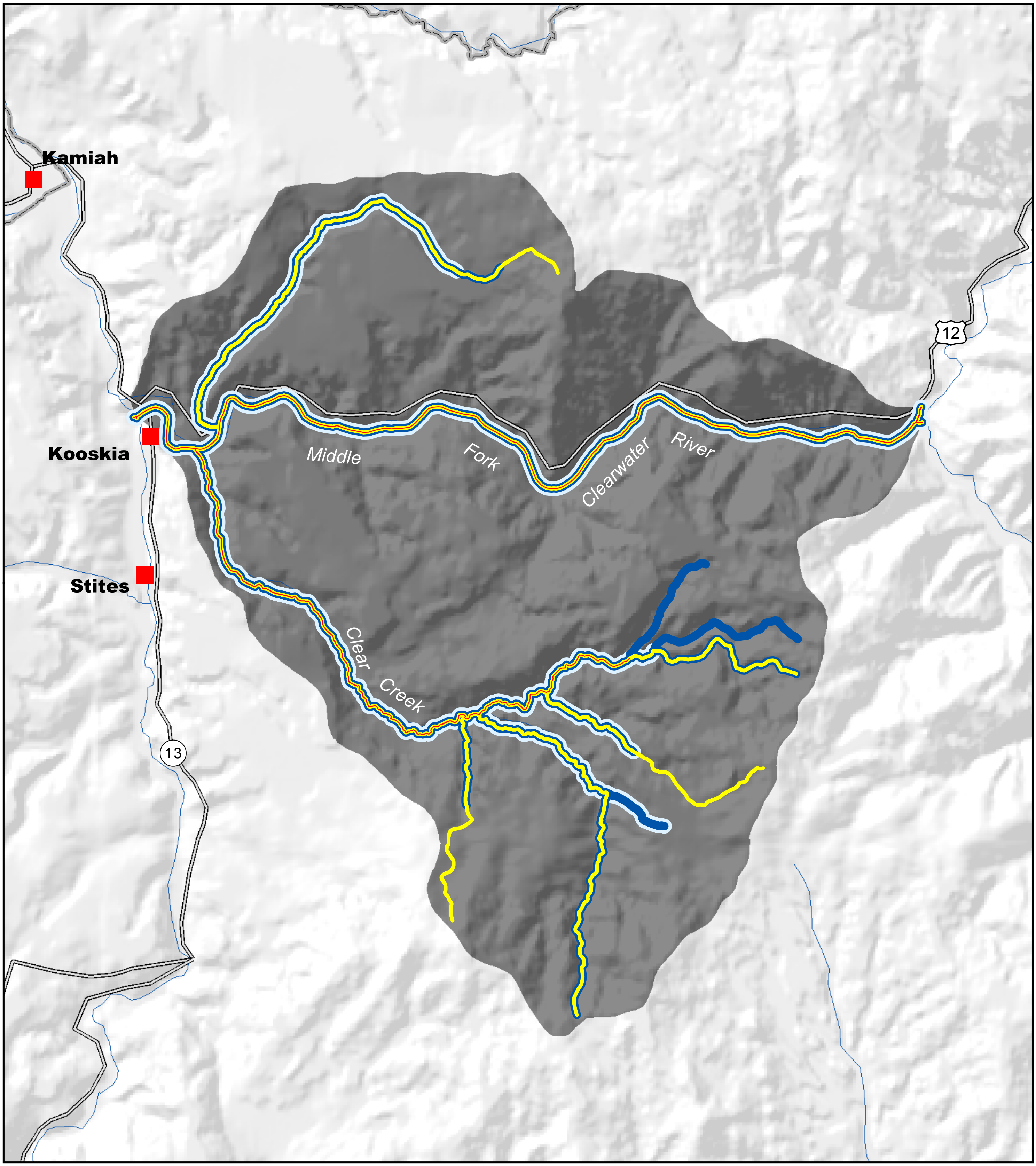
* Line thickness does not represent quantity

FIGURE 3.5-2
Selected Fish Species Distribution Upper Salmon Subbasin

0 2 4 8 Miles

Source: USBR, IDFG, EDAW Inc, 2002.
P:\1e41001 Lemhi\GIS\mxd\Figure3.5-2.mxd

Back of Figure 3.5-2. Selected Fish Species Distribution Upper Salmon Subbasin



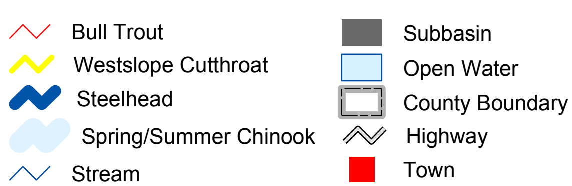
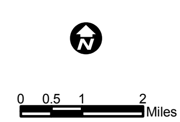


FIGURE 3.5-3

Selected Fish Species Distribution Middle Fork Clearwater Subbasin



Source: USBR, IDFG, EDAW Inc, 2002.
P:\1e41001 Lemhi\GIS\mxd\Figure3.5-3.mxd

Back of Figure 3.5-3. Selected Fish Species Distribution Middle Fork Clearwater Subbasin

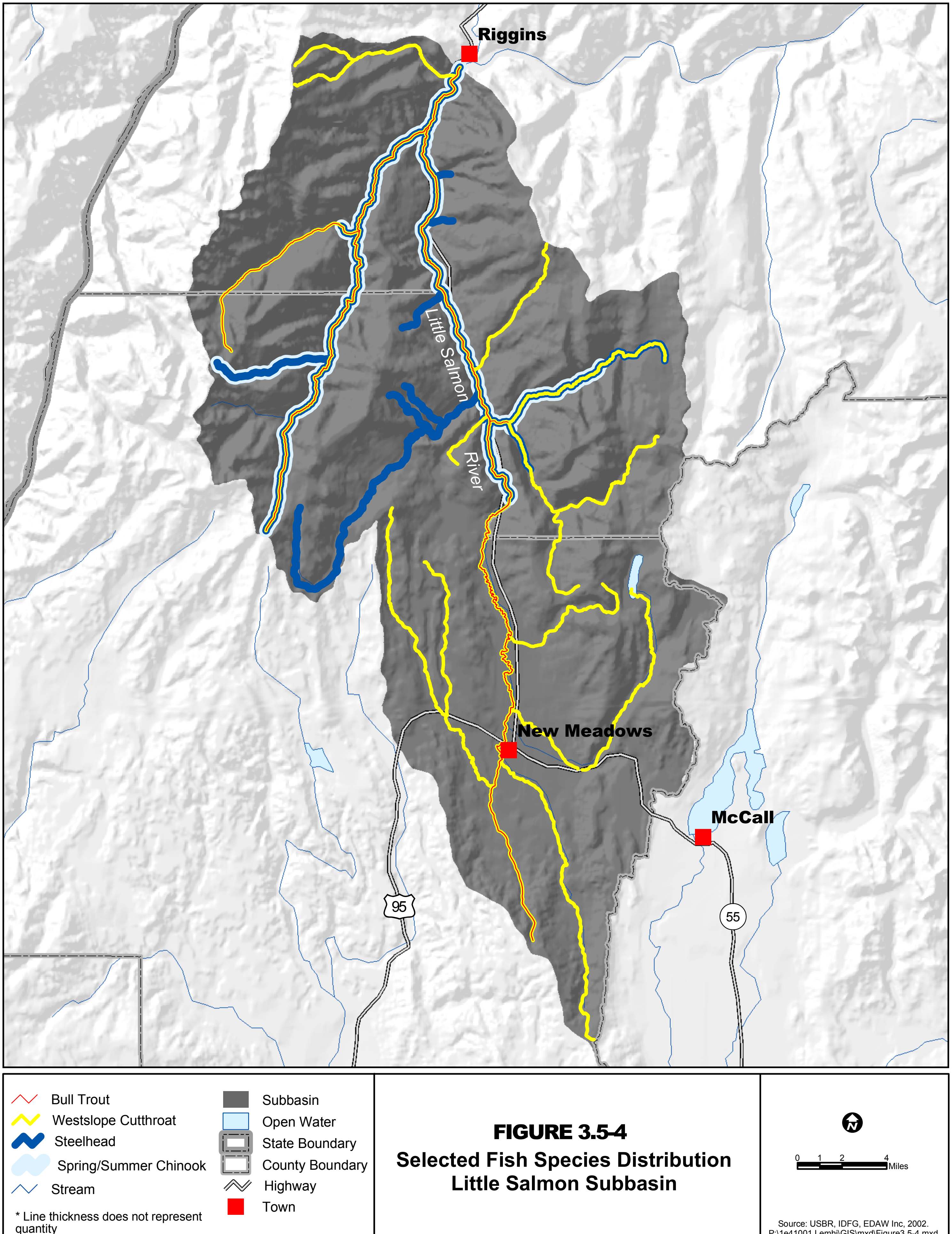


FIGURE 3.5-4

Selected Fish Species Distribution
Little Salmon Subbasin

Source: USBR, IDFG, EDAW Inc, 2002.
P:\1e41001 Lemhi\GIS\mxd\Figure3.5-4.mxd

Back of Figure 3.5-4. Selected Fish Species Distribution Little Salmon Subbasin the potential to negatively impact other selected species; (3) adequate data are available to aid future decision-making; (4) historical dominance in the watershed; (5) social value; or (6) a general association with higher quality habitats. Species meeting one or more of these criteria that are addressed include coho salmon (*O. kisutch*), spring/summer chinook salmon in the Middle Fork Clearwater Subbasin, westslope cutthroat trout (*O. clarki lewisi*), brook trout (*Salvelinus fontinalis*), redband trout (*O. mykiss*), pacific lamprey (*Lampetra tridentata*), non-native rainbow trout (*O. mykiss*), and mountain whitefish (*Prosopium williamsoni*).

Only subbasins in which a particular species are found are discussed within each species section below.

3.5.1.1 Coho Salmon

Coho salmon in the Middle Fork Clearwater Subbasin are hatchery-derived fish and, as such, have no special status. Coho salmon historically migrated to and spawned in the subbasin. Poor fish passage facilities at Lewiston Dam, constructed in 1927, are generally accepted as the factor resulting in extirpation of this species from the subbasin (Nez Perce Tribe and IDFG 1990). Coho salmon were officially declared extinct throughout the Snake River Basin in 1986. Reintroduction efforts were conducted by IDFG between 1962 and 1968 but were abandoned because of lack of success. The Nez Perce Tribe began reintroduction efforts in 1995. Reintroduced coho salmon have spawned in Lolo Creek of this subbasin.

3.5.1.2 Spring/Summer Chinook Salmon

The Middle Fork Clearwater Subbasin is not part of the Snake River spring/summer chinook ESU. This is because spring/summer chinook salmon were extirpated and then reintroduced into this subbasin. However, this species does represent an important effort to restore an indigenous species to its former range and habitat. Spring/summer chinook are distributed relatively continuously through the subbasin (NPPC 2002) (Figure 3.5-3). Populations are classified as present-depressed. Spring/summer chinook enter the Middle Fork Clearwater Subbasin in April through July (Nez Perce Tribe and IDFG 1990). Spawning occurs in August and September, with emergence completed by April (Table 3.5-2). Juveniles migrate to the ocean in their second year, usually from March through June (USFWS 1999).

Major factors limiting use for this species include steep stream gradients, high water temperature, sedimentation, poor instream cover, and dewatering.

3.5.1.3 Westslope Cutthroat Trout

This species is listed as a State of Idaho and Federal species of concern and has been proposed for Federal ESA listing in some areas of its range. It is listed as a sensitive species by the BLM and the U.S. Forest Service (USFS).

Westslope cutthroat spawn in April and May, with emergence in June and July (Table 3.5-2). Migration occurs seasonally to locate spawning or wintering habitat (Bjornn and Mallett 1964). Overwintering survival is highly dependant on deep pools or crevices and interstitial spaces in substrate in streams without deep pools (Paradis et al. 1999a).

Table 3.5-2. Timing of Key Life History Stages of Anadromous and Selected Resident Fish Species in Project Area Drainages.[1]

	Month											
Species	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**
Anadromous Fish												
Spring/Summer Chinook Salmon												
Life stage: Juvenile	X	X	X	X	X	X	X	X	X	X	X	X
Adult			X	X	X	X	X	X	X	X		
Spawning								X	X	X		
Fall Chinook Salmon												
Life stage: Juvenile [2]				X	X	X	X	X				
Adult								X	X	X	X	X
Spawning										X	X	X
Steelhead												
Life stage: Juvenile	X	X	X	X	X	X	X	X	X	X	X	X
Adult	X	X	X	X	X				X	X	X	X
Spawning		X	X	X	X							
Coho Salmon												
Life stage: Juvenile	X	X	X	X	X	X	X	X	X	X	X	X
Adult									X	X		
Spawning										X		
Sockeye Salmon												
Life stage: Juvenile	X	X	X	X	X	X	X	X	X	X	X	X
Adult							X	X	X	X	X	
Spawning										X		
Pacific Lamprey												
Life stage: Juvenile	X	X	X	X	X	X	X	X	X	X	X	X
Adult	X	X	X	X	X	X	X	X	X	X	X	X
Spawning			X	X								
Resident Fish												
Bull Trout												
Life stage: Juvenile	X	X	X	X	X	X	X	X	X	X	X	X
Adult	X	X	X	X	X	X	X	X	X	X	X	X
Spawning									X	X		
Westslope Cutthroat Trout												
Life stage: Juvenile	X	X	X	X	X	X	X	X	X	X	X	X
Adult	X	X	X	X	X	X	X	X	X	X	X	X
Spawning				X	X							
Redband and Rainbow Trout												
Life stage: Juvenile	X	X	X	X	X	X	X	X	X	X	X	X
Adult	X	X	X	X	X	X	X	X	X	X	X	X
Spawning		X	X	X	X	X						
Mountain Whitefish												
Life stage: Juvenile	X	X	X	X	X	X	X	X	X	X	X	X
Adult	X	X	X	X	X	X	X	X	X	X	X	X
Spawning										X	X	X

[1] Includes Federal ESA listed species.
[2] Cold water temperatures may result in some juveniles rearing an extra year in the river before migration to the ocean.

Source: NPPC 2002

Other species introductions, angling mortality, and habitat disruption have been identified as the main contributors to this species' decline (USFS 1997). Hybridization with Yellowstone cutthroat trout is the largest threat, although no Yellowstone cutthroat have been stocked since the late 1970s.

Westslope cutthroat trout are distributed throughout the Lemhi, Upper Salmon, and Little Salmon subbasins, although populations are restricted compared to historical conditions (Rieman and Apperson 1989) (Figures 3.5-1 – 3.5-4). Some populations have been isolated because of habitat fragmentation due to barriers.

Populations in the Middle Fork Clearwater Subbasin may prove important to recovery efforts (NPPC 2002). Historically, westslope cutthroat were likely abundant in the headwaters of the Middle Fork, but populations are now defined as present-depressed (Clearwater National Forest 1997). They are found in all major drainage systems (Figure 3.5-3).

3.5.1.4 Brook Trout

Brook trout are an eastern North America species. Brook trout hybridize with bull trout and displace westslope cutthroat trout, particularly in low-gradient streams. Spawning occurs in late September and October with emergence during April and May. Redds are constructed in gravel but may be constructed in sand or silt if groundwater upwelling occurs (Meehan and Bjornn 1991).

Brook trout are present throughout the Lemhi, Upper Salmon, and Little Salmon Subbasins. They were first introduced in 1913 and have spread throughout the Salmon River system. They are no longer being stocked by IDFG to avoid interaction with bull trout.

In the Middle Fork Clearwater Subbasin, brook trout have been stocked since the 1930s, although none have been stocked since 1984 (Nez Perce National Forest 1998).

3.5.1.5 Redband Trout

Redband trout are an Idaho species of concern and a BLM and USFS sensitive species. Redband trout are thought to be resident steelhead trout where they coexist with anadromous steelhead (Behnke 1992). Their distribution is not well understood in these areas because of the difficulty of differentiating juvenile steelhead from redband trout.

Redband trout spawn in February through June when water temperatures exceed 35 to 39^{o}F (Table 3.5-2) (Stolz and Schnell 1991). Fry take several years to mature. Hybridization with non-native rainbow trout poses the greatest threat to this species.

Redband trout are distributed throughout the Lemhi, Upper Salmon, Middle Fork Clearwater, and Little Salmon Subbasins. However, few data are available to describe their status.

3.5.1.6 Pacific Lamprey

This species is listed as endangered by the State of Idaho. Pacific lamprey were present in all subbasin drainages historically, but the current population is considered extremely depressed (CBFWA 1999).

Adult lamprey migrate into fresh water from May through September, spawning the following March or April (Table 3.5-2). Hatching occurs 2 to 3 weeks following fertilization, after which the ammocoetes burrow into mud. The ammocoetes transform into adults 5 or more years later, at which time they migrate to the ocean (Simpson and Wallace 1982).

Lamprey are vulnerable to water quality degradation, which limits diatom production, and to sedimentation from land management (Paradis et al. 1999b). Additional threats include low flows and poor riparian conditions, with resultant high water temperatures (Close 2000).

The population status for the Lemhi and Little Salmon Subbasins are unknown. Very small numbers are thought to reside in the Upper Salmon Subbasin (NPPC 2001).

For the Middle Fork Clearwater Subbasin, individuals are limited to larger, accessible tributaries (BLM 2000).

3.5.1.7 Non-Native Rainbow Trout

Stocking of non-native rainbow trout began in the 1910s, particularly in streams along roads. Extensive stocking of alpine lakes has also occurred. Current IDFG policy is to stock only sterile rainbow trout (IDFG 2001). Life history for this species is similar to that described for redband trout in Section 3.5.1.5. This species can cross-breed with native salmonids and reduce the native fish's genetic integrity. This species is found throughout all four subbasins.

3.5.1.8 Mountain Whitefish

Mountain whitefish have no special Federal or State status. They are regulated primarily through State law as a game fish.

Little is known about mountain whitefish life history specific to the subbasins. In general, mountain whitefish migrate within stream systems over the course of a year. They migrate from smaller streams in the summer where they are feeding to larger streams during fall, where they spawn from October through early December. They then migrate to deep water pools to overwinter (Davies and Thompson 1976). Emergence occurs in March and April. Younger juveniles inhabit shallow, slow moving water, side channels, and pools, and larger juveniles and adults prefer bottom habitat in mainstem pools and runs.

Threats to mountain whitefish include increasing water temperature and sediment loads that fill spawning gravel. It prefers cold mountain streams and rivers.

This species is well-distributed throughout the northern two-thirds of the Lemhi Subbasin. This species is well distributed throughout the Middle Fork Clearwater Subbasin. This species is well distributed throughout the northern half of the Little Salmon Subbasin and the central and northern parts of the Upper Salmon Subbasin.

