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15 Pend Oreille Subbasin Inventory of Existing Programs – Aquatic¹

15.1 Current Management Directions

State and Federal agencies and Tribal governments that have management authority over fish and wildlife resources in the Pend Oreille Subbasin include the U.S. Fish and Wildlife Service (USFWS), U.S. Forest Service (USFS), Idaho Fish and Game (IDFG), Washington Department of Fish and Wildlife (WDFW), and the Kalispel Tribe. The WDFW and the Kalispel Tribe have a Memorandum of Understanding to promote cooperation and coordination on management of fishery resources of the Pend Oreille River and its tributaries such as the management of largemouth bass in Box Canyon Reservoir and native trout in the tributaries. Other state and federal agencies, including, but not limited to, the U.S. Army Corps of Engineers (USACE), Environmental Protection Agency (EPA), the Natural Resources Conservation Service (NRCS), Idaho Department of Environmental Quality (IDEQ) and Washington Department of Ecology are involved in programs that affect the land or water that provide habitat for fish and wildlife. A complete list of state, federal, and Tribal entities that are involved in management of fish and wildlife or their habitats is included in section 2.4.1, along with a description of the agency's management direction.

Within the Pend Oreille Subbasin, Lake Pend Oreille supports a significant sport fishery. In 1991, anglers expended an estimated 465,000 hours fishing the lake with approximately 65 percent of the effort targeting trout and 35 percent of the effort targeting kokanee (Paragamian 1994). The world record bull trout, 14.5 kilograms (kg, 32 pounds), and the world record rainbow trout, 16.8 kg (37 pounds), were taken from Lake Pend Oreille in 1949 and 1947, respectively. Current and planned fisheries management direction in Lake Pend Oreille emphasizes kokanee as a keystone species with bull trout and rainbow trout managed for a trophy fishery. Westslope cutthroat trout will be managed primarily as a wild trout fishery with restrictive regulations. Lake trout are being actively managed for removal to reduce their impacts on preferred species. All fisheries are self-sustaining with the exception of supplemental stocking with kokanee fry, depending on their availability (N. Horner, IDFG, personal communication).

Currently, rainbow trout, brown trout, westslope cutthroat trout, and mountain whitefish are the important principal sport fishes in the lower Clark Fork River. Bull trout are also present and occasionally caught by anglers. Management direction is to improve habitat and recruitment to the river, with the fishery dependent on self-sustaining populations. Ecologically, restoring connectivity to the lower Clark Fork system via passage at Cabinet Gorge and Noxon Rapids dams is an important goal because it will restore access to the hundreds of miles of spawning and rearing habitat available in the Montana portion of the lower Clark Fork watershed. Enhanced migration and spawn areas are expected to increase native populations of bull trout, westslope cutthroat trout, and mountain whitefish.

¹ Large portions of Section 15 were contributed to by the Pend Oreille Subbasin Summary Report (2001) pp. 25-59, 89-116, 151-166.

WDFW management direction in the lower Pend Oreille River addresses native trout species protection and enhancement, while continuing to provide legislatively mandated recreational opportunities for the residents of Washington State. In 1995, fishing closures for bull trout on the mainstem and all tributaries of the lower Pend Oreille River in Washington state went into effect. A two trout, eight-inch minimum length, is in effect for all other trout in rivers and streams. Westslope cutthroat trout and triploid rainbow trout are stocked by WDFW into 28 lakes and ponds in the lower Pend Oreille Subbasin for public recreational opportunity. In addition, 30,000-45,000 rainbow trout are provided to a cooperative net pen project in the mainstem Pend Oreille River. The project releases the rainbow trout as catchable size fish in the fall of each year. Two isolated lakes are also stocked with eastern brook trout.

Upper Priest Lake has been managed as a refuge for native fish since 1994, with catch-and-release regulations, requiring artificial flies and lures with single barbless hooks and no bait. Much of the fishing in the lake is associated with camping or hike-in anglers, who may be less able to identify bull trout and more likely to keep them than more experienced boat fishermen. Illegal harvest is an issue in the Priest River drainage, but its impact is largely unquantified. Despite harvest restrictions on cutthroat trout and bull trout, neither population has responded in Upper Priest Lake and Priest Lake.

The Priest River below the outlet dam supports a seasonal fishery for westslope cutthroat trout during the spring spawning migration season. This river reach has historically been managed with a year-round season due, in part, to high temperatures that are thought to limit the westslope cutthroat trout population during the late summer. Protection was given to westslope cutthroat trout spawners by implementing seasonal recreation harvest from May 28 to November 30, during the 1994-95 fishing season. Major public opposition led to repeal after only one season; hence there was no evaluation of potential benefits (N. Horner, IDFG, personal communication).

Current and planned fisheries management direction in the Priest River drainage is primarily for wild native salmonids and to provide a yield lake trout fishery in Priest Lake with a year-round season and two-fish limit. Fisheries for westslope cutthroat trout, bull trout, and kokanee are closed to harvest. IDFG conducts supplemental stocking of catchable rainbow trout in isolated small ponds to provide harvest opportunity for unskilled anglers (N. Horner, IDFG, personal communication).

15.1.2 Local Government

15.1.2.1 Bonner County Soil and Water Conservation District (SWCD)

The Bonner County SWCD updates a 5-Year Resource Conservation Plan every year. The five priorities that are being addressed at this time are:

1. Water Quality. Goal – Meet rules, regulations of section 319 of Water Quality Act, the 1986 Safe Drinking Water Act and amendments of the 1972 Clean Water Act, Antidegradation Section.