3.5.2 Environmental Consequences

3.5.2.1 No Action Alternative

Under the No Action Alternative, Reclamation would continue to provide technical assistance in the Lemhi and Upper Salmon Subbasins at the same level of involvement that occurred before the FCRPS BiOp was issued. Reclamation would not provide technical assistance in either the Little Salmon or Middle Fork Clearwater Subbasins, and Reclamation would not directly fund or implement any of the habitat improvement projects in the Middle Fork Clearwater, Little Salmon, Upper Salmon, or Lemhi Subbasins that are described below for the Proposed Action. Instream habitat and riparian conditions and the status of anadromous and resident fish species present in these subbasins would generally be similar to existing conditions, and current trends would likely continue. Habitat improvements and anticipated benefits to fish would occur but at a slower pace than described below for the Proposed Action.

No EFH would be adversely affected from implementation of the No Action Alternative. There would be long-term benefits to EFH from the No Action Alternative but these would accumulate at a slower pace than as described under the Proposed Action.

Cumulative Impacts

Continued problems with barriers, screens, and streamflow in the subbasins and the slower implementation of restoration efforts in the Lemhi and Upper Salmon Subbasins in the No Action Alternative would result in cumulative adverse impacts to resident and anadromous fish in the subbasins. Anadromous salmonids would continue to encounter multiple barriers to downstream and upstream migration, low streamflows and the ensuing problems of water quality, and juveniles would encounter unscreened diversions or inadequate fish screens. Because of the high number of diversions in the Lemhi and Upper Salmon Subbasins cumulative adverse effects would likely disproportionately affect fish stocks in these drainages.

3.5.2.2 Proposed Action

Anadromous and resident fish species and their habitat in the Lemhi, Upper Salmon, Middle Fork Clearwater, and Little Salmon Subbasins would benefit from Reclamation's fish habitat improvement program under the Proposed Action. Program objectives cover three categories of actions that would be implemented to eliminate instream fish passage barriers, correct fish screen deficiencies associated with irrigation practices on private lands, and augment and improve streamflows. The effects of each category of action on fisheries resources are described in the following text. Because the specific types, individual locations, and number of willing participants in the habitat improvement projects within the four subbasins are not known at this time, lack of specific information requires the discussion to be programmatic in nature. Expected benefits to subbasins and fish species are noted where possible.

Fish Passage Barriers

Activities related to fish passage barriers may include the consolidation of irrigation diversions to reduce the number of instream barriers to fish, removal of false attraction from return flow, removal of individual gravel push-up dams, and replacement of these temporary structures with permanent diversions that allow upstream and downstream fish passage. These actions would benefit local movements of resident species and the longer migrations of anadromous species by reopening migratory corridors and allowing access to portions of currently inaccessible but suitable mainstem and tributary habitat. Historic spawning and rearing habitat would once again be accessible and should increase production by resident and anadromous species within the different subbasins. Other direct and indirect passage-related impacts on fish, such as stress, injury, and delayed (or blocked) migrations by juveniles and adults at diversion dams, would be eliminated under the Proposed Action. In addition, the one-time construction of permanent diversions with fish passage facilities would avoid the potential for adversely affecting aquatic habitat and resources during the instream reconstruction of temporary facilities each year. The overall effect of removing fish passage barriers would benefit resident and anadromous species alike. Non-listed species would be affected under the umbrella of safeguards for listed species. Construction windows vary; Reclamation will schedule in-stream construction activities in consultation with fish biologists from IDFG, NMFS, USFS to avoid adversely affecting resident and anadromous fish.

The same set of BMPs would be followed as during the construction of channel enhancements and construction of diversion dams and fish passage facilities. Because of these very precautionary practices and procedures, no long-term, substantive adverse effects on anadromous or resident fish species or their habitat would be expected. If adverse effects did occur, they would be expected to be temporary, localized, and minor in nature and not result in adverse impacts on aquatic habitat or species. Similarly, if any fish were displaced by noise or human activities during construction, the effect would be temporary and localized and would not result in substantive adverse impacts.

Fish migration barriers and habitat fragmentation problems were described for the Middle Fork Clearwater, Lemhi, Upper Salmon, and Little Salmon Subbasins in discussions of existing conditions. The reduction or elimination of fish passage barriers in all four of the subbasins would result in several of the same kinds of fisheries benefits as streamflow improvement. These benefits include greatly improved fish passage and habitat connectivity, but would also include the occupation and use of previously inaccessible stream reaches for spawning and rearing, as well as year-round habitat. Benefits would accrue to the same fish species and in the same subbasins as described for flow improvements. The magnitude of benefits would ultimately depend on the number and location of diversion dam projects that are implemented under the Proposed Action, and the quantity and quality of previously inaccessible stream habitat that would then become available. Habitat suitability in these new stream reaches would vary by fish species according to factors such as stream depth and width, water velocity, instream and overhead cover, substrate composition, and a variety of other factors. Smaller resident species with cold water preferences (such as westslope cutthroat trout) may benefit most from access to headwater tributaries, while species such as redband trout that are more tolerant of warmer water temperatures may benefit from increased access to lower elevation drainages. Larger species such as reintroduced populations of spring/summer chinook salmon and coho salmon may benefit more from access to upstream reaches of mainstem drainages.

Headgate Improvements

Improvements to headgates that would increase water withdrawal efficiency and other improvements such as consolidation of headgates would improve fish habitat by increasing flows and removing nuisance attractants. Habitat improvement would include a widened stream perimeter, improved water depth, and associated improvements to water quality. Because headgate improvement construction would be limited to the margin of the stream there is a small risk of decreased water quality and disturbance to fish habitat during the construction phase. Implementation of the BMPs (Appendix B) would significantly reduce the potential for adversely affecting fish habitat or water quality.

Fish Screens

Activities related to fish screens may include screening unscreened irrigation diversions or replacing obsolete screens with screens that meet NMFS criteria. This action would reduce mortalities of primarily juvenile and smaller fish species that are entrained through or impinged on improperly operating fish screens, as well as mortalities of juveniles and adults that are lost to irrigation ditches and canals at unscreened diversions. Benefits would include increased survival of resident and anadromous fish species, especially of smaller juveniles that have recently emerged from spawning gravels near diversions during the irrigation season and are not strong enough to escape intake flow velocities. Some increased production of resident and anadromous species would be expected in those drainages where mortalities of these species from unscreened or improperly screened diversions have been high. This effect would benefit all fish species occurring in these subbasins.

No long-term, substantive adverse effects on anadromous or resident fish species or their habitat would be expected from screening irrigation diversions. The same BMPs and construction window as previously described (see Water Quality Section 3.3 and Appendix B) would be used to prevent or minimize the occurrence of adverse effects during construction. Any adverse effects (such as increased water turbidity) would be temporary, localized, and minor in nature and would not result in adverse impacts on aquatic habitat or species.

Benefits from properly functioning fish screens would accrue to the same fish species and in the same Subbasins as described for fish passage barriers and flow improvements. Benefits may be greatest in the Lemhi Subbasin where many irrigation diversions on lower reaches of tributaries are not screened to protect migrating fish. The magnitude of benefits would ultimately depend on the number and location of fish screen projects that are implemented under the Proposed Action and the current losses various species are experiencing at unscreened or improperly screened diversions. Benefits from reduced entrainment and/or impingement mortalities should be greatest in those areas with numerous irrigation diversions that also provide important spawning and rearing habitat for anadromous and/or resident fish species.

Streamflow Improvement

Streamflow augmentation and improvement associated with water acquisition, water leasing, and/or channel enhancements would benefit all life stages of resident and anadromous fish species. This would be especially important during late summer and early fall, often a critical time for aquatic species because streamflows are naturally low and the demand for crop irrigation can be high. Expected benefits of streamflow improvement include increases in the amount, quality, suitability, and diversity of instream habitat. Examples include a widened stream perimeter and increased streambed area, increased water depths, a greater range of water velocities required by various life stages of fish, and an increased diversity of habitat types (such as riffles, runs, pools, and pocket water) used by different life stages of fish. The resulting increased wetted perimeter of the streambed and the increased flow and velocity would provide a greater amount of available habitat and a higher quality of habitat for fish. These habitat improvements would contribute to increased spawning and rearing success, provide higher quality holding and over-wintering habitat, and eliminate migratory barriers to anadromous and resident species caused by shallow water depths during summer and fall. They would also help eliminate the potential for fish stranding and mortalities in reduced-flow and dewatered stream reaches. Improved corridor connectivity would benefit both upstream and downstream migrations by resident species in their local movements and by anadromous spawning adults and juvenile outmigrants in their long-distance migrations.

Increased streamflows also would flush and perhaps reduce the amount of sediment that can accumulate among stream substrate interstices. Reduction of streambed sediment would improve spawning and early rearing success of all salmonid species. In addition, improved streamflows may improve water quality by reducing the percentage of streamflows contributed by irrigation return flows, which can contribute to increased nutrient levels, elevated water temperatures, and, on occasion, nuisance algal growths in the receiving stream. Reduced stream water temperatures during summer would be especially beneficial to salmonids, such as resident westslope cutthroat trout and reintroduced populations of anadromous spring/summer chinook salmon and coho salmon, which prefer cold water. The abundance and diversity of aquatic insects, which are important food items for salmonids, also would be expected to increase as a result of streamflow improvement and increased instream habitat quantity and quality.

Improvements to streamflow that result from construction projects, such as headgate automation, headgate consolidation, or barrier removal would have the potential for adverse effects as previously described under the removal of barriers. Construction practices would be controlled by the BMPs, which specify limits for clearing, timing of construction, rehabilitation of the site, and limits of in-water construction. Implementation of the BMPs would minimize the potential for disturbance to fish habitat.

Increased streamflows and decreased seasonal fluctuation in flow volume and streambed shoreline, especially during warmer months of the year, would benefit riparian zone vigor and function. Improved riparian conditions would, in turn, directly and indirectly benefit fish through increased canopy cover, increased input of insects to the stream from overhanging cover, improved bank stability/structure and hiding cover for fish, increased recruitment of woody debris that provides instream cover for fish, and reduced sediment delivery to streams because of the filtering effect of riparian vegetation. Riparian cover can also moderate the effects of extreme air temperatures by shading and cooling streams during summer and insulating streams during winter. Overall, streamflow improvement would be expected to improve fish access, enhance habitat, and increase fish production in mainstem drainages and tributaries of the four subbasins. These benefits would extend to all of the anadromous and resident species that use these subbasins.

No adverse effects on juvenile or adult anadromous or resident fish species or their habitat would be expected to result from streamflow improvement.

Various threats or limiting factors currently faced by anadromous and resident species in the four subbasins, as described under existing conditions discussions, would be reduced or diminished in severity as a result of streamflow improvement. Expected improvements of current problems would include lower water temperatures, increased base flows, reduced flow fluctuations, reduced sedimentation, increased instream cover, improved habitat connectivity and fish passage, and possibly improved riparian conditions. Flow improvements in portions of the Lemhi, Upper Salmon, Middle Fork Clearwater, and Little Salmon Subbasins where these problems are most severe would result in the greatest benefits to resident and anadromous species. Based on their present distributions, recreationally important and/or sensitive (but not Federally listed) fish species that would benefit from one or more of these habitat improvements include westslope cutthroat trout, redband trout, rainbow trout, brook trout, and mountain whitefish in all four of the subbasins; reintroduced populations of spring/summer chinook salmon and coho salmon in the Middle Fork Clearwater Subbasin; possibly Pacific lamprey in the Middle Fork Clearwater and Upper Salmon Subbasins; and possibly sandroller in the Middle Fork Clearwater Subbasin. Other fish and aquatic resources without special protected or recreational status but which are an important part of the aquatic ecosystem in these subbasins would also benefit from flow improvements. The magnitude of benefits in each of the four subbasins and to each of these fish species would ultimately depend on the number and location of flow improvement projects that are implemented under the Proposed Action.

Essential Fish Habitat

The implementation of the Proposed Action for improving fish passage barriers and streamflow would benefit EFH in the four subbasins. As described above under each component, there would be short-term construction related disturbances to EFH from barrier removal and replacement, headgate improvements and consolidation. The BMPs listed in Appendix B were developed in consultation with NMFS and would protect EFH during the construction phase of projects. These BMPs may change following further consultation with NMFS. The Proposed Action would provide long-term benefits for EFH in the subbasins by removing barriers and increasing streamflow. Installation of new fish screens or upgrading existing ones would not affect EFH.

Cumulative Impacts

Improvements in barriers, fish screens, and streamflow in the subbasins would result in beneficial cumulative impacts particularly when considering the additive effect of other efforts within the subbasins. Improvements in these factors would likely improve recruitment in fish stocks in the subbasins.

3.5.3 Mitigation

During construction, contractors would be required to adhere to approved construction BMPs, NMFS screen criteria, and work windows to complete any improvements. These requirements are part of the Proposed Action and would establish conditions to protect endangered species and limit or prevent disturbance to the streams; thus, no mitigation is proposed.

3.6 Wildlife

3.6.1 Existing Conditions

The Lemhi, Upper Salmon, Middle Fork Clearwater, and Little Salmon Subbasins provide an array of habitats that support a wide variety of wildlife species.

A number of amphibians and reptiles use the Mountain Snake Province subbasin habitats. Widespread amphibians include western toad (*Bufo boreas*), Pacific treefrog (*Hyla regilla*), bullfrog (*Rana catesbeiana*), Columbia spotted frog (*Rana luteiventris*), and long-toed salamander (*Ambystoma macrodactylum*). Tailed frogs (*Ascaphus truei*) are found in mountainous streams in the Little Salmon, Middle Fork Clearwater, and Lemhi Subbasins (IDFG 2002). Idaho giant salamander (*Dicamptodon aterrimus*) is found in cold stream and pond habitats in the Little Salmon and Middle Fork Clearwater Subbasins (IDFG 2002).

Widespread reptiles include rubber boa (*Charina bottae*), racer (*Coluber constrictor*), gopher snake (*Pituophis catenifer*), common garter snake (*Thamnophis sirtalis*), western terrestrial garter snake (*Thamnophis elegans*), and western rattlesnake (*Crotalus viridis*). The painted turtle (*Chrysemys picta*), the only native turtle in Idaho, is thought to exist in the lower Lemhi Subbasin (IDFG 2002). This turtle species is found in ponds and slow-moving streams (Storm et al. 1995). The short-horned lizard (*Phrynosoma douglassii*) is known in the open forests and sagebrush habitats of the Lemhi and Upper Salmon Subbasins (IDFG 2002). The sagebrush lizard (*Sceloporus graciosus*) is found in the dry shrublands of Lemhi Subbasin (IDFG 2002). The western fence lizard (*Sceloporus occidentalis*) and western skink (*Eumeces skiltonianus*) are found in the rock talus and open forest habitats of the Little Salmon Subbasin (IDFG 2002). Night snake (*Hypsiglena torquata*) is thought to exist in the rocky lowlands in the Little Salmon Subbasin (IDFG 2002).

More than 70 bird species have been documented in the subbasins (NPPC 20001a) (Table 3.6-1). Federally protected species are discussed in Section 3.7. Sensitive and rare species that are not Federally listed include northern goshawk (*Accipter gentiles*), boreal owl (*Aegolius funereus*), upland sandpiper (*Bartramia longicauda*), peregrine falcon (*Falco peregrinus*), northern pygmy-owl (*Glaucidium gnoma*), loggerhead shrike (*Lanius ludovicianus*), long-billed curlew (*Numerius americanus*), mountain quail (*Oreortyx pictus*), sage grouse (*Centrocercus urophasianus*), flammulated owl (*Otus flammeolus*), white-headed woodpecker (*Picoides albolarvatus*), black-backed woodpecker (*Picoides arcticus*), three-toed woodpecker (*Picoides tridactylus*), pygmy nuthatch (*Sitta pygmaea*), and great gray owl (*Strix nebulosa*).

Mammal species are widespread in the subbasins and include many game species. Elk (*Cervus canadensis*) and deer are found in all subbasins. Other game species known throughout the subbasins include: mule deer (*Odocoileus hemionus*), whitetail deer (*Odocoileus virginianus*), pronghorn antelope (*Antilocapra americana*), bighorn sheep (*Ovis canadensis*), mountain goat (*Oreamnos americanus*), moose (*Alces alces*), coyote (*Canis latrans*), black bear (*Ursus americanus*), and mountain lion (*Felis concolor*). Whitetail deer are particularly abundant in the Little Salmon Subbasin (NPPC 2001). Bighorn sheep are believed to have high reproductive rates in south Lemhi Subbasin, despite the statewide decrease (NPPC 2001).

Nongame mammals potentially occurring or known to occur within the subbasins include gray wolf (*Canis lupis*), lynx (*Lynx canadensis*), fisher (*Martes pennanti*), marten (*Martes americana*), wolverine (*Gulo gulo*), and nearly 50 species of small mammals (NPPC 2001, 2002). The fisher, wolverine, and many bat species are State or Federal sensitive and rare species that are suspected to occur in the subbasins.

Fishers are believed to be more common in the Clearwater Subbasin compared to the more southern subbasins (NPPC 2001). The wolverine range overlaps with all of the subbasins and is associated with mountainous areas away from humans (Ruggiero et al. 1994). A number of bat species inhabit the subbasins, including western small-footed myotis (*Myotis ciliolabrum*), long-eared myotis (*M. evotis*), fringed myotis (*M. thysanodes*), long-legged myotis (*M. volans*), Yuma myotis (*M. yumanensis*), spotted bat (*Euderma maculatum*), Townsend's big-eared bat (*Corynorhinus townsendii*), and western pipistrel (*Pipistrellus hesperus*) (NPPC 2001, 2002). Other small mammals, including rodents, weasel, skunks, fox, rabbits, pika, squirrels, marmot, and shrews are widespread (NPPC 2001, 2002, Chapman and Feldhamer 1982).

A number of exotic wildlife species are found in the Mountain Snake Province subbasins. Introduced game species include California quail (*Callipepla californica*), Gambel's quail (*Callipepla gambelii*), ring-necked pheasant (*Phasianus colchicus*), gray partridge (*Perdix perdix*), chukar (*Alectoris chukar*), and wild turkey (*Maleagris gallopavo*) (NPPC 2001). Other exotic wildlife species include bullfrog, European starling (*Sturnus vulgaris*), house sparrow (*Passer domesticus*), and rock dove (*Columba livia*) (NPPC 2001, 2002; IDFG 2002).

Table 3.6-1. Examples of Avian Species Documented in the Mountain Snake Province Subbasins.