2. Timber and Woodlands. Goal – Strengthen Forestry Resources in the district.
3. Fish, Wildlife and Recreation. Goal – Improve fish and wildlife habitat and increase native trout populations from a locally based, voluntary and cost-effective approach.
4. District Operations/Information and Education. Goal – Have an effective, proactive Board of Supervisors and create public awareness of conservation concerns and practices.
5. Pasture and Hayland. Goal – Find alternative crops with better economic returns and improve yield of existing crops and pastures.

Bonner and Kootenai counties in Idaho have adopted comprehensive plans to guide growth and development on county administered lands. Bonner County’s plan has been under revision for the past three years. Kootenai County adopted a site disturbance ordinance in 1999 that was designed to protect water quality.

The Cocolalla Lake Association and Bonner County SWCD developed a plan for improving water quality in the Cocolalla Creek watershed, which is a tributary of the Pend Oreille River.

15.2 Existing and Imminent Protections

Existing and imminent protection efforts include enforcement of existing habitat protections via the Washington State Hydraulic Code (RCW 75.20.100) and Forest Practice Rules (RCW 76.09)/Forests and Fish Agreement, enforcement of prohibition on taking of bull trout, enforcement of catch limit on harvest of westslope cutthroat trout, and eradication of non-native trout species, such as eastern brook trout (imminent).

The Timber, Fish, and Wildlife Plan is an agreement between WDOE and the timber industry regarding new criteria for protecting anadromous fish and bull trout habitat by specific protections of riparian forests along salmon bearing streams.

The State of Washington passed a Growth Management Act, which requires, among many things, that counties enact ordinances that identify and protect critical habitat, especially of ESA linked species of aquatic but also terrestrial species. This program is just beginning in 2003 but all counties will need to complete Habitat Plans by 2006.

15.3 Inventory of Recent Restoration and Conservation Projects

Refer to Appendix H for a comprehensive list of BPA and non-BPA funded projects within the IMP.

15.3.1 Pend Oreille Subbasin

15.3.1.1 BPA Funded Research, Monitoring and Evaluation

Joint Stock Assessment Project (#9700400)

Discussed in section 2.4.3 Inventory of Restoration and Conservation Projects under the

subheading Resident Fish Stock Status Above Chief Joseph and Grand Coulee Dams (all of the IMP within Washington).

Genetic Inventory of Bull Trout and Westslope Cutthroat Trout in the Pend Oreille Subbasin

Project Description:

This project seeks to comprehensively identify the genetics characteristics of bull trout and westslope cutthroat trout within the Pend Oreille Subbasin. In addition, the extent of hybridization between bull trout and brook trout, and westslope cutthroat, and rainbow trout will be evaluated. Bull trout and westslope cutthroat trout samples will be obtained in 80 locations throughout the Priest Lake and Lower Pend Oreille subbasins, including the Salmo River watershed (Washington and Canada). The entire project will take place from 2002-2004. This project will enable managers to identify core areas (watersheds) where populations and habitat need protection and recovery efforts can be implemented.

Associated Monitoring:

Additional samples may be collected from original sites to determine if any gene flow has occurred. This is to assess the temporal stability/variability of the genetic profiles of the populations.

Accomplishments:

In 2002, the Kalispel Tribe collected 280 bull trout samples and 940 westslope cutthroat samples for a total of 1,220 samples from 40 watersheds. In 2003, the Kalispel Tribe collected an additional 232 bull trout and 1,282 westslope cutthroat trout for a total of 1,514 samples from 34 watersheds. The Washington Department of Fish and Wildlife's genetics lab has completed initial microsatellite DNA analysis of the 2002 samples. The WDFW genetic lab was able to run 24 loci on westslope cutthroat and 12 loci on bull trout.

Notes:

Due to the lack of westslope cutthroat trout and bull trout in some watersheds, alternate watersheds had to be selected. Equipment problems with the new Smith-Root LR-24 shockers have slowed collection. Collection has also been slowed because of unexpected fire restrictions due to an abnormal hot and dry summer.

15.3.1.2 Non-BPA Funded Research, Monitoring, and Evaluation Activities

IDFG License and Federal Aid to Fish Restoration Program

The IDFG has been involved with research, monitoring, and evaluation activities in the Lake Pend Oreille Subbasin since the 1950s. The IDFG conducted a year-long creel survey in 2000 on Lake Pend Oreille and the lower Clark Fork River to assess angler use, catch rates, harvest, catch composition, and angler. This survey was established to assess the response of the fishery to recent closure to kokanee harvest and liberalization of the harvest limits on rainbow trout and lake trout. The data will also be used to assess trends in the fishery by comparison with long-term data sets.

The IDFG regional fisheries staff assists Avista with bull trout redd counts; IDFG houses 18 years of the long-term trend data on Lake Pend Oreille bull trout redd counts. The IDFG also works with local sportsmen groups to monitor participation, catch, and harvest in biannual fishing derbies.

IDFG - Albeni Cove Wetlands Restoration

Project Description:

Ducks Unlimited will construct several wetlands areas with water management provided by dikes, water control structures, and engineered waterways.

Associated Monitoring:

IDFG will provide routine inspection, operation, rehabilitation, and maintenance necessary to maintain the continuing viability and functioning of the Albeni Cove Wetlands Restoration project throughout the term of this Agreement. They will manage the Site to provide habitat that is attractive to waterfowl production and migration, as well as beneficial to other wetland dependent wildlife.

Accomplishments:

Many species of waterfowl, neotropical passerines, raptors, and mammals species utilize the wetlands and waterways in the Pend Oreille River watershed, and these are being restored. This is a thirty-year agreement.

Washington Department of Fish and Wildlife (WDFW)

The WDFW applied for and received grant money from the Salmon Recovery Funding Board to initiate a pilot project in the Middle Branch of LeClerc Creek to remove eastern brook trout in March of 2001. The project is on hold pending environmental documentation processes within the agency, and other outside environmental agencies.

U.S. Forest Service

The USFS Sandpoint Ranger District annually monitors watershed and fish habitat conditions for tributary streams on National Forest System lands. Results are published in an annual monitoring report distributed by the Idaho Panhandle National Forest (IPNF) Supervisor's Office.

The Rocky Mountain Research Station in Boise, Idaho has conducted a significant amount of research on bull trout populations in the Upper Pend Oreille drainage. Studies have included assessing the validity of redd counts, determining timing of migration and spawning, comparison of stock sizes, estimation of mortality, estimating age of adults, monitoring for repeat spawning, estimating of persistence, and, in cooperation with the University of Montana, assessing the genetic structure of tributary bull trout populations. These studies have resulted in several publications, including Rieman and McIntyre 1993, Rieman and Myers 1997, and others.

The Colville National Forest monitors range condition, utilization, and range improvements on grazing allotments, road conditions and follow-up maintenance on system roads within the Subbasin.

U.S. Geological Survey (USGS)

As part of a larger study encompassing watersheds in the northern Rocky Mountains, the USGS is conducting fish and water quality assessments in the Lower Clark Fork subbasin.

Idaho Department of Environmental Quality (IDEQ)

The IDEQ periodically monitors water quality in the Upper Pend Oreille drainage, assessing such attributes as temperature, sediment, heavy metals, and nutrients.

The IDEQ is responsible for assessing waters of the state. The Clean Water Act (CWA) and EPA regulations direct that the State monitor and assess the physical, chemical, and biological integrity of water bodies. To accomplish this, IDEQ has developed the Beneficial Use Reconnaissance Project (BURP), and the Water Body Assessment Guidance (WBAG) program. Waters identified as potentially impaired also undergo a more rigorous water quality Subbasin Assessment that incorporates all available information and focuses on the cause and extent of impairments for development of a TMDL if necessary.

The purpose of the BURP program is to consistently provide the physical, chemical, and biological data necessary to assess the integrity and quality of waters. It relies heavily on macroinvertebrate sampling, habitat evaluation and measurement, bacterial sampling, and fish sampling. The BURP protocol closely follows EPA's *Rapid Bioassessment Protocols for Use in Streams and Rivers* (Plafkin et al. 1989). BURP data also documents existing uses, which must then be designated and protected under Idaho's water quality standards. It is the goal of the state to re-monitor water bodies on a rolling five-year schedule.

The WBAG was designed to use BURP data to answer questions about stream integrity, water quality, and beneficial use support status. It originally consisted of multi-metric indexes for macroinvertebrates and habitat, qualitative and quantitative fisheries assessments, and evaluation of criteria exceedances. Assessments of BURP data collected from 1993 through 1996 were conducted to generate the 1998 list of impaired waters required under section 303(d) of the CWA. Revisions to the assessment methodology are currently underway that would allow the use of more types of data, revise the macroinvertebrate and habitat indexes, add a multi-metric fish index, revise the salmonid spawning beneficial use assessment, and add an interpretation of criteria exceedances in the assessments. The revised water body assessment methodology is expected to be completed in 2001 for use in the next 303(d) and 305(b) reporting cycles, and in ongoing TMDL subbasin assessments.

NRCS

Bismark Meadows Wetland Restoration

Project Description:

Perpetual easements with seven landowners on 1,016 contiguous acres, mostly wet meadow. Filling ditches, plugging ditches, drop structures in Reeder Creek and four shallow water areas will restore functions and values of the meadow. Bluebird, swallow

and bat houses will be installed. Haying, grazing, and other uses will be eliminated except for quiet enjoyment by landowners.

Associated Monitoring:

Annual status review after construction in 2004. Annual plant surveys and photo points will be installed to track hydrology and plant restoration.

Accomplishments:

Interior fence removal, project plan drawn, project bid for construction next summer.

Moores Creek Livestock Fencing & Tree Planting

Project Description:

Fencing livestock from stream and planting trees along creek. This is a Continuous Conservation Reserve Program Contract for 15 years. 12,400 linear feet of creek fencing or 21.8 acres of fencing and tree planting will be completed. Two livestock creek crossings will also be installed.

Associated Monitoring:

Annual Status Review with Landowner by NRCS for five years.

Accomplishments:

The creek has been fenced off from livestock for 5,900 lineal feet or 6.7 acres to date. Trees will be planted in the spring. Another 6,500 lineal feet of fence or 15.12 acres will be fenced off next year with trees planted along creek the following spring.

15.3.1.3 Other Non-BPA Funded Research, Monitoring and Evaluation Activities

- Monitor and evaluate the effect instream structures have on the freshwater macroinvertebrate community.
- Conduct habitat assessments and snorkeling surveys in tributaries to Box Canyon Reservoir under the settlement agreement for the Box Canyon Dam license amendment. Funded by the Pend Oreille County PUD and implemented by the Kalispel Tribe.
 - WDFW's resident fish genetic analysis of fish stocks occurring within managed lakes of Pend Oreille County.
 - Ongoing bull trout recovery efforts within the Northeast Washington Recovery Unit.
 - Settlement for FERC license amendment for Box Canyon Dam, tributary fish population and habitat assessments. Funded by the Pend Oreille County PUD and implemented by the Kalispel Tribe.
 - Timber Fish and Wildlife-funded Riparian Management Zone research to determine fish and wildlife responses to Washington state forest practice standards and modified standards.
 - Pacific Salmon and Wildlife: Ecological Contexts, Relationships, and Implications for Management 2000.