Common Name	Scientific Name
Raptors	
Turkey vulture	*Cathartes aura*
Golden eagle	*Aquila chrysaetos*
Bald eagle	*Haliaeetus leucocephalus*
Swainson's hawk	*Buteo swainson*
Prairie falcon	*Falco mexicanus*
Peregrine falcon	*Falco peregrinus*
Northern goshawk	*Accipter gentiles*
Boreal owl	*Aegolius funereus*
Northern pygmy-owl	*Glaucidium gnoma*
Flammulated owl	*Otus flammeolus*
Great gray owl	*Strix nebulosa*
Game Birds	
Mountain quail	*Oreortyx pictus*
Sage grouse	*Centrocercus urophasianus*
Blue grouse	*Dendragapus obscurus*
Spruce grouse	*Falcipennis canadensis*
Gray partridge	*Perdix perdix*
Chukar	*Alectoris chukka*
California quail	*Callipepla californica*
Gambel's quail	*Callipepla gambelii*
Ring-necked pheasant	*Phasianus colchicus*
Other Birds	
Yellow-billed cuckoo	*Coccyzus americanus*
Upland sandpiper	*Bartramia longicauda*
Vaux's swift	*Chaetura vauxi*
Loggerhead shrike	*Lanius ludovicianus*
Long-billed curlew	*Numerius americanus*
White-headed woodpecker	*Picoides albolarvatus*
Black-backed woodpecker	*Picoides arcticus*
Three-toed woodpecker	*Picoides tridactylus*
Pygmy nuthatch	*Sitta pygmaea*
Belted kingfisher	*Ceryle alcyon*
Sage thrasher	*Oreoscoptes montanus*
Gray catbird	*Dumetella carolinensis*
Vesper sparrow	*Pooecetes gramineus*
Grasshopper sparrow	*Ammodramus savannarum*

Source: IDFG 2002; NPPC 2001, NPPC 2001

Migratory Birds

On January 17, 2001 President Bill Clinton signed an Executive Order mandating that all Federal agencies cooperate with the USFWS to increase awareness and protection of the nation's migratory bird resources. Each agency is supposed to have developed a Memorandum of Understanding with USFWS stating how it intends to cooperate. Reclamation has recently finalized an MOU with USFWS, which includes provisions for analyzing Reclamation's effect to migratory birds.

Most birds in North America are considered migratory under the Federal Migratory Bird Act. The general bird species of the subbasins are described in the above narrative and selected species are displayed in Table 3.6-1. Specifics on the vegetation of the subbasins are provided in Section 3.4.

3.6.2 Environmental Consequences

3.6.2.1 No Action Alternative

Restoration efforts would continue in the subbasin through the work of State, Federal, and local entities and with the technical assistance of Reclamation in the Lemhi and Upper Salmon Subbasins. These efforts would cause some minor, short-term disturbance to wildlife from construction activity and the limited removal of riparian vegetation. Noise from the limited use of heavy equipment for larger projects, such as push-up dam removal, would cause some wildlife to avoid the area during construction. Restoration of disturbed sites would minimize the effects of habitat removal. Long-term benefits to wildlife would be provided by the increased health of aquatic systems in the subbasins, the likely increase in fish populations, and the corresponding benefits to fish-eating wildlife.

Migratory Birds

The No Action Alternative would have no effects on migratory birds. The BMPs would limit the amount of vegetation that would occur and provides for seasonal work windows and restoration of disturbed sites with native vegetation. Larger projects, such as the removal of barriers, would require work during low flow periods at the end of summer. These measures were developed to protect fish but also provide protection for nesting migratory birds by restricting larger construction projects until after most migratory birds have fledged their young.

Cumulative Impacts

There would be no adverse cumulative impacts associated with the No Action Alternative. Implementation of projects in the Lemhi and Upper Salmon Subbasins would improve fish habitat and listed anadromous salmonids, and would have corresponding benefits for wildlife, such as osprey *(Pandion haliaetus)*, that feed on fish.

3.6.2.2 Proposed Action

The Proposed Action would increase the pace of restoration work in the subbasins compared to the No Action Alternative. Wildlife species that forage on fish, such as osprey, bald eagle, and many mammal species, would benefit from reduction in fish mortality and the corresponding increase in the fish populations within the four subbasins. Amphibians and, in turn, their predators would also benefit from improvements to fish passage, as most fish barriers can be barriers to aquatic amphibians.

Construction activities would cause limited and short-term disturbances to wildlife sensitive to noise and increased human presence in the project work sites. In addition, construction activities would have localized and short-term impacts on vegetation, which could decrease habitat values for wildlife species that use the project areas. Implementation of headgate consolidation and the removal and replacement of push-up dams have the potential for disturbing the most streamside habitat among the Proposed Action restoration efforts. Still, disturbance on vegetation would be limited to areas directly adjacent to canals, headgates, and push-up dams, and vegetation disturbance would be minimized according to the agreed-upon BMPs (Appendix B). If riparian vegetation removal is necessary to accommodate equipment such as a small backhoe, the clearing would be limited to what is necessary to safely operate the equipment. The BMPs in Appendix B also require Reclamation to restore areas that are disturbed by construction activities. Impacts to rare and sensitive species would be avoided through a site inspection prior to actions, as stipulated by the BMPs. Impacts would be mitigated through site restoration and enhancement after construction is completed. Furthermore, impacts are lessened because project sites are commonly located in areas that have been previously affected from installation of canals, headgates, roads, and adjacent farming activity.

The Lemhi and the Upper Salmon have substantially greater numbers of diversion structures than the Middle Fork Clearwater and Little Salmon Subbasins. Therefore, the number of restoration projects would likely be higher in the Lemhi and Upper Salmon Subbasins. In general there would be a greater magnitude of temporary disturbance to vegetation and wildlife compared to the number of projects in the other subbasins. Impacts to vegetation and wildlife would be minimal because of the implementation of BMPs that specify limits of vegetation clearing and rehabilitation standards for streambanks and vegetation.

Migratory Birds

It may be possible that seepage from existing drainage ditches supports wetland habitat that could be affected by consolidation projects. Such site-specific considerations would be assessed by Reclamation's implementation team, and actions to prevent or mitigate impacts would be developed accordingly. Reclamation would continue to coordinate habitat protection measures with USFWS staff. Thus, there would be no impacts to migratory birds from implementation of the Proposed Action. Provisions in the BMPs as described under the No Action Alternative would provide sufficient protection for migratory birds.

Cumulative Impacts

There would be no adverse cumulative impacts associated with the Proposed Action. There would be similar beneficial effects to migratory birds as described under the No Action Alternative, but the pace of project implementation is expected to be faster under the Action Alternative, with corresponding benefits to fish and the migratory birds that feed upon them.

3.6.3 Mitigation

Impacts of the Proposed Action are addressed by the BMPs which include standards for clearing and rehabilitation of disturbed sites. No additional mitigation measures are necessary.

3.7 Threatened and Endangered Species

3.7.1 Existing Conditions

Pursuant to Section 7 of the Endangered Species Act (ESA), Reclamation has contacted NMFS and the USFWS to request information on listed and candidate endangered and threatened animal and plant species (TES) that may be present within the Mountain Snake Province subbasins. Reclamation's correspondences from NMFS and USFWS are provided in Appendix E. USFWS provided a list of threatened and endangered species in the four subbasins in March of 2002 but updated this information by letter on September 20, 2002.

Reclamation is required to determine whether its proposed Federal action may affect listed and/or proposed species or their critical habitat pursuant to Section 7 (a)(1) and 7 (a)(2) of the ESA.

Prior to implementation of specific projects, consultation will occur with both USFWS and NMFS. Conferencing regarding proposed critical habitat will be integrated into the consultation process. Reclamation is currently working with USFWS and NMFS to develop a Biological Assessment for general types of projects for which programmatic consultation can be done. For the types of projects included in the programmatic consultation, additional consultation would not be needed. For other types of projects, additional consultation would occur as necessary. Refer to Section 4.1.1 for additional discussion on consultation.

3.7.1.1 Aquatic Resources

Federal ESA listed species addressed in this section include the Snake River spring/summer chinook salmon (*Oncorhynchus tshawytscha*) evolutionarily significant unit (ESU), except in the Middle Fork Clearwater Subbasin; Snake River fall chinook salmon ESU; Snake River sockeye salmon (*O. nerka*) ESU; Snake River steelhead (*O. mykiss*) ESU; and Columbia River Basin bull trout (*Salvelinus confluentus*) distinct population segment (DPS). Snake River spring/summer chinook salmon ESU are not addressed in the Middle Fork Clearwater Subbasin because this species is considered extirpated in the Clearwater River Basin; those chinook salmon that are present are hatchery-derived fish with no special status and are not part of the ESU encompassing other Snake River spring/summer chinook salmon stocks.

Only subbasins in which a particular species is found are discussed within each species section below. If a species is not found within a particular subbasin, that subbasin is not included in the discussion.

<u>Snake River Fall Chinook Salmon</u>

Snake River fall chinook salmon are listed as threatened under the Federal ESA within the designated ESU.

Middle Fork Clearwater Subbasin

Although the Snake River ESU fall chinook salmon are found within the larger Clearwater River Basin, they do not venture into the Middle Fork Clearwater Subbasin. The Middle Fork Clearwater Subbasin is included in the ESU designation as critical habitat for this species, however. The Snake River fall chinook salmon in the Clearwater River Basin include natural re-colonized and re-introduced populations. All indigenous fall chinook salmon stocks were eliminated by the Lewiston Dam (Schoen et al. 1999). Re-introduction efforts began in 1960 but were terminated in 1968 because of insignificant returns (Hoss 1970). However, redds have increased since 1988 through re-colonization and introduction of hatchery fish (USFWS 1999). Fall chinook are not known to inhabit or spawn in the Middle Fork Clearwater River subbasin (NPPC 2002). Table 3.5-2 in Section 3.5 shows key life history stages for this species.

<u>Steelhead</u>

Snake River summer-run steelhead are Federally listed as threatened under the ESA within the NMFS designated ESU.

Lemhi Subbasin

Specific data on spawning populations of steelhead within this subbasin are very limited. Steelhead in the Lemhi Subbasin are classified as A-run steelhead (early migrators and spawners) (Figure 3.5-1). These fish arise from stocks that were introduced by IDFG but are now considered natural populations.

The lower 27 miles of the mainstem Lemhi River from the mouth to Agency Creek serves mainly as a migration corridor. The 11-mile reach between Agency and Hayden Creeks provides rearing and limited spawning habitat. Tributary streams also provide spawning habitat.

Irrigation, grazing, and road construction have affected habitat conditions throughout the Lemhi Subbasin (NPPC 2001). Limiting factors on the mainstem river can be grouped based on three distinct river segments, each having its own limiting factors. The lower 27-mile mainstem reach is degraded because of the lack of riparian vegetation and lack of pools for rearing and adult holding. The next segment, an 11-mile reach between Agency and Hayden Creeks, provides habitat, but riparian degradation has led to elevated water temperatures and unstable banks. The third mainstem segment, 28 miles from Hayden Creek to Leadore, has fluctuating summer temperatures, unstabilized banks, and few high quality pools. Salmonid habitat threats in the tributary streams include bank erosion leading to sedimentation, elevated temperatures, and degraded riparian habitat. Irrigation withdrawals have resulted in dewatered lower reaches in most tributaries. Water does not flow into the Lemhi River from many of the tributaries except during spring runoff, substantially reducing downstream migrations of fish and creating migration barriers. Many irrigation diversions on lower reaches of tributaries are not screened to protect migrating fish.

Upper Salmon Subbasin

Specific data on spawning populations of steelhead within this subbasin are very limited. Steelhead in the Upper Salmon River are classified as A-run steelhead (Figure 3.5-2). These fish arise from stocks that were introduced by IDFG, but are now considered natural populations.

Limiting factors in this subbasin differ among the three major watersheds present in the Upper Salmon Subbasin (NPPC 2001). Although adequate flows are present in the mainstem East Fork of the Salmon River for fish migration, spawning, and rearing, channelization has degraded riparian areas and reduced habitat complexity and channel stability. In the Yankee Fork Salmon River, mining has altered the previously high quality spawning habitat. Mining has disconnected some tributaries from the mainstem. Upslope disturbance contributes sediment to the channel, which degrades spawning habitat and embryo survival. Riparian degradation, bank instability, high summer temperatures, and migration barriers caused by water diversions on tributaries have degraded habitat in the Salmon River headwaters upstream of the Yankee Fork (NPPC 2001).

Middle Fork Clearwater Subbasin

Over 55 percent of all Columbia River steelhead historically came from the Snake River Basin, of which the Clearwater River Basin provided a significant contribution. "A-run" steelhead are currently widely distributed throughout the Middle Fork in at least a portion of all accessible watersheds (Figure 3.5-3). A-run steelhead typically spend 1 year in the ocean before returning to spawn (Table 3.5-2) (Kiefer et al. 1992). There are clusters of 6th order Hydrologic Unit Codes (HUCs) in Orofino and Jim Ford Creeks not being used by steelhead. Wild A-run steelhead occur in the lower mainstem tributaries up to Maggie Creek in the Middle Fork. Populations are considered "present-depressed" (NPPC 2002).

Steelhead enter the Columbia River between May and September and reach the Clearwater River by September through November. Spawning occurs from February through early May, with emergence from mid-April through May (Nez Perce Tribe and IDFG 1990). Most juveniles remain in the river for 2 years, with out-migration from March through May.

High soil erosion rates, high bedload movement rates, altered stream channel morphology and riparian areas, variable streamflow with severely limited late summer flows, and high summer temperatures in lower tributary reaches are the major habitat problems for A-run steelhead (Kucera and Johnson 1986; Nez Perce Tribe and IDFG 1990).

Little Salmon Subbasin

Specific data on spawning populations of steelhead within this subbasin are very limited. Steelhead in the Little Salmon River are A-run wild steelhead. Boulder Creek and Rapid River provide the most significant steelhead spawning and rearing habitat for this subbasin (NPPC 2001) (Figure 3.5-4).

Timing of migration and spawning is slightly different than in the Middle Fork Clearwater Subbasin (NPPC 2001). Steelhead enter the Little Salmon in June or July and spawn from mid-March through mid-May. Juvenile out-migration is typically 2 years later in April and May.

Just downstream of Round Valley Creek waterfalls form a barrier to anadromous fish migration. The reach above the falls is heavily grazed, and altered stream temperatures and channel simplification limit spawning and rearing. Tributaries to this upper reach are in poor condition. High temperatures in the lower reach of the mainstem Little Salmon River limit steelhead spawning below Hazard and Boulder Creeks. This lower reach is also steep, and the channel is encroached upon by upstream land uses and an adjacent Federal highway (U.S. 95). Even though Boulder Creek provides the best spawning and rearing habitat, much of the channel's natural function has been compromised by streamside development (NPPC 2001).

Spring/Summer Chinook Salmon

Spring/summer chinook salmon are Federally listed as threatened under the ESA and by the State of Idaho. The two "races" of spring/summer chinook salmon in the Salmon River are classified by the season of adult passage at Bonneville Dam during upstream migration. Spring/summer chinook enter the Columbia River March through July. Chinook that pass from March 1 to May 31 are considered "spring chinook" and those that pass from June 1 to July 31 are considered "summer chinook."

Spawning occurs in August through October. Eggs hatch in April and May, and the fry emerge approximately 1 month later. Juveniles rear for 1 year before out-migrating to the ocean (Simpson and Wallace 1982).

Lemhi Subbasin

The "spring" race of chinook salmon spawn in the Lemhi River upstream of Hayden Creek (Figure 3.5-1). Over 95 percent of the salmon spawning and rearing in this subbasin takes place in the upper 28 miles of the mainstem between Hayden Creek and Leadore. All spawning is natural, as hatchery releases from Hayden Creek were suspended in 1982. Threats to chinook salmon are the same as those discussed for steelhead in the Lemhi Subbasin.

Upper Salmon Subbasin

Chinook salmon in the Upper Salmon Subbasin migrate farther than any other chinook salmon stock in the lower 48 states, traveling over 900 miles to spawn and then rear at over 6,000 feet in elevation (Hassemer 1998) (Figure 3.5-2). Summer chinook in the Upper Salmon Subbasin are considered wild fish. Threats to spring/summer chinook salmon are the same as discussed for steelhead in the Upper Salmon Subbasin.

Little Salmon Subbasin

Spring chinook salmon were first introduced in the Little Salmon River in 1964. Rapid River has a remnant wild run of summer chinook (Figure 3.5-4). Threats to spring/summer chinook salmon are the same as discussed for steelhead in the Little Salmon Subbasin.

Sockeye Salmon

Snake River Sockeye Salmon ESU are Federally listed as Endangered under the ESA. They are listed as endangered by the State of Idaho.

Upper Salmon Subbasin

Sockeye historically returned to five lakes in the Upper Salmon Subbasin including Redfish, Alturas, Pettit, Stanley, and possibly Yellowbelly Lakes. Fish did not return to Stanley, Pettit, and Yellowbelly Lakes after 1962. Only Redfish Lake currently supports a remnant anadromous run (Figure 3.5-3). Numbers of sockeye salmon returning each year to Redfish Lake from 1954 to 1966 ranged from 11 to 4,361 fish (1955). Only 16 adult fish have returned to Redfish Lake since 1990 (NPPC 2001).

Residual and anadromous sockeye salmon are present in Redfish Lake. The residual fish are not migratory but are considered part of the ESU. Historically, sockeye first arrived at Redfish Lake in late July, with the run peaking in mid-August and a few fish coming in October (Simpson and Wallace 1978). Spawning occurs in October. Sockeye salmon spend 2 years in fresh water and 2 years in salt water before returning to spawn. Threats to sockeye salmon are the same as discussed for steelhead in this section.

Middle Fork Clearwater Subbasin

While there are no native populations of sockeye salmon in the Middle Fork Clearwater, the subbasin has a hatchery stock population. The hatchery population is not listed under the ESA.

Bull Trout

Bull trout are listed as threatened under the Federal ESA and as a species of concern by the State of Idaho. On November, 29 2002, USFWS published in the Federal Register proposed critical habitat for bull trout in the Columbia River basin. The relation of the four subbasins to proposed critical habitat in Idaho is shown in Figures 3.7-1 through 3.7-4.

Bull trout in all four subbasins are considered fluvial stock, as they migrate between streams and larger rivers. Bull trout typically spawn in September and October but may begin their spawning migration as early as April (Table 3.5-2) (USFWS et al. 2001). Spawning occurs in clean gravels, with areas of groundwater upwelling preferred. Fry emerge from early April through May. Small juveniles tend to remain in the gravels and cobbles. After reaching 4 inches in length, they move to backwater and sidewater channels, eddies, or pools (Goetz 1989).

Lemhi Subbasin

Bull trout are found in Big Eightmile, Big Timber, Eighteen Mile, Geertson, Hauley, Hayden, Kenny, Bohannon, Kirtley, Little Eight Mile, Mill, Pattee, and Texas Creeks; their tributaries; and in the Lemhi River (NPPC 2001) (Figure 3.5-1).

Threats to bull trout and their habitat are the same as listed for steelhead in the Lemhi Subbasin. Of particular concern to fluvial bull trout is dewatering of lower tributary reaches and un-screened diversion structures that inhibit downward migration into mainstem waters.

Upper Salmon Subbasin

Fluvial bull trout use the mainstem Salmon River in this subbasin for migration between streams and larger rivers. Numbers of bull trout monitored in the mainstem Salmon River since 1986 have ranged from 4 to 38 fish, with no discernable trend (Lamansky et al. 2001). Bull trout have been documented in 54 streams in this subbasin, including the mainstem and tributaries of the East Fork Salmon River (BLM 1998) (Figure 3.5-2). Estimates of numbers of fish migrating each year in the East Fork Salmon River since 1984 range from 2 to 175, with no apparent trend (Lamansky et al. 2001). Threats to bull trout spawning/survival are the same as discussed for steelhead in the Upper Salmon Subbasin.