- East LeClerc Creek road relocation project. Designed to reduce sedimentation loads and address fish passage issues in LeClerc Creek. Project cooperators include USFS, WDFW, Stimson Timber Company, Kalispel Tribe, and Federal Highways Department.

15.3.2 Upper Pend Oreille

15.3.2.1 BPA Funded Research, Monitoring, and Evaluation Activities

Lake Pend Oreille Fishery Recovery Project

BPA funded fishery research activities on Lake Pend Oreille are limited to the IDFG's Lake Pend Oreille Fishery Recovery Project. The goal of this project is recover fisheries that were directly impacted by the federal hydropower system. The research covers activities as diverse as predation, competition, mysis shrimp interactions, lake level effects, and recovery efforts in the Pend Oreille River above Albeni Falls Dam.

Every year since 1977, mid-water trawling was used to assess the kokanee population. Data on kokanee abundance and survival is obtained. Basic limnology, including temperature, oxygen, and secchi transparency is collected monthly throughout the spring, summer, and fall on the lake. Time-series data has also been collected on mysis shrimp during most years dating back to the early 1970s. Since 1995, BPA has sponsored annual hydroacoustic surveys of the lake to provide a second, less biased, estimate of kokanee abundance as well as an estimate of the open water predators of the lake. Sampling throughout the lake with a large fry net has also become a standard monitoring activity when information on kokanee fry abundance is needed. This has been done for the last four years. The substrate at five major spawning areas in the lake is also monitored annually. These data are related to lake levels to determine the effect of changes on the quality of spawning areas. Counts of kokanee spawning in tributary streams and on the shoreline of the lake are one of the longest running data sets. Each year since 1972, these spawning fish were counted as an index of the adult kokanee population.

Between 1985 and 1992 research focused on defining the best ways to stock kokanee into the lake to get the best returns. Results indicated stocking larger fry (50 mm) improved the survival during stocking and that stocking location did not significantly influence hatchery fry survival (Paragamian 1994). The Cabinet Gorge Hatchery has produced kokanee for Lake Pend Oreille since 1985. It was designed to produce enough fish so the lake could reach its recovery goal of 750,000 kokanee in the harvest. To date, supplemental stocking has not improved the kokanee population sufficient to meet this goal.

Currently BPA is funding several monitoring activities as part of the research program including (1) understanding kokanee population dynamics; (2) gaining an understanding of limiting factors for kokanee; (3) assessing the effects of a modified lake level management regime on kokanee spawning and recruitment; (4) examining the effects of the introduction of opossum shrimp; (5) determining whether or not food is limited for planktivorous species; and (6) identifying the effect of the hatchery program on the kokanee population.. As part of the ongoing research to evaluate effects of a modified

lake level the USACE held the lake higher for the past three years during winter while IDFG documented changes to the habitat and fish community in the lake and river.

Cabinet Gorge Hatchery

Cabinet Gorge Hatchery was constructed in 1986 as a cost-share project between BPA, IDFG, and Avista. It is operated with IDFG funds. The hatchery has a production capacity of 17 million kokanee fry, but in most years this capacity has not been met. The hatchery was constructed to mitigate for losses of kokanee spawning due to Albeni Falls and Cabinet Gorge Dam operations. While in some years hatchery reared kokanee appear to make up a significant proportion of the kokanee population in Lake Pend Oreille, the hatchery has not kept the kokanee population from continuing to decline. Prior to construction of the dams in the early 1950s, annual kokanee fry production in the lake and tributaries was estimated at approximately 200 million.

15.3.2.2 Non-BPA Funded Research, Monitoring, and Evaluation Activities

A substantial number of “on-the-ground” projects have been undertaken to improve the watershed conditions that sustain fish populations, directly improve habitat, or provide protection for fish through education and increased law enforcement. The projects listed below are in addition to regular management and enforcement activities conducted by the managing agencies.

Lake Pend Oreille

- | | |
|-----------|--|
| 1998 | Education and enforcement to protect bull trout. Angler awareness of regulations and fish identification skills has improved. Avista, Trout Unlimited (TU), and IDFG. |
| 1997-2004 | Maintain high water elevations of Pend Oreille Lake during the winter months to improve kokanee spawning. Results: Survival of young of the year kokanee improved by 500 percent in 1998 and 1999. USACE. |
| 1994 | Harvest management of lake trout (limits removed in 2000). Results: Lake trout populations have remained low, and anglers harvest an increased number of lake trout caught. IDFG and Lake Pend Oreille Idaho Club (LPOIC). |
| 1996 | Legal harvest of bull trout eliminated on Lake Pend Oreille. Results: Redd counts have increased in several tributaries. IDFG. |
| 1997 | Color fish identification guide. Results: Improved fish identification skills by angler. IDFG and LPOIC. |
| 1997 | Fish information pamphlet. Results: Increased public awareness of fish habitat needs. IDFG, USFS, and Idaho Chapter of the American Fisheries Society. |

- 1998 Stabilized eroding lakeshore at Ponder Point in Lake Pend Oreille. Results: Reduced fine sediment delivery to the lake and halting loss of shoreline habitat. NRCS.
- 2000-present Lake Pend Oreille bull trout survival study is implemented by IDFG and funded by Avista.
- 1983-present Lake Pend Oreille bull trout redd counts implemented by IDFG and Avista.