Middle Fork Clearwater Subbasin

Bull trout are sparsely distributed in this subbasin, with spawning/rearing occurring in upper reaches of Clear Creek, and migration occurring in the Middle Fork Clearwater River (NPPC 2002; Paradis et al. 1999a) (Figure 3.5-3). No key watersheds in this subbasin are listed in the State of Idaho's Bull Trout Conservation Plan (Batt 1996). Where data exist, populations are designated as "present-depressed." Primary threats to bull trout in this subbasin are elevated water temperatures and increased sedimentation from forestry, grazing, roads, and mining (NPPC 2002).

Little Salmon Subbasin

Bull trout in the Little Salmon River-Rapid River complex represent one of two distinct subpopulations in the Salmon River drainage (Figure 3.5-4). These fish exhibit resident and migratory behavior, with spawning and rearing occurring in Boulder Creek and Rapid River (Overton et. al

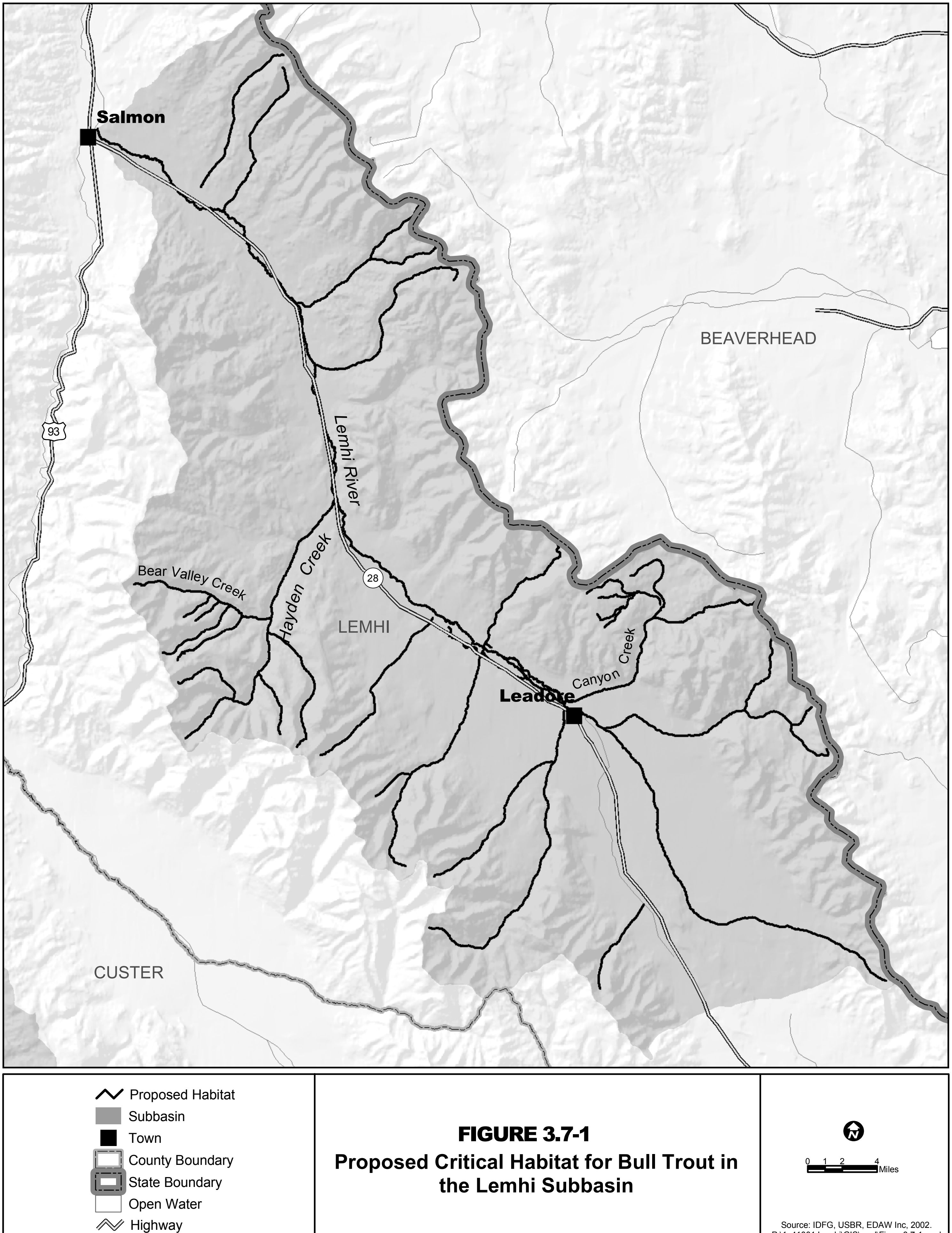


FIGURE 3.7-1

Proposed Critical Habitat for Bull Trout in the Lemhi Subbasin

Source: IDFG, USBR, EDAW Inc, 2002.
P:\1e41001 Lemhi\GIS\mxd\Figure3.7-1.mxd

Back of Figure 3.7-1

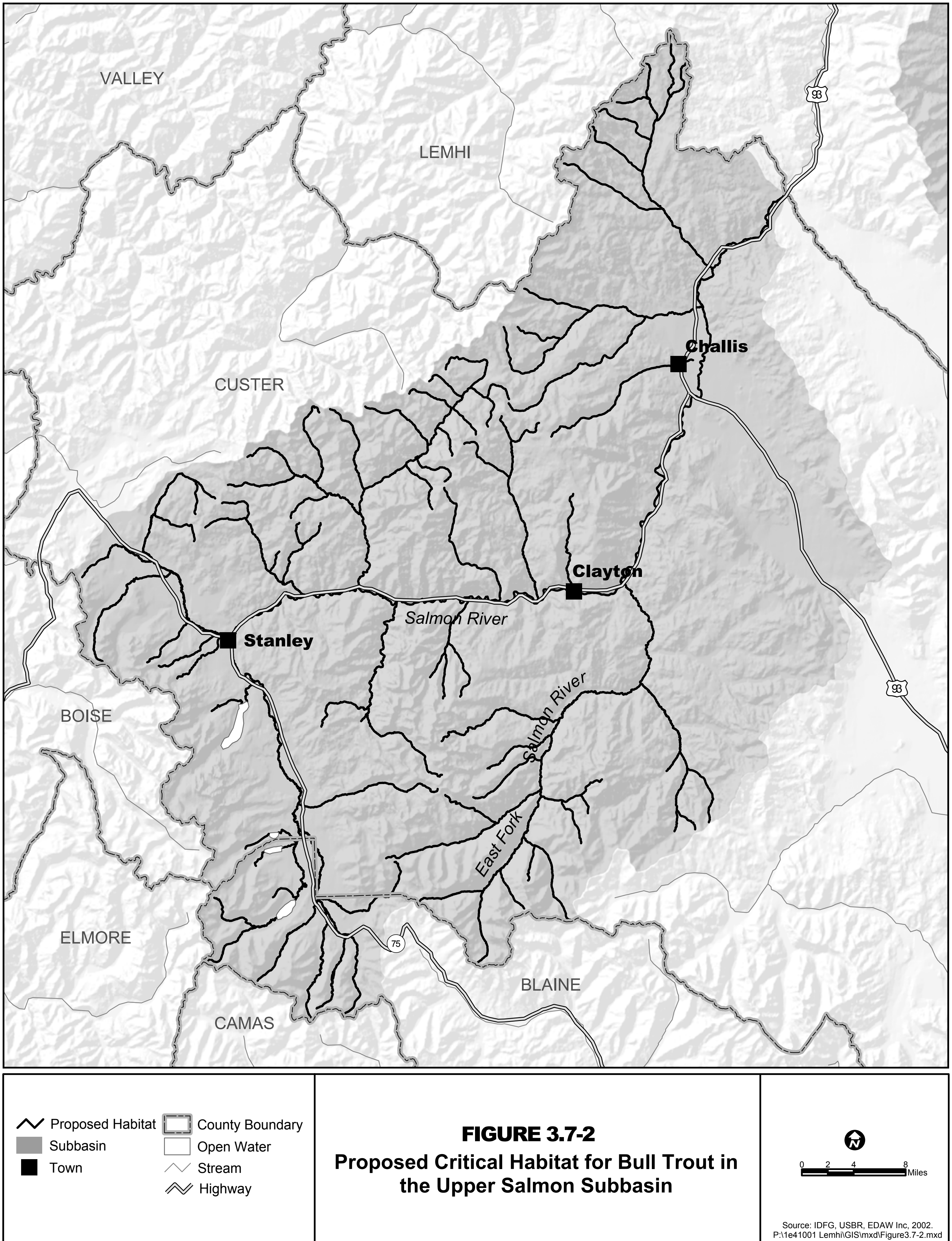


FIGURE 3.7-2

Proposed Critical Habitat for Bull Trout in the Upper Salmon Subbasin

Source: IDFG, USBR, EDAW Inc, 2002.
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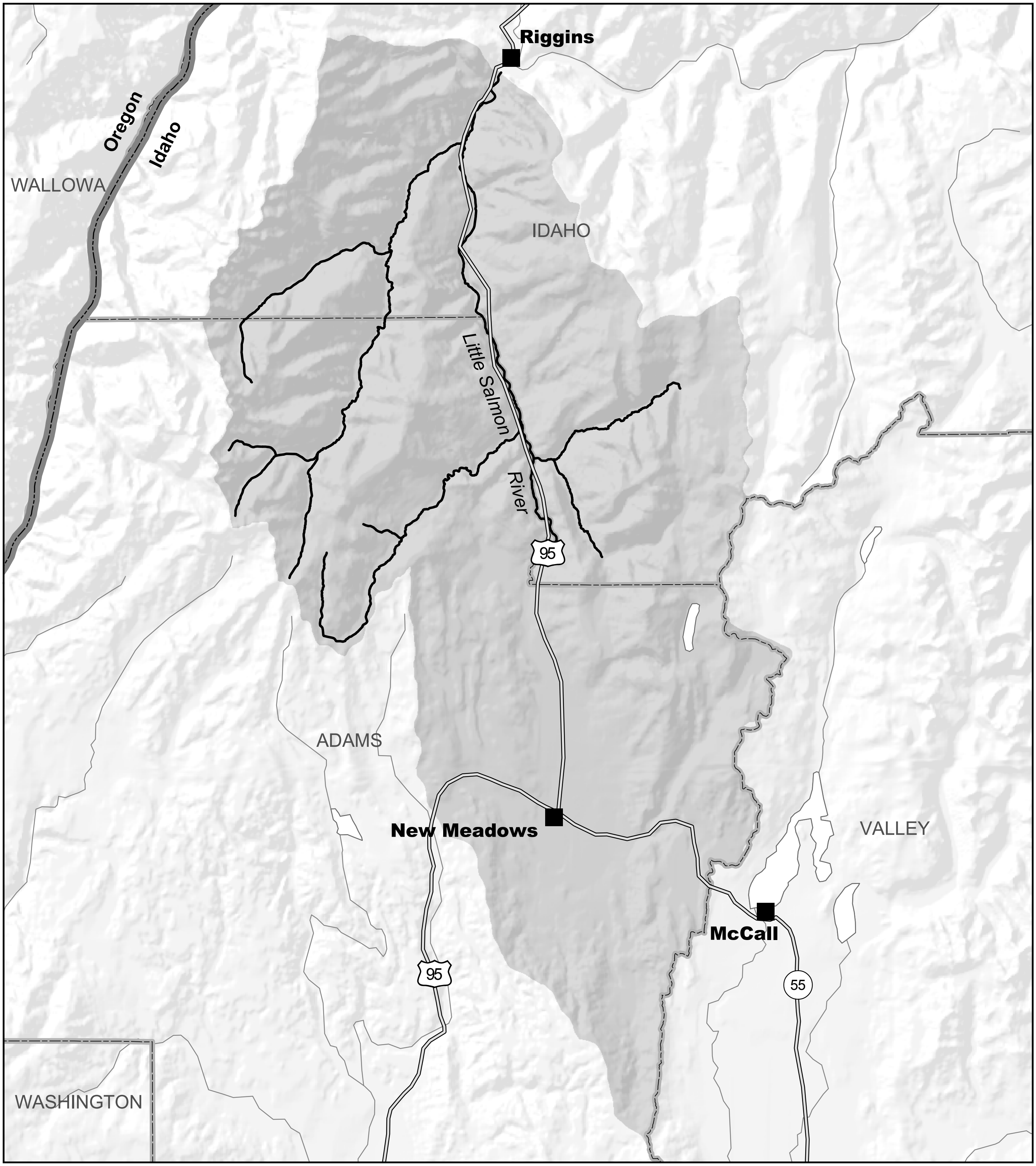

Subbasin
Town
County Boundary
State Boundary
Open Water
Stream
Highway

FIGURE 3.7-3
Proposed Critical Habitat for Bull Trout in the Little Salmon Subbasin

0 1 2 4 Miles

Source: IDFG, USBR, EDAW Inc, 2002.
P:\1e41001 Lemhi\GIS\mxd\Figure3.7-3.mxd

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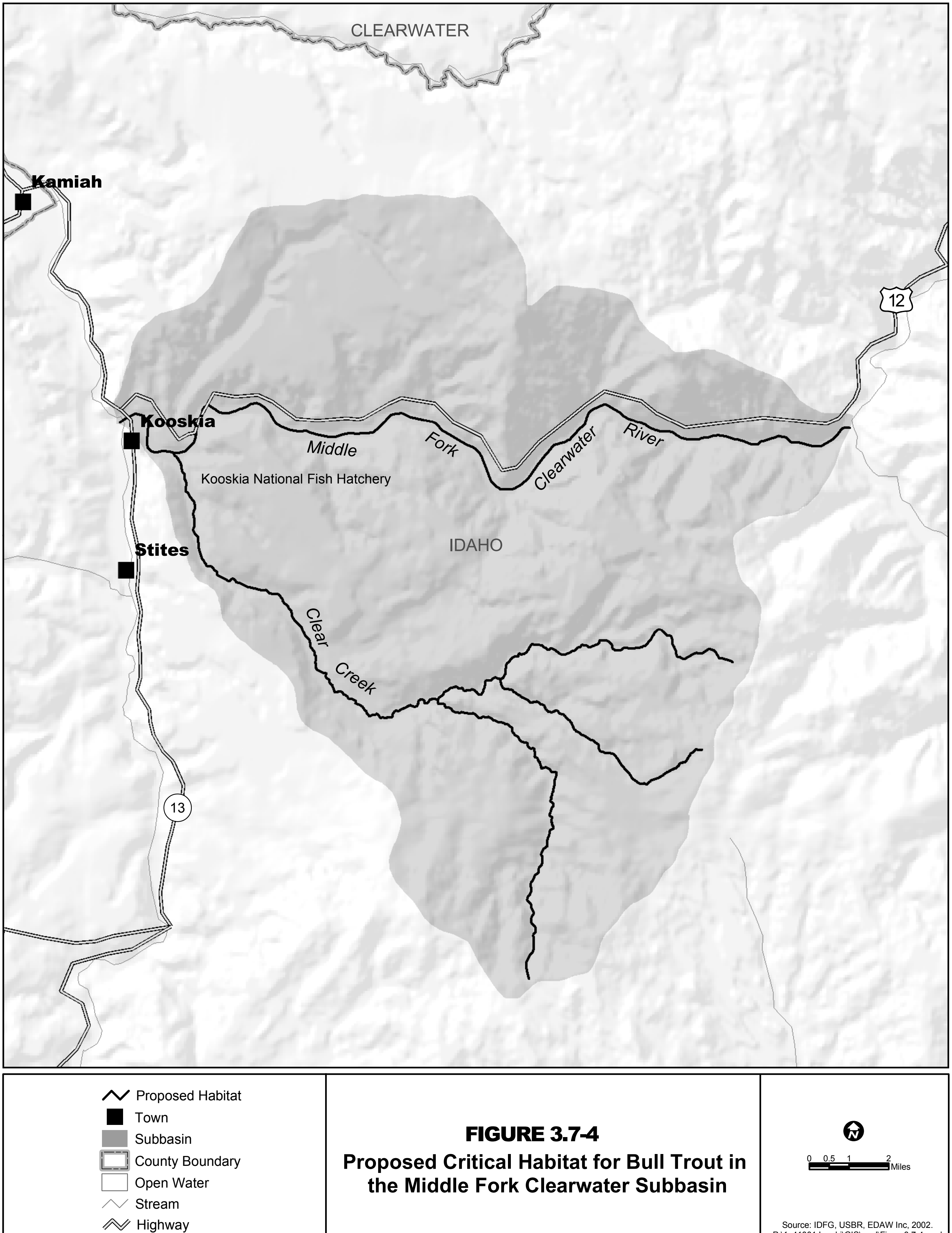

FIGURE 3.7-4

Proposed Critical Habitat for Bull Trout in the Middle Fork Clearwater Subbasin

Source: IDFG, USBR, EDAW Inc, 2002.
P:\1e41001 Lemhi\GIS\mxd\Figure3.7-4.mxd

Back of Figure 3.7-4

1993). Other known occupied streams include Hard Creek, Boulder Creek, upper Hazard Creek, and other small tributaries (USFWS 2003), but USFWS was unable to supply digital map data of these occurrences at this time. Spawning returns have been variable since 1973, with numbers between 100 and 500 fish. There has been a slight statistically insignificant downward trend (NPC 2001). Threats to bull trout are the same as discussed for steelhead in the Little Salmon Subbasin.

3.7.1.2 Terrestrial Resources

Terrestrial species protected by the ESA that may occur in the subbasins include two mammals and two birds (Table 3.7-1). In addition, USFWS has identified one candidate bird species that may occur in the subbasins. Candidate species have no official status under ESA but may be listed as threatened or endangered in the future.

The Canada lynx (*Lynx canadensis*), a threatened species, is known to occur in the Lemhi, Upper Salmon, Middle Fork Clearwater, and Little Salmon Subbasins (NPPC 2001, NPPC 2002). Although this species has been observed in each subbasin, they are uncommon and little is known

Table 3.7-1. Listed Species Occurring or Potentially Occurring in the Mountain Snake Province Subbasins.

Species Name	Federal Status[1]	State Status[2]	INHP Status[3]	Subbasin of Concern
Fish				
Bull Trout (*Salvelinus confluentus*)	T	-	-	All
Spring/Summer Chinook Salmon (*Oncorhynchus tshawytscha*)	T	-	-	All
Steelhead (*Oncorhynchus mykiss)*	T	-	-	All
Sockeye Salmon (*Oncorhynchus nerka)*	E	-	-	Upper Salmon
Birds				
Bald Eagle (*Haliaeetus leucocephalus*)	T	E	S3	All
Yellow-billed Cuckoo (*Coccyzus americanus*)	C	SC	S1	Upper Salmon
Mammals				
Canada Lynx (*Lynx Canadensis*)	T	SC	S1	All
Gray Wolf (*Canis Lupus*)	E	E	S1	All

Source:

1 NMFS/USFWS: E= Endangered; Taxa in danger of Extinction throughout all or a significant portion of their range. T=Threatened; Taxa likely to be classified as Endangered within the foreseeable future throughout all or a significant portion of their range. C= Candidate; Taxa for which the USFWS has on file sufficient information on biological vulnerability and threats to support issuance of a proposed rule to list, but issuance of the proposed rule is precluded.

2 Idaho Department of Fish and Game Status: E**=** Any species in danger of extinction throughout all or a significant portion of its Idaho range. **T**= Threatened; Any species likely to be classified as Endangered within the foreseeable future throughout all or a significant portion of its Idaho range. **SC=** Native species which are either low in numbers, limited in distribution, or have suffered significant habitat losses. **GP1** = Global Priority 1; **GP2** = Global Priority 2; **GP3** = Global Priority 3.

3 The network of Natural Heritage Programs and Conservation Data Centers--which currently consists of installations in all 50 states, several Canadian provinces, and several Latin American and Caribbean countries--ranks the rangewide (G- global rank) and state (S- state rank) status of plants, animals, and plant communities on a scale of 1 to 5 (see below). **G** = Global rank indicator; denotes rank based on rangewide status. **S** = State rank indicator; denotes rank based on status within Idaho.

- **1** = Critically imperiled because of extreme rarity or because some factor of its biology makes it especially vulnerable to extinction (typically 5 or fewer occurrences).
- **2** = Imperiled because of rarity or because other factors demonstrably make it very vulnerable to extinction (typically 6 to 20 occurrences).
- **3** = Rare or uncommon but not imperiled (typically 21 to 100 occurrences).
- **4** = Not rare and apparently secure, but with cause for long-term concern (usually more than 100 occurrences).
- **5** = Demonstrably widespread, abundant, and secure.

about their population dynamics (NPPC 2001 and NPPC 2002). It has been established that the populations rely heavily on snowshoe hare (*Lepus americanus*) population health (NPPC 2002). In Idaho, the lynx is known to use young forests and woodlands for foraging and mature stands for denning (IDFG 2002).

The bald eagle (*Haliaeetus leucocephalus*) is a threatened species with a wide range in Idaho (IDFG 2002). Bald eagle use of the Upper Snake Subbasins is restricted to foraging, especially during winter months (NPPC 2001). The Salmon and Lemhi Rivers are known to provide winter habitat for this species (NPPC 2001).

Yellow-billed cuckoo (*Coccyzus americanus*) is a candidate bird species that occupies riparian areas with thick understory, especially mature stands of cottonwood-willow (USFWS 2002; IDFG 2002). According to IDFG databases, this species is known in the region around Idaho Falls and Elmore County and is not likely in the Mountain Snake Province.

The gray wolf (*Canis lupus*), an endangered species, was extirpated in Idaho by the 1930s through hunting and other control methods (Bangs et al. 1999). Wolves were reintroduced in 1995 and 1996 and are primarily found in central Idaho (NPPC 2002). The Idaho population is deemed "nonessential experimental" to allow for management flexibility (USFWS 1994). Wolf packs are known in the Upper Salmon (Twins Peaks, Stanley Basin) (Bangs et al. 1999). The populations and their recovery are being closely monitored by the USFWS.

3.7.2 Environmental Consequences

The following narrative describes the effects to threatened and endangered species from implementation of the No Action and the Action Alternatives.

3.7.2.1 Aquatic Resources

Reclamation has initiated informal consultation with NMFS and USFWS regarding the potential effects to listed anadromous salmonids and bull trout in the subbasins. Together, these agencies have developed the BMPs listed in Appendix B that will be implemented for all Reclamation's actions. These BMPs will ensure that restoration actions are carried out using protocols for construction and in-water construction timing to minimize potential adverse effects to listed fish species. NMFS has indicated that they reserve the option for individual endangered species consultation for in-stream projects, particularly for removal and replacement of push-up dams and for measures not currently included in the BMP listing. Reclamation is continuing discussions with NMFS and USFWS on the protocol for coordination on the design and implementation of these projects.

No Action Alternative

Potential effects of the No Action Alternative on instream habitat, riparian conditions, and the status of Federally listed fish species present in the Middle Fork Clearwater, Little Salmon, Upper Salmon, and Lemhi Subbasins would generally be to maintain existing trends. Habitat improvements and anticipated contributions to the potential recovery of Federally listed species described below for the Proposed Action would occur under the No Action Alternative, but at a slower pace than the Proposed Action.

Cumulative Impacts

Continued problems with barriers, screens, and streamflow in the subbasins and the slower implementation of restoration efforts in the No Action Alternative would result in cumulative adverse impacts to ESU anadromous salmonids in the subbasins. Reclamation would, however, continue its current work assisting in fish enhancement projects in the Lemhi and Upper Salmon Subbasins on an Ad Hoc basis.

Proposed Action

Federally listed anadromous and resident fish species and their habitat in the Lemhi, Upper Salmon, Little Salmon, and Middle Fork Clearwater Subbasins would benefit from Reclamation's fish habitat improvement program under the Proposed Action. These species include the endangered Snake River sockeye salmon, threatened Snake River spring/summer chinook salmon, threatened Snake River steelhead, and threatened bull trout. All but the bull trout are anadromous species. The general types and locations of benefits from eliminating instream fish passage barriers, correcting fish screen deficiencies, and augmenting and improving streamflows associated with irrigation practices on private lands would be the same as described in Section 3.5, Fish. Anticipated benefits to Federally listed fish species and their habitat in each of the four subbasins are briefly described in the following text for each of these three categories of improvement. Because the specific types and locations of projects and number of willing participants within the four subbasins are not known, the following discussion is consequently largely programmatic in nature. In addition, the amount of projects that could be completed are not yet known because Congressional approval is pending.

Fish Passage Barriers

Fish migration barriers and habitat fragmentation problems were described for the Lemhi, Upper Salmon, Middle Fork Clearwater, and Little Salmon Subbasins in discussions of existing conditions. Benefits from eliminating or reducing the number of barriers would greatly improve fish passage and habitat connectivity in the subbasin, and increase use of previously inaccessible stream reaches for spawning and rearing by Snake River steelhead and spring/summer chinook salmon, and year-round use by bull trout. Bull trout exhibit a cold water preference and may benefit most from access to headwater tributaries, while the typically larger spring/summer chinook salmon and steelhead may benefit more from access to upstream reaches of mainstem drainages. Barrier projects could also result in improvements to streamflow. The magnitude of benefits would ultimately depend on the number and location of barrier removal projects that are implemented under the Proposed Action, and the quantity and quality of previously inaccessible stream habitat that would then become available.

The Lemhi and Upper Salmon Subbasins would likely exhibit the greatest improvement because these subbasins have substantial numbers of dams and diversions (370 between the two subbasins). Therefore there would be corresponding improvements in habitat for Snake River Basin Steelhead and spring/summer Chinook salmon, the two ESU species present in the Lemhi and Upper Salmon Subbasins.

Instream construction projects pose the greatest risk for adverse effects on listed anadromous salmonids and bull trout. Excess sedimentation, use of large equipment in the stream, and disturbing streambanks and riparian can have deleterious effects to fish. Implementation of the BMPs (Appendix B) would ensure that strict protection measures are in place during construction. These BMPs include provisions for limiting construction areas, amounts of gravel removal or fill, and area of vegetation clearing. Consulting with NMFS regarding the timing of in-water construction will minimize the chance that listed fish are in the vicinity of the construction zone. Because of the protection afforded by the BMPs, there would be no effect to proposed critical habitat for bull trout. Reclamation would continue to coordinate with USFWS.

Fish Screens

Benefits from properly functioning fish screens would accrue to the same Federally listed fish species and in the same subbasins as described for fish passage barriers above. Benefits may be greatest in the Lemhi Subbasin where many irrigation diversions on lower reaches of tributaries are not screened to protect migrating fish. This subbasin is used by Snake River steelhead and spring/summer chinook salmon and by bull trout. The magnitude of benefits would ultimately depend on the number and location of fish screen projects that are implemented under the Proposed Action and the current losses these species are experiencing at unscreened or improperly screened diversions. Benefits from reduced entrainment and/or impingement mortalities would be greatest in those areas with numerous irrigation diversions that also provide important spawning and rearing habitat for steelhead, chinook salmon, and bull trout.

Streamflow Improvement

Various threats or limiting factors currently faced by Federally listed anadromous and resident species in the four subbasins that were described under existing conditions would be reduced or diminished in severity as a result of streamflow improvement. Expected improvements of current problems would include lower water temperatures, increased base flows, reduced flow fluctuations, reduced sedimentation, increased instream cover, improved habitat connectivity and fish passage, and possibly improved riparian conditions. Targeting flow improvements in portions of the Middle Fork Clearwater, Little Salmon, Upper Salmon, and Lemhi Subbasins where these problems are most severe would result in the greatest benefits to the threatened and endangered fish species. Based on their present distributions, Federally listed fish species that would benefit from one or more of these habitat improvements include Snake River steelhead and bull trout in all four of the subbasins; Snake River spring/summer chinook salmon in the Lemhi, Upper Salmon, and Little Salmon Subbasins; and Snake River sockeye salmon in the Upper Salmon Subbasin. In-channel improvements, as well as improved riparian zone health and function, would benefit all of these species. The magnitude of benefits in each of the four subbasins and to each of these fish species would ultimately depend on the number and location of flow improvement projects that are implemented under the Proposed Action.

Cumulative Impacts

Improvements in barriers, fish screens, and streamflow in the subbasins would result in beneficial cumulative impacts particularly when considering the additive effect of other efforts within the subbasins. Because of the high number of diversions in the Lemhi and Upper Salmon Subbasins cumulative impacts of correcting adverse effects associated with these features would likely provide greater benefits to listed anadromous salmonids and bull trout in these drainages. These projects would have a beneficial cumulative effect on the Federally listed anadromous and resident fish species in the four subbasins and would contribute to their recovery.

3.7.2.2 Terrestrial Resources

No Action Alternative

Under the No Action Alternative, Reclamation would continue to supply technical assistance to local subbasin or watershed groups only in the Lemhi and Upper Salmon Subbasins to aid their salmon restoration efforts. These efforts would proceed at a slower pace without Reclamation's construction authority. There would be no effects to bald eagles, lynx, or gray wolf because the projects are relatively small and construction would be limited to very discrete parcels over the 15-year period that Reclamation would be involved in these subbasins. ESA surveys would be conducted by the lead agency prior to construction.

Cumulative Impacts

There would be no cumulative impacts to terrestrial ESA-listed or proposed species from the No Action Alternative.

Proposed Action

Reclamation's construction authority would allow salmon habitat restoration efforts to proceed at a faster pace than under the No Action Alternative in all four subbasins. In addition, it is likely that the number of projects that could be implemented would be greater. There would be no effects to lynx, gray wolf, or bald eagle because of the limited disturbance zone of construction and the agricultural setting of the implementation sites. Disturbed or removed vegetation would be replanted as stipulated in the BMPs. Reclamation's adherence to BMPs (Appendix B) would also lessen potential impacts to TES species. Long-term benefits for TES species, especially the bald eagle, are likely to occur as a result of increased stability and health of fish (prey) populations resulting from the Proposed Actions.

Cumulative Impacts

There would be no cumulative impacts to terrestrial ESA-listed or proposed species from the Proposed Action.

3.7.3 Mitigation

The Proposed Action includes the implementation of BMPs developed in coordination with NMFS. Reclamation would implement these BMPs and coordinate with NMFS regarding the specific timing dates for in-water construction to avoid adverse effects to ESA-listed plants, fish, and wildlife. Therefore, no mitigation measures are necessary.

3.8 Recreation

3.8.1 Existing Conditions

3.8.1.1 Lemhi Subbasin

Water-based recreation activities in the Lemhi Subbasin are somewhat limited because a large portion of the property adjacent to the river is in private ownership. While access to the river can be difficult, there are four Sportsman's Access Areas maintained by IDFG along the river, where fly-fishing is popular. There are also three campgrounds. The BLM manages a small campground about 8 miles west of Lemhi Pass on Agency Creek. In addition, the USFS (Salmon-Challis National Forest) manages two campgrounds in the vicinity of the town of Leadore: Smokey's Cubs Campground, about 3 miles east of Leadore, and McFarland Campground, between Leadore and Tendoy. Hiking is also a popular activity, with opportunities to access the Lewis and Clark National Historic Trail and the Continental Divide National Scenic Trail. Unlike the other three rivers, the Lemhi River is not a popular whitewater boating destination due to its limited public access, relatively calm flow, and extensive irrigation structures. Hunting opportunities are similar to those described under the Upper Salmon subbasin.

3.8.1.2 Upper Salmon Subbasin

Recreation opportunities in the Upper Salmon Subbasin are provided by Federal, State, and private entities. The subbasin includes the Challis and Salmon National Forests and the Sawtooth National Recreation Area. In addition, the Lewis and Clark and Nez Perce National Historic Trails and the Continental Divide National Scenic Trail pass through or close to the subbasin. The subbasin also offers steelhead fishing, premier boating, canoeing, and wildlife and wildflower viewing opportunities.

Fishing and Hunting

The Upper Salmon River, from Challis upstream to Stanley, is a spring steelhead fishery. Fishing is mainly walk and wade, angling to visible fish. A Sawtooth National Recreation permit is required along with a steelhead permit from IDFG. There are no designated Sportman's Access Areas provided along this river reach; however, it is a popular area for local flyfishing, as the fishing is usually consistent. Fly fishers are allowed on the water from March 1 through April 30. Hunting, particularly for big game, is popular in the subbasin. Deer, elk, bear, and cougar are hunted throughout the subbasin. There are a number of guiding services located in the town of Salmon that guide in the Upper Salmon and Lemhi subbasins.

Boating

The Upper Salmon River is used extensively by boaters, mostly on a 10-mile section that runs from near the town of Sunbeam. A wide range of floaters use this section of the river, from beginning rafters to expert kayakers. Estimated use of this section of river is 11,000 to 12,000 people annually. Four commercial outfitters host a total of about 9,000 guests annually. The remainder are private boaters using their own or rented equipment. There are six designated put-ins and take-outs, including Buckhorn Bridge, Four Aces, Mormon Bend Campground, Yankee Fork, Elk Creek, and Torrey's (PLIA 2000). The rafting season runs from mid-May until the end of September; however, chinook salmon mitigation measures go into effect in mid-August and continue through September. During this time, assigned floating times, a 1/2-mile portage, and river closures may be put into effect.

Camping

Camping is a popular activity in the Upper Salmon River corridor. The BLM manages six recreation sites and the USFS manages nine campgrounds. Overall, there are approximately 150 campsites. Most of these sites are adjacent to the river and provide primitive campsites, potable water, toilets, and good fishing and river floating access. Some of these sites are more developed and provide picnic sites, room for recreational vehicle (RV) parking, group facilities, and designated river put-ins.

Scenic Byways

The Idaho State Byways Program was initiated in 1977 to protect and enhance the archaeological, cultural, historic, natural, recreational, and scenic qualities of these roadways. These routes are designated and managed in a partnership with local entities and several State and Federal agencies. The Upper Salmon River is closely paralleled by the 161-mile Salmon River Scenic Byway. The byway begins near the Montana border at the 6,995-foot-high Lost Trail Pass and travels along the Salmon River through the Salmon and Challis National Forests to Stanley, where it connects with the Ponderosa Pine Scenic Byway and the Sawtooth Scenic Byway. The route offers travelers views of the Salmon River from near its headwaters; views of the White Cloud, Lemhi, and Bitterroot Mountains; and abundant wildlife.

3.8.1.3 Middle Fork Clearwater Subbasin

The Middle Fork Clearwater River is known for its extraordinary scenery, exceptional water quality, and excellent wildlife viewing and whitewater opportunities. The river flows between the boundaries of the Clearwater and Nez Perce National Forests. Progressing upstream from Kooskia, the river runs past the small town of Syringa to Lowell, where the Selway and Lochsa Rivers meet. Much of the property along the river is privately owned; however, there are several spots along the road to stop. There are several turnouts that provide whitewater access points and hiking opportunities. Other recreation opportunities within the subbasin include visiting historic sites. On the north side of the river, the Lolo Trail corridor, first used by Native Americans as a travel and trade route through the Bitterroot Mountains and later followed by Lewis and Clark, is accessible from Syringa. Recreation opportunities within the corridor include camping, scenic viewing, hiking, fishing, and interpretive activities.

Fishing and Hunting

The Middle Fork Clearwater River flows along US Highway 12, providing anglers with easy fishing access on public land. Westslope cutthroat, bull trout, chinook salmon, rainbow trout, and steelhead are present in the river. Anglers can also fish for westslope cutthroat in a small number of tributaries on USFS lands within the Nez Perce National Forest to the south and the Clearwater National Forest to the north. Two miles east of Kooskia, the Kooskia National Fish Hatchery collects adult spring chinook salmon from May to August. Hunting is a popular activity in the vicinity on public and private land. Elk, deer, and bear are popular hunting objectives. Upland game birds and waterfowl are hunted throughout the subbasin.

Boating

Seasoned boaters are challenged by the high water on the free-flowing rivers in May and June, families enjoy the calmer waters during July and August, and anglers enjoy trout fishing in September and October, when the water slows and the fish begin to run. Along this spectrum, the Middle Fork Clearwater provides a relatively “easy float” year-round. The Selway and the Lochsa Rivers, on the other hand, are premier whitewater rivers and may provide some of the most extraordinary whitewater trips in the country (PLIA 2000). Several put-ins and take outs for the Lochsa and Middle Fork Clearwater Rivers are dotted along State Highway 12.

Camping

The Nez Perce National Forest manages one small campground (six campsites) and two picnic areas on the south side of the river. Just outside of Lowell, the USFS manages eight campgrounds with a total of approximately 70 primitive and developed campsites along the Selway River.

Wild and Scenic River Designation

The Middle Fork Clearwater is one of 8 rivers in Idaho designated as a Wild and Scenic River, under the 1968 National Wild and Scenic Rivers Act. Wild and Scenic Rivers are classified according to the amount of development in and type of access to the river corridor, and each classification prescribes specific management actions. There are three classifications: Wild, Scenic, and Recreational. River segments designated recreational are readily accessible by road or railroad and may have some development along their shorelines; however, rivers given this classification do not necessarily offer outstanding recreation. They may offer other outstanding qualities. A 22-mile length of the Middle Fork Clearwater is classified as recreational and is recognized for its outstanding scenic, water quality, fishery quality, and recreational values. The USFS is responsible for managing the river corridor (approximately 0.25 mile on each side of the river) to protect these outstanding values and the river's free-flowing character.

3.8.1.4 Little Salmon Subbasin

Federal, State, and local entities manage lands and facilities that provide recreation opportunities in the Little Salmon Subbasin. These include the USFS (Payette National Forest), IDFG, BLM, Adams County, and some private recreation providers. There are developed facilities for fishing, boating, and camping; in addition, there is considerable dispersed use on public land, including hunting, dredge mining, and winter sports such as snowshoeing.

Fishing and Hunting

The Little Salmon Subbasin offers a diverse combination of angling opportunities including chinook, steelhead, and trout fishing. The small size of the river and easy access via U.S. Highway 95 allow for bank fishing, unlike steelhead fishing on the Clearwater or Snake Rivers where boats are often used (IDWR 2002). The Rapid River, a large tributary in the lower subbasin, is managed as a wild trout fishery. In addition, lake fishing opportunities in the subbasin are abundant, with 42 alpine lakes managed for a variety of fish. IDFG manages six Sportman's Access Areas along the river, all within 15 miles of the town of Riggins. Hunting opportunities in the Little Salmon Subbasin are similar to those described under the Middle Fork Clearwater Subbasin. Deer and elk hunting have been increasing over the past 5 years. About 18 percent of elk hunters are not state residents while about 13 percent of deer hunters are not state residents.