Trestle Creek

- 1994-1996 Watershed restoration project, including road reclamation, culvert replacements, riparian re-planting, large woody debris placement. Results: 32 km of problem roads obliterated; bull trout redd counts remain high, average 263 per year since project completion; and security has improved for grizzly bears and elk. USFS.
- 1996 Adopted site specific Best Management Practices (BMPs) for timber harvest, requiring harvest plans, buffer strips, and other measures. Results: logging is more tightly regulated, particularly in the riparian areas, increased protection for bull trout, cutthroat trout, and cavity nesting species. Trestle Creek Local Working Committee and Idaho Department of Lands (IDL).
- 2000 Easements acquired on over 300 miles of creek frontage to protect habitat. Results: Long term protection for bull trout, cutthroat trout, and other species dependent on riparian forest. Avista Settlement Agreement.

South Gold Creek

- 1996 Replaced culverts, placed large woody debris, and completed channel restoration on two miles of creek. Results: Channel stability improved, reducing the threat to bull trout redds from mid-winter floods. USFS.
- 1997 Adopted site-specific best management practices for timber harvest. Results: logging is more tightly regulated, particularly in the riparian areas, increased protection for bull and cutthroat trout, and cavity nesting species. Lakeview Local Working Committee (LLWC) and IDL.
- 1998 Restricted vehicle access to Gold Creek with a gate to protect spawning habitat. Results: recreational vehicles in the stream channel prohibited, protecting bull trout redds. Avista.
- 1998-2004 Hand excavated channel through drawdown zone to allow adult bull trout to migrate back to Lake Pend Oreille. Results: Post-spawning bull trout survival has improved. IDFG.

2002 Remediation of the Kickbush Slide. IDEQ.

2003 Removal of Tailings at Idaho Lakeview Mine. IDEQ.

North Gold Creek

1997 Adopted site-specific best management practices for timber harvest. Results: Logging activity is more tightly regulated, particularly in the riparian areas, resulting in increased protection for bull and cutthroat trout, and cavity nesting species. LLWC and IDL.

1998-1999 Watershed restoration work, woody debris placement, headwater channel stabilization, riparian plantings, and road reclamation. Results: Problem roads have been obliterated; bull trout redd counts remain high; conditions improved for harlequin ducks; and improved security for elk. USFS.

1998-2003 Hand excavated channel through drawdown zone to allow adult bull trout to migrate back to Lake Pend Oreille. Results: Post-spawning bull trout survival has improved. IDFG.

Granite Creek

1997 Adopted site-specific best management practices for timber harvest. Results: Logging activity is more tightly regulated, particularly in the riparian areas, resulting in increased protection for bull and cutthroat trout, and cavity nesting species. LLWC and IDL.

1957-2000 Operated and maintained a kokanee spawning channel and egg taking facility in Sullivan Springs. Results: Egg take and wild production of fish from Sullivan Springs has forestalled the collapse of the kokanee fishery. IDFG, with assistance from LPOIC, TU, and Avista.

1996-1999 Placed cleaned gravel, removed fines, and redesigned kokanee trap to improve conditions for bull trout in Sullivan Springs. Results: Increased use of the spawning channel by bull trout and kokanee, reduced impact to bull trout redds and outmigrants from trapping operations. IDFG.

1998 Transported 40 bull trout spawners around intermittent reach of Granite Creek. Results: Increased egg deposition by bull trout. IDFG.

1997 Transported over 90 bull trout spawners around intermittent reach of Granite Creek. Results: Increased egg deposition by bull trout. IDFG.

1994-1997 Completed watershed restoration work, including channel stabilization, culvert removal, woody debris replacement, and placement of a fish ladder in a culvert. Results: Channel stability is improved, reducing the threat to bull trout redds from mid-winter floods, fish passage to approximately 1 km of habitat restored. USFS.

- 2000 Over 24 hectares (ha) of private land purchased. Results: Mature riparian forest habitat, floodplain, spawning channel, and bull trout rearing habitat are permanently protected from development. IDFG, Avista, LPOIC, and IDFG.
- 2001 The Willow Creek (Priest River) Aquatic Restoration project is sponsored by the Kalispel Tribe and encompasses the decommissioning of 8.4 miles of unstable Forest Service roads. The project was funded by the Washington State Salmon Recovery Funding Board.
- 2002 Fish passage and stream channel restoration project funded by Avista and implemented by IDFG, USFS, and Avista.

Lightning Creek Complex

- 1995 Relocated approximately 1 km of floodplain road. Results: Riparian forest habitat restored, floodplain habitat and channel conditions improved, and sediment input reduced in Lightning Creek. USFS.
- 1997 Recontoured road segments in the headwaters of Lightning Creek. Results: Improved watershed stability, increased security for grizzly bears and elk. USFS.

Grouse Creek

- 1996 Adopted site-specific best management practices for timber harvest. Results: Logging activity is more tightly regulated, particularly in the riparian areas, resulting in increased protection for bull trout, cutthroat trout, and cavity nesting species. Pack River LLWC and IDL
- 1990 Created 21 pools and 35 boulder clusters in Grouse Creek. Results: Increased rearing habitat for Gerrard rainbow trout. USFS, LPOIC, and TU.
- 1996 Planted riparian areas in Grouse Creek. Results: Improved bank stability, increased habitat for riparian wildlife species. USFS and Coldwater Creek Company.
- 1997 Placed 62 cover structures in North Fork Grouse Creek and 56 boulder clusters in Grouse Creek. Results: Increased rearing habitat for bull trout and Gerrard rainbow trout. USFS and TU.
- 1996-1997 Completed stream improvement work on four miles of stream in Grouse Creek. Results: Increased rearing habitat for Gerrard rainbow trout. USFS and CedaPine Veneer.

1995-1997 Obliterated roads, removed culverts, and restored fish passage in Grouse Creek tributaries. Results: Increased security for big game and grizzly bears, restored passage to over 5 km of spawning and rearing habitat for bull trout, improved conditions for harlequin ducks. USFS, with assistance from TU and IDFG.

Johnson Creek

1997 Added eight pool-and-cover structures in lower Johnson Creek and re-contoured roads in the headwaters. Results: Improved rearing habitat for bull trout and increased watershed stability and big game security. USFS.

2001 Bull trout and transport project on Johnson Creek is implemented by Avista and IDFG, and funded by Avista.

Pack River

1996 Adopted site-specific best management practices for timber harvest. Results: Logging activity is more tightly regulated, particularly in the riparian areas, resulting in increased protection for bull and cutthroat trout, and cavity nesting species. Pack River Local Working Committee and IDL.

1997 Closed 2.6 km of unstable road. Results: Reduced fine sediments into spawning and rearing habitat for bull trout, increased wildlife security. IDL.

1996-1997 Relocated and re-contoured roads, removed culverts, planted riparian areas, and completed in-channel work in upper Pack River and tributaries. Results: Reduced fine sediments into spawning and rearing habitat for bull trout and increased big game and grizzly bear security. USFS.

1999 Conducted bank stabilization projects on lower Pack River. Results: Reduced fine sediment delivery to Pack River and improved riparian habitat. NRCS.

1999 Stabilized 420 feet of bank along Hellroaring Creek. Annual Status Review by NRCS with Landowner. Improved fish habitat and banks stabilized from erosion.

Twin Creek

1997 Removed culvert from North Fork Twin Creek. Results: Reduced risk of culvert failure and impacts to downstream spawning and rearing habitat. USFS.

1998-2000 Planned, designed, and reconstructed over 2 km of previously channelized stream. Results: Channel length increased by approximately 300 meters, channel complexity increased, width-to-depth ratio was reduced, and

floodplain and riparian function restored. IDFG, the USFWS, Avista, TU, Ruen Family Trust, Bonner County, and Crown Pacific.

Clark Fork River

- 1995 Constructed spawning area for bull trout in spring-fed section of river. Results: Annual spawning by bull trout, averaging approximately five redds per year. Avista.
- 1998 Inspection at Cabinet Gorge to protect bull trout redds. Results: No more de-watering of bull trout redds in the Clark Fork spawning channel. IDFG, Avista, and IDEQ changed timing of Federal Energy Regulatory Commission (FERC).
- 1998 More than \$950,000 annually to fund a native fish restoration project focused on providing fish passage; \$400,000 annually for tributary restoration in Idaho; \$475,000 annually for tributary restoration work in Montana; minimum flows in the lower Clark Fork River; recreational fish enhancements; habitat enhancement in the lower Clark Fork River in Idaho; and fisheries management assistance funding (\$35,000 annually in Idaho). Results: Funded the Twin Creek, Granite Creek, and Trestle Creek projects in 2000; reconnected Lake Pend Oreille with upstream habitats in Montana; restored habitats in Montana and Idaho. Avista Settlement Agreement.
- 1999 Increased minimum flow release from Cabinet Gorge Dam from 85 cubic meters per second (cms) to 142 cms. Results: Over four hectares of productive riffle habitat restored and improved density of trout. Avista Settlement Agreement.
- 1999-2000 Initiated bull trout passage project for Cabinet Gorge Dam using an adaptive management approach. Results: Even though the project was recently initiated, several juvenile bull trout were safely transported downstream past Cabinet Gorge Dam from Montana tributaries. Avista, USFWS, IDFG, and Montana Department of Fish Wildlife and Parks (MDFWP).
- 1999-present Clark Fork River fishery monitoring project is implemented by IDFG and Avista and funded by Avista.
- 2001 A water control structure was constructed on Derr Creek. It allows water control on 75 acres of wetland. Annual status reviews by NRCS and FSA. A 48-inch gated water control structure was completed.

Strong Creek

1994 Placed fish ladder in previously impassable flume. Results: Access restored to over 0.5 km of spawning and rearing habitat for cutthroat trout and bull trout. IDFG and TU.

Rapid Lightning Creek

1997 Removed culvert and repaired stream crossing. Results: Reduced sediment delivery to stream. USFS.

1998 Implemented streambank stabilization project. Results: Reduced sediment delivery to stream. NRCS and landowner.

Trout Creek

1996 Pulled culverts, improved cross drainage, and improved stream crossings. Results: Reduced sediment delivery to stream. USFS.

Hoodoo Creek

1999 Installed riparian buffers. Results: Improved habitat for fish, songbirds, waterfowl, and furbearers. NRCS and landowners.

2000 Constructed manure pit and two manure storage slabs. Annual Status Review with Landowner by NRCS for five years. Above practices completed along with a nutrient management plan.

2001 Fencing creek off from livestock 4,214 lineal feet and tree planting on 7.5 acres inside fence next to creek. Annual Status Review with Landowner by NRCS for five years. Practices completed – no haying or grazing for 10 years at least.

Cocolalla Creek

1996-2000 Incentive program for management of riparian areas on private lands, restored fish passage, and improved water quality in the lake. Results: Improved water quality and improved trout fishery in the lake. Cocolalla Lake Association, Bonner County SWCD, NRCS, Soil Conservation Commission, IDL, IDEQ, and IDFG.

2001 Forest riparian buffer along Careywood Creek, wildlife pond and tree plantings. Ten years of haying and grazing restrictions. Annual status review by NRCS. Thus far 2,760 lineal feet of riparian buffer planted on 4.7 acres, one wildlife pond.