Boating

River boating in the Little Salmon Subbasin is particularly popular in the spring when higher flows are available, but the boating season extends through early fall. Boating on lakes and reservoirs occurs throughout the summer and fall. There is one boat ramp along the river, located at Riggins City Park.

Camping

The majority of campgrounds in the Little Salmon Subbasin are adjacent to or proximate to water, with several clustered around the town of Riggins. There are just three campgrounds located along the river; however, there are several campgrounds throughout the subbasin managed by the USFS, Payette National Forest.

Wild and Scenic River Designations

A portion of the Rapid River, a tributary of the Little Salmon River, was designated as a Wild and Scenic River in 1975. A 26.8-mile stretch is classified as Wild. River segments with a Wild classification are essentially primitive and are often inaccessible except by trail. The Rapid River is recognized for its exceptional water quality; its support of chinook salmon, steelhead, and bull trout; and their associated habitat, as well as outstanding scenery and diverse riparian vegetation. Most of the Rapid River watershed is managed as a roadless area providing primitive non-motorized recreation opportunities.

3.8.2 Environmental Consequences

3.8.2.1 No Action Alternative

Salmon and steelhead restoration efforts would continue under the direction of a number of entities within each of the subbasins and with Reclamation's contribution of technical assistance in the Lemhi and Upper Salmon Subbasins. Habitat restoration efforts would proceed slower than under the Proposed action. Consequently, benefits in salmon and steelhead stock would be relatively slow, and the opportunities for recreational salmon fishing would improve in a corresponding manner. Disruption of fishing would be limited to confined areas during construction operations of larger projects, such as push-up dam removal. All projects would be implemented on private land; therefore, public access would not be affected. Work in the Upper Salmon Subbasin could temporarily affect the scenic quality as viewed from the Scenic Byway, but this would be a minor effect and would last only as long as the construction phase. Where these projects are visible from such important sites, Reclamation would incorporate standard design guidelines to ensure new structures are not a visual intrusion, to the extent practical.

Cumulative Impacts

There would be no cumulative impacts to recreation resources from the No Action Alternative.

3.8.2.2 Proposed Action

Effects of the Proposed Action would be similar to those described under the No Action Alternative, but restoration efforts would occur at a faster pace with Reclamation construction authority and funding. Recreation benefits would occur from the improvement of salmon habitat and the increased potential for increased recreational fishing. All projects would occur on private property and would not affect public access. Increased flows would provide minor long-term benefits for boating, particularly in the Upper Salmon Subbasin where this is a popular activity.

Cumulative Impacts

There would be no cumulative impacts to recreation resources from the Proposed Action.

3.8.3 Mitigation

While not specific for recreation concerns, the BMPs that Reclamation would implement as part of the Proposed Action would benefit fisheries and riparian habitat, and indirectly benefit fishing and water quality. There would be no adverse impacts to recreation resources and no mitigation is necessary.

3.9 Aesthetics

3.9.1 Existing Conditions

All of the subbasins are located in central Idaho, a region of mountains, plateaus, and deep canyons within the Northern Rocky Mountain geographic province. This area is well known for its rugged mountainous terrain with many deep canyon-walled rivers and streams with whitewater rapids. Visually apparent geology and soils vary considerably throughout the subbasins, with a unique mix of low relief hills, isolated buttes, lava basalt interfingers, and granite, sedimentary, and metamorphic rocks. Glaciated areas are prevalent in this region, and deeply incised canyons, bench topography, and basalt outcrops are common.

The most dominant manmade visual feature in each of the subbasins is either a highway or a scenic byway. Idaho Scenic Routes have been designated since 1977 through the Idaho State Byways Program. This program is administered by the Idaho Transportation Department and serves two purposes: (1) to promote the scenic, historic, and backcountry byways of Idaho; and (2) to provide funding for tourist amenities, kiosks, and signs that will assist the traveler along the byways (ITD 2002). Highways in these subbasins include: U.S. Highway 95 that parallels the Little Salmon River, State Route (SR) 28 that follows closely along the Lemhi River, and U.S. Highway 12 that follows the Middle Fork Clearwater River, intersecting with the Clearwater Canyon Scenic Byway at the town of Kooskia. Scenic highways in these subbasins include the Salmon River Scenic Byway that follows the entire reach of the Upper Salmon River.

The Lemhi Subbasin is characterized by stands of fir and pine trees, high-mountain meadows, and rolling, jade-colored hills. In the nearly 200 years since Meriwether Lewis and William Clark journeyed to the crest of Lemhi Pass the area has changed but still retains a high aesthetic quality. The subbasin is home to the Lewis and Clark Back Country Byway, which provides spectacular vistas of the surrounding mountain ranges, wildlife and wildflower viewing, and roadside interpretive stops and picnic areas. The Little Salmon Subbasin is characterized by a unique mix of high mountain lakes, rugged canyons, alpine meadows, and forests. In the Upper Salmon Subbasin, the Salmon River Scenic Byway traverses hills and meadows and provides views of the river as well as the surrounding mountain ranges. The river itself serves as a natural pathway through the subbasin's rugged backcountry. The Middle Fork Clearwater River is part of the National Wild and Scenic River System and is a very popular kayaking and whitewater rafting destination.

3.9.2 Environmental Consequences

3.9.2.1 No Action Alternative

Under the No Action Alternative, restoration efforts would continue at their current pace under the direction of various entities in the subbasins and with Reclamation's technical assistance in the Lemhi and Upper Salmon Subbasins. Short-term construction-related activities and materials could negatively impact the visual experience of travelers along scenic byways in the subbasins. Temporary access roads, equipment and material storage sites, and staging areas would create temporary visual impacts in the immediate vicinity of construction projects. Replacing earthen push-up dams with concrete structures, along with other new structures, in or adjacent to the river may have long-term visual impacts that alter the experience of travelers along the scenic byways in the subbasins. Vortex weirs (natural rock structures) could be used when visual resources are an issue. However, where push-up dam replacement would be most relevant are those areas where ranching is a common land use and part of the cultural landscape. Standard design guidelines would be used for the diversion structures, and any associated building would use designs that would blend into the landscape.

Cumulative Impacts

There would be no cumulative impacts to aesthetics resulting from the No Action Alternative.

3.9.2.2 Proposed Action

Implementation of Action 149 with Reclamation construction authority and funding would result in completion of restoration efforts at a faster pace than under the No Action Alternative. Construction of projects would occur more frequently and consequently may have greater, temporary adverse effects to aesthetics. These effects would generally be limited to areas visible from roadsides and would include the assembly of construction equipment and staging of construction material. The sight of construction equipment is not an unusual one in ranch pastures, particularly in the Lemhi, Upper Salmon, and Little Salmon Subbasins where irrigated pastures are a common feature of the landscape. Vortex weirs could be used if visual resources are a concern. Assembly of construction equipment and materials would be a minor, short-term effect to local aesthetics. Implementation of BMPs and design guidelines for any new structures would minimize long-term effects. The BMPs include provisions for rehabilitating sites following construction disturbance.

Cumulative Impacts

There would be no cumulative impacts to aesthetics resulting from the Proposed Action.

3.9.3 Mitigation

Reclamation's adherence to BMPs would reduce the potential for adverse effects to aesthetic resources. These BMPs include provisions for limits on land clearing and for site restoration following construction. There would be no adverse effects to aesthetic resources and no mitigation is necessary.

3.10 Cultural Resources

3.10.1 Existing Conditions

3.10.1.1 Prehistoric Context

The four subbasins lie within the Salmon-Clearwater subregion of the Eastern Plateau prehistoric cultural area defined by Roll and Hackenberger (1998). The presence or absence of migrating salmon and steelhead greatly influenced the course of cultural development more than any single factor. Anadromous fish were prominent elements of native diet in the areas drained by the Salmon and Clearwater Rivers. Large portions of the territory drained by the Salmon River possess conditions optimum for camas (*Camasia quamash*)—also a vital plant food resource to prehistoric and ethnographic inhabitants.

Using systematic classification of phases on the lower Snake River by Leonhardy and Rice (1970), several investigators defined local phases and complexes in the Clearwater and Salmon Basins (see Pavesic 1971; Ames et al. 1981; Sappington 1994; and Holmer and Ross 1985). The most recent classification proposed by Roll and Hackenberger (1998) argues for a simplified chronology. They proposed three periods: Early Prehistoric Period—Before 8000 to 5000 B.C.; Middle Prehistoric Period—5000 B.C. to A.D. 500; and Late Prehistoric Period—A.D. 500 to 1750.

The Early Prehistoric Period archaeological record is known from surface finds, excavated rockshelters, and limited deep testing of open sites. Artifacts from this period include fluted points, Haskett and Humboldt-like projectile points. One site in the region yielded Plains Plano Tradition points. Several sites have yielded Lind Coulee and Windust type stemmed and shouldered points.

The Middle Prehistoric Period archaeological record is better known. Settlement along the Lower Clearwater and Lower Salmon Rivers intensified as early as the Tucannon phase (approximately 2500 B.C.), but pit house occupations occur more frequently during the Harder phase (about 500 B.C.). Harder phase houses and campsites on the Upper Clearwater suggest population expansion from the Lower Clearwater into the Upper Clearwater and seasonal use of the Lochsa and Selway Rivers. Limited testing of seven sites on the Selway River and analysis of large private artifact collections suggest that regular seasonal occupations of the area began after 1000 B.C. In the Lower Salmon canyon, test excavations revealed occupations spanning the late Cascade, Tucannon, and Harder phases. Test excavations in the surrounding uplands indicate extensive seasonal gathering and hunting. Hunting and hide processing tools, as well as pestles and hopper mortar bases and hearth features, reflect camas processing. Rockshelter excavations along the Middle Fork Salmon revealed 4-meter-deep deposits and radiocarbon dates extending from 10,460 +/- 115 B.C. to 3650 +/-230 B.C. Bitterroot side-notched points dominate the collections, followed by Elko and Pinto types. Scrapers and fleshers comprise over 25 percent of the total artifacts. Sporadic surveys of elevations higher than 1,675 meters revealed sites with shallow buried deposits on the upper Middle Fork Salmon River tributaries. Site locations suggest upland hunting, root gathering, and white-bark pine nut gathering.

The Late Prehistoric Period archaeological sites in the Clearwater River area have yielded numerous cutting tools, cobble tools and anvils, and pestles. The Salmon River area archaeological record has been secured from numerous surveys, testing and data recovery programs too numerous to review here. This rich and complex archaeological record is reviewed by Roll and Hackenberger (1998).

Sites include surface finds, open sites with deep deposits, and housepit villages. Recovered artifacts testify to hunting, fishing, gathering, and long-distance trade (or Bison-hunting forays into Montana).

3.10.1.2 Ethnographic Context

The four subbasins lie within the ancestral lands of the Nez Perce Indians (Walker 1998). Nez Perce territory centered on the middle Snake and Clearwater Rivers and the northern portion of the Salmon River Basin in central Idaho and adjacent Oregon and Washington. In 1800, there were over 70 permanent villages ranging from 30 to 200 individuals, depending on the season and type of social grouping (Walker 1958-1964). The Upper Nez Perce were oriented more toward a Plains lifeway. The Nez Perce are also very closely related by language, culture, and social factors to the *Sahaptin* speakers of Oregon and Washington including the Palouse, Walla Walla, Yakama, Umatilla, and Wayampam (Anastasio 1972). Nez Perce territory was marked by diverse flora and fauna and elevation dependent temperature and precipitation patterns. The deep canyons cut by the Clearwater, Salmon, and Snake Rivers encouraged seasonal subsistence migrations similar to other Plateau groups (Marshall 1977; Walker 1987, 1998).

Walker (1998) reviews aspects of Nez Perce culture; salient information is summarized here. The Nez Perce hunted elk, deer, moose, mountain sheep, and goat as well as black and grizzly bear. After 1700, horse-mounted Nez Perce hunting parties secured bison in Montana and engaged in long-distance trade and exchange with other groups. Small game food resources included rabbit, squirrel, badger, and marmot. Birds such as ducks, geese, grouse, and sage hens were taken for food, and raptors were taken for ceremonial purposes. Nez Perce fished for chinook, coho, chum, and sockeye salmon; Dolly Varden, cutthroat, lake, and steelhead trout; suckers; whitefish; sturgeon; lampreys; and northern pikeminnow. Walker (1967) estimated the Nez Perce consumed 500 pounds of fish per person per year.

In the early spring after cache pits were emptied of stored food, the Nez Perce began communal drives in the river valleys, snowshoe hunted in deep snow, and canoed down the Snake and Columbia Rivers to intercept the early salmon runs. As spring progressed, salmon began arriving in Nez Perce territory, and the early root crops were taken at lower elevations.

Large fish traps and weirs were usually built communally by villages and regulated by a fishing specialist who regulated the fishing and divided the catch. Weirs and traps constructed close to winter villages were often placed on smaller lateral streams. Salmon were speared and netted from canoes and dipping platforms on the major tributaries.

Roots in higher areas were ripe by mid-August, but the basic root staple was camas (supplemented by bitterroot, couse, wild carrot and wild onion). Important gathered fruits included serviceberries, gooseberries, hawthorn berries, thornberries, huckleberries, currants, and chokecherries. Pine nuts, sunflower seeds, and black moss were also gathered.

By midsummer, the Nez Perce typically left their villages in the lower river valleys and moved into the highlands to gather later-growing crops, fish the streams, and hunt. The fall salmon runs, fall hunting, and gathering late root and berry crops comprised the main foods stored for winter. Brief bison hunting trips into Montana helped stretch winter meat supplies.

Around 1560, Spanish horses reached Indians in the southern United States and later dispersed northward to other groups, reaching the Nez Perce by about 1720. Once equestrian, Nez Perce became much more mobile and were able to visit Oregon and Montana. The first significant contact with Euro-Americans started with Lewis and Clark (see below). Euro-Americans arrived in increasing numbers, resulting in more trade goods such as beads being used by the Nez Perce. The influence of Euro-Americans became greater through the mid-1800s until Native Americans were relegated to the reservation.

The Lemhi Subbasin is the ancestral home to Agaidika (Salmoneaters) and Tukukika (Sheepeaters), known as the Lemhi Shoshone and now part of the Shoshone-Bannock Tribes of the Fort Hall Reservation. Like the Nez Perce, the Lemhi people utilized camas, salmon, mountain sheep, antelope, and bison. Also like the Nez Perce, the introduction of the horse led to strong Plains Indian influences that contrasted to a life way in southwestern Idaho that approximated that of the Nevada Great Basin (Murphy and Murphy 1986:289).

The most famous Lemhi Shoshone is Sacajawea, the young female interpreter who accompanied Lewis and Clark and their Corps of Discovery.

3.10.1.3 Historic Context

The arrival of Lewis and Clark in 1805 began the historic period in the subbasins. Lewis and Clark traveled along the Lemhi and Clearwater Rivers; while they did not visit the Lower Salmon River, it is believed that members of their party traveled to the confluence of the Salmon and Snake Rivers. Soon after, fur trappers entered the region (BLM 1987). Donald McKenzie arrived at the confluence of the Little Salmon and Salmon Rivers in 1811, and he traveled along the Salmon River to the White Bird area before continuing north on his search for furs.

In 1855, the Nez Perce signed a treaty establishing a reservation with the understanding that they would retain control over most of their territory. In 1860, however, gold was discovered on their land, creating pressure from Euro-Americans to change the reservation boundaries. In 1863, a new treaty was drafted, greatly reducing their territory. Not all Nez Perce agreed to the treaty, and those who did not agree were forced into the new treaty area in 1877. While camped at Tolo Lake near Grangeville, several young men left camp and killed some white settlers along the Salmon River near White Bird. This resulted in a confrontation with the U.S. Army at the Battle of White Bird, on June 17, and the beginning of the Nez Perce War. The first mining in the four subbasins may have occurred along the Salmon River in 1860 when fine (flour) gold was found. From the 1860s to 1880s, intensive mining was conducted, with ups and downs through the Depression of the 1930s. An important part of regional history includes the Chinese who arrived in north Idaho in the 1860s to work in the newly discovered gold fields. Most of the Chinese mining along the Lower Salmon River took place between the 1870s and 1900.

Agriculture had its beginnings near the stations and stops along the trails leading to the mining regions. The station keepers grew garden crops for their own use, and eventually these gardens expanded in size to supply the needs of miners. Much of the mountainous land was not suitable for agriculture but had some utility for ranching. The first cattle in the region came with the first settlers. Gradually, emphasis shifted from mining to farming and ranching along the rivers. Sheep were also brought into this area, and feuds arose between the cattlemen and sheepmen over the use of open range.

Ferries formed an important transportation link in the region, moving people and livestock across the major rivers. By the early 1900s, many areas were settled with a system of trails and roads that lead to homesteads, mines, and small communities. For example, a stagecoach road between White Bird and Riggins was completed between 1894 and 1898. Highway 95 was constructed in 1931, mostly covering the original stage road. In the early 1900s, large sweep boats were used to transport people and goods on the Salmon River. The first railroad survey of the Salmon River took place around 1872 by the Northern Pacific Railroad.

3.10.1.4 Recorded Cultural Resource Sites

The following compilation of cultural resource sites was taken from an examination of a sample 2-mile wide corridor centered on the mainstem of the principal river in each subbasin. Large portions of each subbasin have never been inventoried for cultural resources; thus, these numbers do not represent a complete or exhaustive record of all sites in the subbasins (Table 3.10-1). Areas most likely to have been inventoried are Federal lands, and areas where Federally licensed or permitted actions have occurred. Although specific project locations are not currently known, it is likely that many project areas will be on private lands that have not been surveyed for cultural resources. This compilation does not include traditional cultural properties (TCPs) or sacred sites. These numbers represent only those sites registered with the Idaho State Historic Preservation Office and do not distinguish between those sites that have been evaluated for listing on the National Register of Historic Places (NRHP)and those that have not. Furthermore, all archaeological sites are listed together, whether of Native American or Euro-American origin.

Table 3.10-1. Recorded Archaeological and Architectural Sites in the Four Subbasins.*

Subbasin	Archaeological Sites	Architectural (Structure)
Lemhi River	84	56
Upper Salmon River	298	125
Little Salmon River	30	35
Middle Fork Clearwater River	52	24

* Table includes only sites within a sample 2 mile corridor of the rivers main-stem.