2002 Conservation Plan developed for Fish Creek. Water Quality Problem of bacteria and sediment. Replaced eroding culvert with bridge. Cocolalla Lake Association personnel are trained in doing stream walking, and they will be monitoring Fish Creek and send their data to the DEQ. The Cocolalla Lake Association was instrumental in outlining what they

thought were major problems in the Fish Creek Watershed.

Clark Fork Settlement Agreement

As part of the Settlement Agreement, Avista funds a full-time fisheries biologist for IDFG, the USFWS, and MDFWP in addition to having hired their own biologist. All four biologists work cooperatively as the Aquatic Implementation Team to implement projects in the Lake Pend Oreille and lower Clark Fork subbasins.

The Idaho biologist is responsible for implementing, monitoring, and evaluating the Idaho Tributary Habitat Acquisition and Fishery Enhancement Program. To date, this program has resulted in the acquisition of floodplain and riparian habitat on Granite Creek and Trestle Creek. Funds were also used to implement a 2 km stream channel restoration project in Twin Creek. Operational changes at Cabinet Gorge Dam have resulted in an increase in the minimum flow from 85 cms to 142 cms. Current monitoring activities include screw trapping of outmigrating fish in Trestle Creek and Twin Creek, cooperating with the USFS Rocky Mountain Research Station in estimating adult bull trout abundance in tributaries prior to spawning, annual redd counts of all known bull trout spawning areas, and spring and fall electrofishing on the Clark Fork River to estimate fish population size and community structure for comparison with pre-Settlement Agreement information. Research is being conducted to assess the influence of watershed condition on bull trout recruitment.

Current population studies on Twin Creek will allow for comparisons between habitat conditions and fish population responses to the channel restoration project. The *Lake Pend Oreille Bull Trout Conservation Plan* (Lake Pend Oreille Bull Trout Watershed Advisory Group 1999) is the primary document guiding implementation of the Tributary Habitat Acquisition and Fishery Enhancement Program.

The USFWS biologist is responsible for implementing, monitoring, and evaluating the Native Salmonid Restoration Plan (NSRP), developed as part of the Settlement Agreement. Projects in the Upper Pend Oreille subbasin include trapping and radio tagging adult bull trout to assess their movements in the Clark Fork River below Cabinet Gorge Dam to identify the best potential locations for a permanent trap site or fish ladder entrance. The project has also resulted in a description of the genetics of bull trout populations in tributaries to Lake Pend Oreille, and the lower Clark Fork River in Idaho and Montana, and in the trap and haul of juvenile bull trout downstream from Montana tributaries to the lower Clark Fork River in Idaho.

The Avista biologist is responsible for monitoring the effects on the downstream aquatic community of high TDG levels produced by spill at Cabinet Gorge Dam. Monitoring was contracted out to a consultant and includes collecting fish during spill events to assess the level of gas bubble disease (GBD), monitoring the health of penned fish in the Clark Fork River and Lake Pend Oreille, and assessing fish distribution during spill events. Research is ongoing, with preliminary results indicating some fish afflicted with GBD, and high TDG extending down the Clark Fork River, across the north arm of Lake Pend Oreille, and into the Pend Oreille River during large runoff events. In 2000, Avista started to

investigate engineering solutions to reduce entrainment of atmospheric gas at Cabinet Gorge Dam.

Montana biologists are implementing a tributary restoration and enhancement program upstream from Cabinet Gorge Dam similar to the Idaho project. If fish passage efforts are successful, improved conditions in the Montana tributaries should increase recruitment of bull trout and westslope cutthroat trout to Lake Pend Oreille. Trapping and tagging programs in the Montana tributaries will be used to monitor success of the restoration efforts.

Avista funded projects provide annual reports to the Management Committee, which oversees Settlement Agreement implementation.

15.3.3 Lower Pend Oreille

15.3.3.1 BPA Funded Research, Monitoring, and Evaluation Activities

Kalispel Tribe and Washington Department of Fish and Wildlife

In 1995, the Kalispel Tribe, in cooperation with WDFW, initiated the Kalispel Resident Fish Project (NPPC Program Measure 10.8B.14-16, 18 and 19). This project consisted of habitat and population surveys to determine existing habitat conditions, fish distribution, and abundance. Habitat assessments were used to determine the types and habitat quality that were limiting to native bull trout and westslope cutthroat trout. Data collected in these assessments were compiled to develop recommendations for enhancement measures. From 1996 to 1998, the Kalispel Tribe implemented those recommendations in Whiteman Creek, Mineral Creek, Fourth of July Creek, Middle Branch LeClerc Creek, Indian Creek, Cee Cee Ah Creek, Browns Creek, and Mill Creek. Restoration efforts primarily include instream structures and riparian restoration. Instream structures perform specific improvements for fish habitat, including spawning habitat, rearing cover, feeding areas, and overwintering habitat. These structures provide desirable conditions in areas where the stream conditions have been degraded.

The goals of instream restoration are to improve habitat quality and quantity in degraded areas, and increase cutthroat trout and bull trout populations. Riparian restoration includes fencing and vegetation planting. The purpose of riparian restoration is to reduce the impacts of land use practices, and enhance the natural recovery process in disturbed stream areas. Monitoring and evaluation of these enhancement measures started in 1997 and will continue at least through 2001 and beyond. The Kalispel Tribe will continue to conduct habitat and fish population surveys and implement enhancement measures in additional tributaries. Since 1998, the Pend Oreille County PUD has surveyed an additional 104 km of stream. In 2001, an additional 56 km were surveyed.