3.10.2 Environmental Consequences

3.10.2.1 Regulatory Setting

Important cultural resources or historic properties are given consideration in the environmental planning and permitting process through the National Historic Preservation Act (NHPA) of 1966, as amended, and other statutes and regulations. Section 106 of NHPA requires the responsible Federal official to consider the effects of any Federal action on cultural resources and to give the Advisory Council on Historic Preservation (ACHP) the opportunity to comment on said action. A step-by-step process for identifying, evaluating, and, if necessary, mitigating adverse project effects on historic properties is provided in 36 CFR 800. Historic properties include cultural resources such as archaeological and historic sites, TCPs, historic landscapes, and buildings, structures, and objects that are eligible for listing in the National Register of Historic Places. National Register Bulletin 38, *Guidelines for Evaluating and Documenting Traditional Cultural Properties* (Parker and King 1995) specifically addresses TCPs. As noted earlier, specific locations of sacred sites and TCPs are generally not included in the State list of historic properties, and the locations are generally held as sensitive, private knowledge by tribes, to be shared only as necessary to protect them on a project-specific basis. At the programmatic level of analysis, specific project impacts cannot be determined. As specific projects are developed, the Section 106 process begins, with identification of cultural resources through inventories and surveys. Since certain types of sites, such as TCP's, may not be apparent to non-native investigators, ethnographic studies incorporating oral histories are often undertaken to identify such properties. If the project is on ancestral lands of Federally recognized tribes, formal government-to-government consultation between the Federal agency and the affected tribe is required.

The Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) establishes regulations regarding the treatment of any Native American graves, human remains, and/or funerary objects, sacred objects, or objects of cultural patrimony on Federal lands. Objects of cultural patrimony are objects of central importance to a group as a whole, which cannot be owned or controlled by an individual. Knowingly disturbing or removing gravesite remains or these objects is a felony under Federal law and can result in criminal prosecution. This legislation applies to Federally owned lands. In addition, Idaho's Protection of Graves Act (1984) requires notification to the director of the Idaho State Historical Society when human skeletal remains are discovered on any non-Federal lands.

3.10.2.2 High Probability Areas

Within most delineated geographic area are locations more likely to contain cultural resources than other locations. These are commonly referred to as High Probability Areas (HPAs). HPAs are designated by the archaeologist on a project-specific basis to develop survey and inventory strategies for finding cultural resources. In the Intermountain West, the availability of fresh water has long been demonstrated as an important factor influencing prehistoric settlement and subsistence patterns. Other factors important in the identification of HPAs include slope, elevation, and plant and mineral resources. As a general rule, however, the nearer accessible water, the higher probability that archaeological sites are present. In the four subbasins, stream courses fostered rich wildlife habitat and important plant resources that supported Native American subsistence and settlement. The presence of anadromous fisheries was particularly influential in the subsistence patterns of Native American inhabitants. Areas close to streams bearing salmonids are generally considered HPAs. Within an HPA, there are areas more likely and areas less likely to contain cultural sites. Areas near stream confluences, for instance, typically have a higher likelihood of containing archaeological sites, while areas directly adjacent to a fish-bearing stream but along a fast-moving stretch of deep water with high steep banks are far less likely to contain cultural sites. Although specific project locations are not currently known, it is likely that some will occur in relatively high probability areas. BMPs that will be implemented for all site-specific projects include pre-construction screening of sites regarding cultural resources. In general, there has not been a sufficient level of surveys in Idaho to confidently identify high or low probability areas. All projects must be reviewed under Section 106 regardless of a project's location relative to a high probability area.

3.10.2.3 No Action Alternative

Under the No Action Alternative, the implementation of projects to help protect and restore ESA-listed anadromous fish would continue, with limited Reclamation participation in the Upper Salmon and Lemhi Subbasins. With limited Reclamation involvement, the number and scope of these projects cannot be defined at this time but would likely proceed slower than under the Proposed Action. Since fewer of the habitat improvements would occur, the potential impacts to archaeological sites, sacred sites/TCPs, and historic structures would be less. Desirable impacts to Native American cultural and spiritual lifeways resulting from improved salmon habitat would occur at a slower pace than under the Proposed Action.

Cumulative Impacts

No Cumulative Impacts to Cultural Resources are expected from the implementation of the Proposed Action.

3.10.2.4 Proposed Action

Barriers

Archaeological Sites

The addition or replacement of barriers could result in direct impacts to archaeological sites through ground-disturbing activities associated with construction and construction vehicle traffic. Archaeological cultural resources are finite in space, possessing definable boundaries. Much of the value of an archaeological site lies in its ability to provide meaningful information about an earlier prehistoric or historic cultural group—information not readily obtained by other means. This information is gleaned from the vertical and horizontal position of artifacts and other cultural materials *in situ* within an archaeological deposit. Ground-disturbing activities that disturb the relative *in situ* position of archaeological materials compromise the site's value for providing data and information. Based on the greater number of projects proposed in the Lemhi and Upper Salmon Subbasins, and because the current state of site recordation shows these areas to have the greatest number of archaeological sites (and historic standing structures), the likelihood of impacts to cultural resources appears greatest in the Lemhi and Upper Salmon Subbasins. Project review under Section 106 of the NHPA would ensure avoidance of impacts to cultural resources.

Historic Structures

Standing historic structures such as diversion dams are subject to direct physical impacts. Any cosmetic or structural change resulting from construction activities constitutes a direct impact. If project activities do not directly (physically) impact a structure but do alter its setting, such setting alterations may be considered a direct impact.

Screens

Archaeological Sites

The addition or replacement of screens could result in direct impacts to archaeological sites through ground-disturbing activities associated with construction and construction vehicle traffic. All sites are on private land in agricultural settings. Most sites have been previously disturbed. The greatest risk would be in the Lemhi and Upper Salmon Subbasins where the largest number of fish passage and screening projects are likely to be constructed. Projects would be reviewed under the guidelines of Section 106 of the NHPA prior to earth-moving activity.

Historic Structures

The environmental consequences of installing screens in the four subbasins would be the same for historic structures as the consequences of removing barriers.

Streamflow Improvement

Archaeological Sites

Actions to improve flow could result in direct physical impacts to archaeological sites through construction activities, such as headgate consolidation, that disturb ground surfaces Changes in flow from transfer of water rights would increase streamflow during critical periods. Such increases, compared to high seasonal flows, would be negligible. This appears most likely in the Lemhi and Upper Salmon Subbasins.

Historic Structures

The environmental consequences of modifying flow in the four subbasins would be the same for historic structures as the consequences of constructing screens and/or barriers.

Cumulative Impacts

While individual projects could cause some minor site-specific impacts, no Cumulative Impacts to Cultural Resources are expected from the implementation of the Proposed Action. Timely project review under Section 106 of the NHPA would result in the avoidance of cumulative effects on historic properties.

3.10.3 Mitigation

Because specific project impacts cannot be determined at the programmatic level of analysis, specific mitigation measures cannot be determined. Where impacts to archaeological sites are unavoidable, mitigation often takes the form of data recovery or archaeological excavation. Where impacts to structures are unavoidable, professional photographic documentation according to Historic American Buildings Survey/Historic American Engineering Records (HABS/HAER) standards may be required. Projects would be reviewed in accordance with the guidelines of Section 106 of the NHPA.

During project implementation, avoidance of cultural resource sites will occur whenever possible and is always the preferred course of action. If cultural resource sites are found within the area of project effect, Reclamation will consult with the Idaho SHPO and interested parties about their eligibility to the National Register of Historic Places (Register), project effect, and appropriate mitigation. If sites are determined eligible for the Register and cannot be avoided, the exact nature of the mitigative treatment would be determined in consultation with the SHPO (and others as appropriate) and documented in a Memorandum of Agreement with the consulting and interested parties. If NAGPRA human or cultural items are discovered during project implementation, activities in the immediate area of the discovery shall cease, and will not resume until Reclamation has completed consultation requirements with the tribes under NAGPRA.

3.11 Sacred Sites

3.11.1 Existing Conditions

It is recognized that the environmental and/or archaeological assessment process does not adequately address the cultural significance of all places that might be of importance to Indian people. Significance assessments of impacts to archaeological or natural resource sites fail to take into account Indian conceptions of the physical environment. Executive Order 13007 promotes accommodation of access to American Indian sacred sites by Indian religious practitioners and provides additional protection for the physical integrity of such sacred sites. The Order provides a definition of sacred sites as "any specific, discrete, narrowly delineated location on Federal land that is identified by an Indian Tribe, or Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion.

Reclamation has corresponded with tribes having aboriginal ties to the four subbasins, about the possible existence of sacred sites being present in the vicinity of the subbasins. Although the tribes have not responded, and no specific sacred sites have been identified, it is assumed that the subbasins, in general, would include places of spiritual and religious importance to the tribes. Various natural and physical features on the landscape - - such as mountains, foothills, buttes, springs, lakes, rivers, and caves - - derive their sacredness and power from a natural undisturbed state. In addition, certain cultural sites may be regarded as sacred to tribes, including, for example, burial places, petroglyph and pictograph sites, important travel routes, and battle or massacre sites, among others.

It is assumed in this analysis that sacred sites are present in each subbasin, and that they could be subject to the same kinds of impacts as other cultural resources.

3.11.2 Environmental Consequences

Because of the minor differences in impacts between the two alternatives this section discusses the Environmental Consequences of both alternatives. Any intrusion into a sacred site can result in direct impacts. Impacts can be immediate and directly associated with construction activities, or long term. Examples include introduction of modern development into a traditional cultural landscape that degrades the pristine setting and disrupts the ability of Indians to pray and/or view a traditional landscape feature important to Indian mythology or religious practice, and introduction of grazing into an area of critical native plant habitat. Improvement in salmon habitat can be a direct positive impact on the practice of traditional religious practices of tribes where salmon play a key role in traditional spiritual lifeways and practices.

There are likely positive impacts on sacred sites from the removal of barriers, the replacement of screens, and streamflow improvement. Sacred sites on waters edge are likely to have association with salmon. Improved habitat and subsequent greater numbers of fish would be a direct positive impact. There is a small possibility of negative impacts due to construction and the introduction of man-made materials to sacred locations.

Improvements to ESA anadromous salmonid habitat would occur at a slower pace under the No Action Alternative compared to the Proposed Action. Thus benefits regarding Sacred Sites would likely accrue faster under the Proposed Action.

Cumulative Impacts

No Cumulative Impacts are anticipated to Sacred Sites from the implementation of either the No Action or Proposed Action Alternatives.

3.11.3 Mitigation

Although Executive Order 13007 does not authorize agencies to mitigate for the impact of their actions upon Indian sacred sites, it does direct them to avoid adverse impacts whenever possible. For future Reclamation actions within the four subbasins that could impact Indian sacred sites, Reclamation will consult with tribes in conjunction with any 36CFR800 consultations. Under these consultations, Reclamation will seek means to avoid adverse impacts to sacred sites.

Sacred Sites and TCPs often embody non-physical cultural values or attributes that cannot be easily mitigated. While mitigation measures for Sacred Sites and TCPs subject to unavoidable project impact are usually developed on a case-by-case basis in consultation with the affected tribes, common off-site compensatory mitigation may include: funding tribal oral history programs or language preservation efforts, funding tribal museums or other cultural resource programs of critical importance to the tribes, or funding natural or cultural resource mitigation measures such as stream or wetland rehabilitation or fisheries enhancement. Because there are no specifics available regarding TCPs or sacred sites in the four subbasins, no mitigation beyond the BMPs to be implemented by Reclamation are recommended at this time.

3.12 Indian Trust Assets

3.12.1 Existing Conditions

Indian Trust Assets (ITAs) are legal interests in property held in trust by the United States for Indian tribes or individuals. The Secretary of the Interior, acting as the trustee, holds many assets in trust for Indian tribes or Indian individuals. Examples of things that may be trust assets are lands, minerals, hunting and fishing rights, and water rights. While most ITAs are on-reservation, they may also be found off-reservation.

The United States has an Indian trust responsibility to protect and maintain rights reserved by or granted to Indian tribes or Indian individuals by treaties, statutes, and executive orders. These are sometimes further interpreted through court decisions and regulations.

The Shoshone-Bannock Tribes, a Federally recognized tribe located at the Fort Hall Indian Reservation in southeastern Idaho, have trust assets both on-reservation and off-reservation. The Fort Bridger Treaty was signed and agreed to by the Bannock and Shoshone headman on July 3, 1868. The treaty states in Article 4 that members of the Shoshone-Bannock Tribe "...shall have the right to hunt on the unoccupied lands of the United States..." This has been interpreted to mean unoccupied Federal lands.

The tribes believe their right extends to the right to fish. The Fort Bridger Treaty for the Shoshone-Bannock has been interpreted in the case of State of Idaho v. Tinno, an off-reservation fishing case in Idaho. The Idaho Supreme Court determined that the Shoshone word for "hunt" also included to "fish." Under Tinno, the Court affirmed the tribal members' right to take fish off-reservation pursuant to the Fort Bridger Treaty (Shoshone-Bannock Tribes 1994).

The Nez Perce Tribe is a Federally recognized Tribe of the Nez Perce Reservation in northern Idaho. The United States and the tribe entered into three treaties (Treaty of 1855, Treaty of 1863, and Treaty of 1868) and one agreement (Agreement of 1893). The rights of the Nez Perce Tribe include the right to hunt, gather, and graze livestock on open and unclaimed lands, as well as the right to fish in all usual and accustomed places (Nez Perce Tribe 1995).

The Northwestern Band of the Shoshone Indians, a Federally recognized tribe without a reservation, possess treaty-protected hunting and fishing rights that may be exercised on unoccupied lands within the area acquired by the United States pursuant to the 1868 Treaty of Fort Bridger. No opinion is expressed as to which areas may be regarded as "unoccupied lands" (Regional Solicitor 1995).

Other Federally recognized tribes may have cultural and religious interests in the four subbasins but do not have off-reservation ITAs. Cultural interests may be protected under historic preservation laws and the Native American Graves Protection and Repatriation Act (NAGPRA). See Sections 3.10 and 3.11 (Cultural Resources and Sacred Sites) for a discussion of other tribal interests.

3.12.2 Environmental Consequences

Because of the similarity of the impacts between the two alternatives the impacts are discussed within the following narrative. There is no universally accepted understanding as to the specific treaty rights to hunt and fish in the vicinity of the subbasins since there has not been a settlement with either the Nez Perce Tribe, the Shoshone-Bannock Tribe, or the Northwestern Band of the Shoshone-Nation as to the extent and nature of their off-reservation hunting and fishing treaty rights. Thus, the ITAs considered are tribal hunting and fishing rights that may exist. Water rights claims or lack of such claims within the Snake River Basin Adjudication is not necessarily determinative of these kinds of rights.

The rights of the tribes to hunt and/or fish that may exist would not be altered by any of the alternatives. The availability of fish may be somewhat changed during the construction period. Potential changes are expected to be an increase in anadromous salmonid populations in the four subbasins, representing a beneficial impact. Restoration efforts and subsequent benefits to fish would occur at a faster pace under the proposed action compared to the No Action Alternative. See 3.6.2 Wildlife and 3.5.2 Fish Affected Environment for a complete discussion.

Cumulative Impacts

No Cumulative Impacts are anticipated to ITAs from the implementation of either the No Action or Proposed Action Alternatives. There would be no impacts to traditional hunting, fishing, or gathering sites.

3.12.3 Mitigation

As there are no anticipated adverse impacts, no mitigation measures are required.

3.13 Socioeconomics

The following narrative describes the socioeconomic setting of the Lemhi, Upper Salmon, Lower Salmon, and Middle Fork Clearwater Subbasins. See Figure 1.1-1 for orientation.

3.13.1 Existing Conditions

3.13.1.1 Lemhi Subbasin

The City of Salmon is the largest population center within or adjacent to the subbasin, although other smaller towns within the subbasin include Leadore and Tendoy. Over the past decade, Lemhi County and communities showed consistently lower population growth rates than the state average. According to the Bureau of the Census, between 1990 and 2000, the population of Lemhi County grew by 13.1 percent (to 7,806 persons) compared to a statewide rate of 28.5 percent. Lemhi County had a population density of 1.7 persons per square mile in 2000, compared to the state average of 15.6 persons per square mile.

The county showed significantly lower income and employment levels than the state. As of 1999, Lemhi County showed a Per Capita Personal Income (PCPI) of $18,886, 17.4 percent below the statewide average, a proportion similar to 1990 levels (17.1 percent). In 2000, Lemhi County showed an annual unemployment level of 9.0 percent, having risen from 7.9 percent in 1998 and 8.3 percent in 1990 - significantly above the respective statewide averages of 4.9, 5.2, and 5.9 percent. One factor contributing to this trend is the seasonal nature of many local jobs.

Federal and State government activities remain a major influence upon the economy, with Federal land ownership accounting for nearly 91 percent of the County (IDC 2002). Approximately 80 percent of the Lemhi Subbasin is managed by the USFS or the BLM (ISCC 1995). The subbasin supports intensive farming and ranching and uses an extensive system of canals for irrigating crops (mainly alfalfa) and watering stock (USGS 1998).

Outdoor recreation is a key part of the local culture and customs (ISCC 1995), and recreation and tourism are also important to the county economy. The leading economic sector within the City of Salmon is tourism, followed by timber and agriculture (ISCC 1995). The city, known as "the whitewater capital of the world" (IDOC 2001), relies heavily on seasonal recreational activities such as whitewater rafting, boating, fishing, hiking, camping, and hunting.

3.13.1.2 Upper Salmon Subbasin

The Upper Salmon Subbasin constitutes a significant portion of Custer County. The City of Challis is the largest population center within or adjacent to the subbasin; smaller communities within the subbasin include Stanley and Clayton. According to the Bureau of the Census, Custer County's population growth between 1990 and 2000 at 5.1 percent, was significantly lower than the State average (28.5 percent). Conversely, between 1990 and 2000, Challis and the smaller community of Stanley showed population growth rates of 18.0 and 29.0 percent, respectively. Over the decade, 39.2 percent of the county population growth was attributable to migration rather than through births. The county is a sparsely populated and entirely rural area, evidenced by a population density of 0.9 persons per square mile, much lower than the state average of 15.6 persons per square mile.

Incomes within the county have remained generally similar to the statewide averages. As of 1999, Custer County showed a PCPI of $23,087, 0.9 percent above the statewide average having increased proportionally by 5.7 percent from 1990.

The Federal government owns more than 93 percent of the lands in the county (IDOC 2001), and predominant uses of public lands within the subbasin include livestock grazing (sheep, cattle, and horses), mining, and recreation. Livestock grazing and irrigated cut hay pasture are also the predominant activities on private land, although residential development is increasing rapidly (NPPC 2001).

3.13.1.3 Middle Fork Clearwater Subbasin

The Middle Fork Clearwater Subbasin is situated in north-central Idaho, entirely within Idaho County. Portions of both the subbasin and the county are within the Nez Perce Indian Reservation. The largest population center within or immediately adjacent to the subbasin is the small city of Kooskia, with Grangeville, the county seat, situated approximately 20 miles to the south. Idaho County is sparsely populated and predominantly rural. Land ownership within the county remains mixed, comprised of private, State/Federal, and tribal holdings, with Federal government ownership covering over 83 percent of the County (IDC 2001). Between 1990 and 2000, population growth within the county, at 12.7 percent (to 15,511 persons), remained significantly below the statewide average (28.5 percent). As of 2000, the County was characterized as almost 80 percent rural (IDC 2001) and showed a population density of 1.8 persons per square mile, much lower than the state average of 15.6 persons per square mile. In 1999, Idaho County showed a PCPI of $17,690, 22.6 percent below the statewide average.

The economy in Idaho County remains heavily dependent on natural resources, with forest products, manufacturing, and agriculture the basic industries (IDC 2001). Employment within the lumber and wood products sector constitutes a large part of the labor force (11.8 percent in 1998). The number of government jobs decreased due to cutbacks at the USFS, and the number of jobs in agriculture is just one-third of what it was 20 years ago (IDL 1999). Substantial employment is also provided within the trade and services sector (IDC 2001). Major employers include timber companies, school districts, USFS, and the County government (IDC 2001). Recreation is an increasingly significant component of the local economy with a variety of attractions situated within the county including several popular wilderness areas, a large part of the Hells Canyon National Recreation Area, and significant stretches of the Salmon River. In relation, whitewater rafting increased over the last several years along with fishing and hunting services (IDL 1999).

3.13.1.4 Little Salmon Subbasin

The Little Salmon Subbasin is situated in west-central Idaho, across portions of northern Adams and Valley Counties and southern Idaho County. Communities within or adjacent to the subbasin include Riggins in Idaho County and New Meadows in Adams County. The subbasin is an entirely rural, sparsely populated area that has generally shown relatively low levels of growth over the past decade. According to the Bureau of the Census, as of 2000, population densities within the three counties were extremely low, ranging from 1.8 to 2.5 persons per square mile, much lower than the state average of 15.6 persons per square mile. The population of Adams and Idaho Counties grew by 6.8 and 12.7 percent over the decade, respectively, much lower than the statewide rate of 28.5 percent, although the growth of Valley County (25.2 percent) was much closer to the statewide average. A large number of residents have second houses or vacation homes in the area; as such, there are sizeable differences in population based on the season of the year (IDL 1999). As of 1999, Adams, Idaho, and Valley Counties showed PCPIs of $18,212, $17,690, and $24,390 (-19.4 percent, -22.6 percent, and +6.6 percent above or below the statewide average, respectively).

Public landholding accounts for nearly 70 percent of the subbasin, with the vast majority being USFS land. The main employers within the region include the USFS, local government, logging, and tourism-related trade and services (IDC 2001). The Adams County economy relies heavily on forest products manufacturing and government for employment (IDC 2001). Government employment through the USFS traditionally provides a stable economic element (IDL 1999). As of 2000, in Valley County nearly 31 percent of all non-farm employment was with government (IDC 2001), with other main sources of employment in construction and forest products/ manufacturing. In Valley and Adams Counties, an essential support of the economy has traditionally been natural resource-based industry. Timber harvesting and lumber production operations are still present, although the future of the timber industry is uncertain because of the continued dispute over access to public lands (IDL 1999). Recreation and tourism are important components of the Valley County economy. The Brundage Ski Area, located on the Adams and Valley County border, is a large seasonal employer. In Idaho County, forest products manufacturing and agriculture are the basic industries; government is the largest employment sector, and substantial employment is also provided by the trade and services sector (IDC 2001).

3.13.2 Environmental Consequences

3.13.2.1 No Action Alternative

Under the No Action Alternative, Reclamation would continue to provide technical assistance in the Lemhi and Upper Salmon Subbasins. Other entities have initiated similar streamflow improvement projects within the four subbasins. The role of Reclamation would be limited to providing technical assistance for certain irrigation-related projects in the Lemhi and Upper Salmon Subbasins. The scope and level of this involvement would continue to fluctuate annually. There would be no effect to the socioeconomics of the four subbasins.

Cumulative Impacts

There would be no cumulative impacts to socioeconomics from the No Action Alternative.

3.13.2.2 Proposed Action

No displacement or relocation of any person, populations, or housing would occur as a result of the Proposed Action. The construction of the structures and installation of the related equipment would take place incrementally throughout each of the subbasins over approximately 10 years. Construction would involve a certain amount of locally procured materials and would use local labor predominantly. These factors allow an incremental but positive economic impact from the limited increase in local employment and use of material. These economic benefits would be minor because of the small size of the projects and their dispersion throughout the subbasins. Landowners may have to contribute to part of the cost of these structures. The level of contribution by landowners is not yet known and will depend on the outcome of pending Congressional approval of Reclamation construction authority. Landowners will realize improved operation efficiencies and would benefit from assistance in complying with ESA requirements. Construction impacts are anticipated to be short-term, localized, and not adverse. No significant impacts would occur during construction.

Landowners must bear the cost of maintenance and upkeep of the structures on their property. This maintenance is expected to be minimal given the sturdy construction and long lifespan of the structures. Projected maintenance costs of the new structures are not anticipated to outweigh the costs of maintenance of the existing structures. Maintenance of new Fish Screens or other facilities would be an added cost to private landowners. Long term operation and maintenance related to push-up dam replacement may reduce operation and maintenance costs, due to more efficient alternative irrigation methods.

The proposed structures and equipment, when constructed, would facilitate more efficient extraction and distribution of irrigation water. Therefore, while the volume of extracted water would diminish at any given location, the actual amount of water currently applied to crops would remain constant, with no impact to agriculture.

The fishing and recreation industry is an increasingly important economic sector within all of the subbasins, and outdoor recreation tourism and tourist-related industries have become increasingly important to the economy of the entire region. Given that the ultimate goal of the Proposed Action is to improve flows and eliminate instream passage barriers, the resultant increase in flows would positively impact fish habitat and, with the installation of adequate fish screens, enhance fish passage. In turn, increases in fish populations would enhance and expand fishing and recreational opportunities within each subbasin, allowing a wider package of visitor-serving activities to be offered. All projects would be implemented with willing participants and would provide solutions to endangered species concerns for landowners. There would be no socio-economic impacts to willing participants from implementation of the Proposed Action. Overall long-term socioeconomic impacts would be positive. No significant socioeconomic impacts are anticipated.

Cumulative Impacts

There would be no cumulative impacts to socioeconomics from the Proposed Action.

3.13.3 Mitigation

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

3.14 Land Use

3.14.1 Existing Conditions

This section summarized land use in the Mountain Snake Province Subbasins. A brief summary of the largest cities and towns, land ownership, and predominant land uses in each subbasin is provided.

3.14.1.1 Lemhi Subbasin

The Lemhi Subbasin encompasses 1,270 square miles. The majority of the subbasin is Federally owned. The Federal lands are distributed evenly between the USFS (39 percent) and the BLM (39 percent) with another 3.0 percent in public ownership at the State level. Of the four subbasins, Lemhi has the largest proportion of private ownership at 18.4 percent.

The largest city within this subbasin is Salmon, with a population of 3,122, located at the confluence of the Lemhi and Salmon Rivers. Leadore, a town with a population of 594, is approximately 45 miles upstream from Salmon (IDC 2000).

The predominant land uses within the subbasin are agriculture and livestock grazing. Highway 28 roughly parallels the Lemhi River throughout the subbasin. Approximately 21 percent of the river-bed has been channelized and straightened by the state Highway Department and local ranchers. This has subsequently raised the riverbed and increased flood hazards (NPPC 2002).

3.14.1.2 Upper Salmon Subbasin

The majority of the lands within the Upper Salmon Subbasin are publicly owned. Private ownership covers 5 percent of the land area and is generally concentrated around the City of Challis and along the Salmon River, especially near the town of Stanley (NPPC 2002).

The predominant uses of public lands within the subbasin are mining, livestock grazing, and recreation. Livestock grazing is not as predominant as mining but has been a constant use within the subbasin for decades. The subbasin lowlands are primarily used for livestock grazing with a few upper rangeland areas grazed by sheep. The majority of allotments within the subbasin are managed under an Allotment Management Plan administered by the BLM. Livestock grazing and irrigated cut hay pasture agriculture are the predominant activities on private land, although residential development is increasing.

3.14.1.3 Middle Fork Clearwater Subbasin

Land ownership in the Middle Fork Clearwater Subbasin is highly mixed and is comprised of private, State, Federal, and tribal holdings. Potlach Corporation and the Idaho Department of Lands manage substantial portions of the land within the subbasin, and properties managed by these two entities are highly mixed. The eastern-most portion of the Middle Fork Clearwater is Federally owned and managed by the USFS. Private holdings are an important component in the western half of the subbasin, which is also interspersed with Nez Perce Tribal lands.

The largest town within the subbasin is Kooskia, with a population of 675 (IDC 2000). Highway 12 parallels the river throughout the subbasin. While moderate urban development is occurring in the lower Clearwater Subbasin, land cover in the Middle Fork Clearwater Subbasin is primarily forest, with agricultural use limited to portions of the western plateaus. Much of the forested area has been intensively harvested, reflected by the high densities of forest roads through much of the subbasin. Most of the land in the larger Clearwater Basin is Federally owned, particularly in the mountainous areas, and mostly under USFS jurisdiction.

3.14.1.4 Little Salmon Subbasin

The Little Salmon Subbasin lies within northeastern Adams and southwestern Idaho Counties and covers 582 square miles. Land ownership in the Little Salmon Subbasin is dominated by USFS (67.8 percent) and private ownership (23 percent) with 5.3 percent and 3.9 percent owned by BLM and the State, respectively (NPPC 2002). The largest towns within the subbasin are Riggins and New Meadows, which have a combined population of just under 1,000 (IDC 2000). Highway 95 parallels the river throughout the subbasin. Predominant land uses include livestock grazing, mining, recreation, residences, and timber harvest.

3.14.2 Environmental Consequences

3.14.2.1 No Action Alternative

Salmon and steelhead restoration efforts would continue under the present pace under the guidance of local entities and with continued technical assistance by Reclamation in the Lemhi and Upper Salmon Subbasin. Implementation of these efforts would have no effect on land use in the four sub-basins.

Cumulative Impacts

There would be no cumulative impacts to land use from the No Action Alternative.

3.14.2.2 Proposed Action

Implementation of restoration efforts would occur at a faster pace with Reclamation's participation through the FCRPS BiOp than described under the No Action Alternative. All projects would occur on private land. Reclamation could purchase water rights from willing landowners and permanently transfer these rights to a third part for instream use. Such a transaction would need to comply with Idaho water law. Transfer of water rights could have some minor land use effects if land in agriculture use, such as irrigated pasture, were removed from production. Given the complexities of these transfers and the likely limited use of these efforts by Reclamation, there would be minimal effects to land use from water transfers. There would be no effect to land use in the four subbasins addressed herein.

Cumulative Impacts

There would be no cumulative impacts to land use from the Proposed Action.

3.14.3 Mitigation

No impacts have been identified; therefore, no mitigation measures are necessary.

3.15 Environmental Justice

Executive Order 12898 (Environmental Justice, 59 Fed. Reg. 7629 [1994]) requires each Federal agency to achieve environmental justice by addressing "disproportionately high and adverse human health and environmental effects on minority and low-income populations." The demographics of the affected area are examined to determine whether minority populations, low-income populations, or Indian tribes present in the area are impacted by a proposed action. If so, a determination must be made as to whether the implementation/development of the proposed project may cause disproportionately high and adverse human health or environmental effects on the minority or low-income populations present. Examination of minority and low income populations is warranted through the adoption of a 1994 directive designed specifically to examine impacts to such things as human health of minority populations, low income populations, and Indian tribes and is commonly known as Environmental Justice.

The Council on Environmental Quality (CEQ) defined "minority" to consist of the following groups: Black/African American, Asian, Native Hawaiian or Other Pacific Islander, American Indian or

Alaskan Native, and Hispanic populations (regardless of race). Additionally, for the purposes of this analysis, “minority’ also includes all other non-white racial categories within the 2000 Census such as "Some other race" and "Two or more races." The Interagency Federal Working Group on Environmental Justice (IWG) guidance states that a "minority population" may be present in an area if the minority population percentage in the area of interest is "meaningfully greater" than the minority population in the general population. CEQ also defined "low income populations" based on the annual statistical thresholds from the Bureau of the Census. These “poverty thresholds” are calculated by family size and composition and are updated annually to reflect inflation. A population is considered low income if the percentage of the population that is below the poverty threshold within the area of interest is "meaningfully greater" than the low-income population in the general area (state-wide) population.

3.15.1 Existing Conditions

According to the Bureau of the Census, as of 2000, the white population is the substantial majority (91 percent) in Idaho with much smaller populations of other racial groups such as African American (0.4 percent), Asian (1.4 percent), and Hawaiian (0.1 percent). With regard to ethnicity, the statewide Hispanic population was 7.9 percent and consequently raised the total minority population (under Environmental Justice guidelines) of the State to 12.0 percent. Because non-white Hispanics (ethnicity) and people of color (race) are included in the definition of Minority under the Environmental Justice guidelines, the total for minorities and the majority (whites) is greater than 100 percent. Under this classification a person who is white Hispanic gets counted in both the majority and minority. Racial and ethnic populations within each of the subbasins were examined both by county and primary towns/cities, as shown in Table 3.15-1.

Mirroring the state, all counties examined were dominated by white populations, ranging from 94.1 percent (Idaho County) to 97.3 percent (Custer County). Consequently, other racial categories were correspondingly low. Black/African American populations ranged from 0 to 0.1 percent, Asian populations ranged from 0 to 0.3 percent, “Some other race” ranged from 0.8 to 1.2 percent, and “Two or more races” ranged from 0.9 to 1.7 percent. Native American populations were significantly lower than the statewide average of 1.4 percent in Lemhi, Custer, and Valley Counties, and equal within Adams County (1.4 percent); Idaho County at 2.9 percent has a higher percentage than the statewide average. Hispanic populations within each of the subbasins, ranging from 1.6 percent (Adams County) to 4.2 percent (Custer County), were also all significantly below the statewide average of 7.9 percent. Total minority populations within the subbasins were all significantly below the statewide average of 12.0 percent, and ranged from 4.2 percent (Valley County) to 6.6 percent (Idaho County).

The cities of Salmon, Challis, Grangeville, and Riggins showed total minority populations of 4.5 percent, 5.1 percent, 4.3 percent, and 1.7 percent, respectively, all equal to or below the applicable county and statewide averages. The City of Kooskia showed higher “Two or more races” populations (2.7 percent) than that of both the county and statewide averages and, although marginally lower than the county average of 2.9 percent, also showed higher Native American populations (2.2 percent) than the statewide average. However, at 7.7 percent, the total minority population remained considerably below the statewide average of 12.0 percent. As such, using the criteria presented above, none of the counties or communities examined are considered to have sufficient minority populations to warrant evaluation under Executive Order 12898.

Table 3.15-1. Summary of Race and Ethnicity for County, Local, and Tribal Jurisdictions of the Subbasins.

	Idaho State	Lemhi County	City of Salmon	Custer County	City of Challis	Adams County	City of Riggins	Valley County	Idaho County	City of Grangeville	City of Kooskia	Nez Perce Reservation
White	91.0	96.6	96.8	97.3	97.1	96.3	98.3	96.4	94.1	96.3	93.2	84.6
Black or African American	0.4	0.1	0.2	-	-	0.1	-	-	0.1	-	-	0.2
American Indian, Alaskan Native	1.4	0.6	0.5	0.6	0.9	1.4	0.5	0.7	2.9	1.1	2.2	11.7
Asian	0.9	0.2	0.3	-	-	0.1	-	0.3	0.3	0.3	0.3	0.3
Native Hawaiian and Other Pacific Islander	0.1	[1]-	-	-	-	-	-	-	-	-	-	0.1
Some Other Race	4.2	0.8	0.6	1.2	1.2	0.9	0.2	1.1	0.9	0.7	1.6	0.9
Two or More Races	2.0	1.7	1.6	0.9	0.8	1.2	1.0	1.4	1.7	1.5	2.7	2.2
Hispanic origin, any race	7.9	2.2	2.2	4.2	3.9	1.6	-	2.0	1.6	1.6	2.4	2.0
Total Non-Minority Population (White Non-Hispanic)	88.0	95.5	95.5	94.4	94.9	95.5	98.3	95.8	6.6	95.7	7.7	83.8
Total Minority Population	12.0	4.5	4.5	5.6	5.1	4.5	1.7	4.2	93.4	4.3	92.3	16.2

Source: Bureau of the Census 2000

[1] less than .01 %

The Nez Perce Reservation, located partially within the Middle Fork Clearwater Subbasin, includes a significant Native American population of 11.7 percent in turn leading to a total minority population of 16.2 percent. Thus, using the criteria presented above, the Nez Perce Reservation is a minority population that warrants consideration of impacts under the Environmental Justice criteria.

According to the Bureau of the Census, in 1990, 13.25 percent of Idaho's population was below the poverty level. In 1990, Adams and Valley Counties showed poverty levels below that of the statewide average (10.9 percent and 12.7 percent, respectively). Custer and Lemhi Counties, at 14.84 percent and 20.24 percent, were significantly above the statewide average, while Idaho County, at 13.75 percent, was only marginally above. According to the Bureau of the Census 1997 mode-based estimates of the poverty level (the latest figures available), the statewide average poverty level was marginally lower (13 percent), and Adams and Idaho Counties, at 14.6 percent and 17.6 percent, respectively, showed elevated poverty levels significantly above the statewide average. Poverty levels within Valley County rose to 13.8 percent, marginally above the statewide rate. Between 1990 and 1997, both Custer and Lemhi Counties showed marked decreases in poverty levels, with Custer County at 12.1 percent, which is below the statewide average. However, Lemhi, County, at 15.8 percent, remained significantly above the statewide average. As of 1997, the poverty levels of Adams, Lemhi, and Idaho Counties were considerably higher than that of the state, and thus, using the criteria presented above, are considered to be low-income populations that warrant consideration of impacts under the Environmental Justice criteria.

3.15.2 Environmental Consequences

3.15.2.1 No Action Alternative

Under the No Action Alternative Reclamation would continue providing technical assistance in the Lemhi and Upper Salmon Subbasins. Because of the limited scope of the No Action Alternative the general economy of these subbasins and the region in general would benefit to a lesser degree than under the Proposed Action. Disproportionately high and adverse human health or environmental effects on the minority or low income populations are not expected. Therefore, no environmental justice impacts are anticipated.

Cumulative Impacts

There would be no cumulative environmental justice impacts associated with the No Action Alternative.

3.15.2.2 Proposed Action

Impacts associated with the Proposed Action include short-term biological, water quality, and noise impacts. Minimal short-term positive economic impacts are anticipated related to construction activities. No adverse long-term impacts are anticipated within any of the subbasins, although potentially significant long-term positive local and regional economic impacts are expected with the implementation of the Proposed Action. The number and dispersion of the temporary structures to be replaced also render project impacts relatively evenly distributed throughout four subbasins. Similarly, the growth of the fishing, recreation, and tourism sectors throughout the region means that positive impacts will also be felt throughout region as a whole.

Although there are both minority and low income populations present within the study areas, given the number and geographically dispersed nature of the individual sites, anticipated impacts would be distributed relatively evenly within each subbasin. There is no indication that the Proposed Action would impact a minority or low income population component to any greater degree than the surrounding area or region. As such, disproportionately high and adverse human health or environmental effects impacts on the minority or low income populations present are not expected. Thus, no environmental justice impacts are anticipated.

Cumulative Impacts

There would be no cumulative environmental justice impacts associated with the Proposed Action.

3.15.3 Mitigation

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