The Kalispel Tribe, in cooperation with Pend Oreille County and WDFW, now provided permitting oversight, replaced culverts with arched bridges at Mill Creek in 1997 and Cee Cee Ah Creek in 1998 to improve fish passage. The Kalispel Tribe and the Pend Oreille County PUD, initiated an adfluvial trapping program in 1998 as part of the Resident Fish Stock Status above Chief Joseph and Grand Coulee Dams Project (JSAP). This project is a management tool using ecosystem principles to manage artificial fish assemblages in

altered environments within the Columbia River Basin above Chief Joseph and Grand Coulee dams.

For the past several years, the Kalispel Natural Resource Department (KNRD), the Washington Bass Anglers Sportsman Society (B.A.S.S.) Federation, and the Inland Empire Bass Club have participated in a bass habitat enhancement project on Box Canyon Reservoir. The project is intended to increase the survival of juvenile largemouth bass, thus enhancing recruitment of adult bass to the reservoir. These enhancement structures include Berkley Habitat Structures and Christmas trees. Funding sources for this project include the BPA, the Kalispel Tribe, Fish America Foundation, and the Washington State B.A.S.S. Federation.

In 1996, the KNRD constructed a largemouth bass hatchery, funded by BPA, to supplement populations of largemouth bass in Box Canyon Reservoir. Annual production includes 150,000 bass of which 100,000 are fry and 50,000 are fingerlings. The goal is to create a productive bass fishery in Box Canyon Reservoir that is available to tribal members and the public.

15.3.3.2 Non-BPA Funded Research, Monitoring, and Evaluation Activities

Pend Oreille Watershed Planning Unit

In 1998 Governor Locke signed HB 2514, the Watershed Management Act, providing the impetus for Watershed Planning Units to form throughout the State. Washington Department of Ecology administers this program through grants. In Water Resource Inventory Area (WRIA) 62, which encompasses the Lower Pend Oreille drainage, the Pend Oreille Conservation District is the Lead Agency facilitating the development of a Watershed Management Plan addressing three components: water quality, water quantity, and habitat. The Watershed Planning Unit is currently collecting water quality data from seven monitoring stations on four major tributaries to the Lower Pend Oreille.

Pend Oreille Lead Entity Salmonid Recovery Team

The Salmonid Recovery Team is developing and implementing the *Strategy for Protection and Improvement of Native Salmonid Habitat in the Pend Oreille Watershed, Washington Water Resource Inventory Area 62*. This Team solicits project applications annually and prioritizes those project applications for funding through the Washington Salmon Recovery Funding Board (SRFB) to achieve the goals outlined in the Strategy. To date four projects have been funded through this process by the SRFB in the Lower Pend Oreille. They are:

- Pend Oreille Conservation District and the Kalispel Tribe are conducting a barrier, habitat, and fish assessment survey on private lands in the Lower Pend Oreille River.
- The Cee Cee Ah Creek project, jointly sponsored by the Pend Oreille County Department of Public Works and the Kalispel Tribe, involved the removal of a double culvert under LeClerc Road that presented a velocity barrier to salmonids.

- The Middle Branch LeClerc Creek antimycin project is sponsored by the Washington Department of Fish and Wildlife and has been delayed awaiting permits to move on. Some riparian fencing work along the creek has been accomplished.
- The East Branch LeClerc Creek road relocation project is designed to reduce sedimentation loads and address fish passage issues in LeClerc Creek. Project cooperators include USFS, WDFW, Stimson Timber Company, Kalispel Tribe, and Federal Highways Department.
- The Willow Creek project is sponsored by the Kalispel Tribe and USFS. This project began in 2003 and in 2004, 8.4 miles of unstable roads in the North Fork of Granite and Willow Creek drainages will be decommissioned. Direct benefits to native salmonids from this proposed project would be protection and enhancement of existing spawning and rearing habitat. Fish habitat would be improved by restoring habitat connectivity and by removing the failing road system that is currently delivering sediment to the channel. This project is funded by the Washington State Salmon Recovery Funding Board.

U.S. Forest Service

The Colville National Forest has closed USFS roads in the Subbasin where it has become necessary to prevent resource damage and provide isolation for threatened and endangered species, such as grizzly bear and woodland caribou. In the LeClerc Creek watershed, the USFS, Stimson Lumber Co., the Kalispel Tribe, and Pend Oreille County Roads Department have built a bypass road and are reclaiming 3.6 km of existing road. Road resurfacing, riparian planting, enclosure fencing, the armoring of livestock crossings, and range utilization monitoring in LeClerc Creek have improved habitat conditions.

The USFS national road policy limits future road building in current roadless areas. The USFS has been inventorying all culverts on USFS service roads to determine whether the culverts are appropriate for maximum flows and whether they provide fish passage for all life stages of resident fish.

The USFS, Region 6, has signed a Memorandum of Agreement with the WDOE to continue to reduce sources of sediment from forest roads.

The Colville National Forest continues to conduct Hankin-Reeves stream inventory surveys on segments of Pend Oreille River tributaries on National Forest System lands. Survey results, in addition to the culvert inventory, are used to determine where instream and/or riparian habitat restoration is needed and indicate sources of ongoing direct and indirect effects.

15.3.4 Priest River

Fisheries management has largely focused on a shift away from stocking non-native species toward managing for native species with wild stocks. IDFG research and management on fish populations in the Priest River drainage has been funded through the Federal Sport Fish program. Recently, funding from the USFWS through Section 6 of the ESA has been used to document bull trout abundance in the Upper Priest Lake system and evaluate the threat posed by brook trout and lake trout.

Habitat management has been the responsibility of the major landowners in the Priest River drainage, primarily the USFS and the IDL. There is a need for a comprehensive survey of bull trout and cutthroat trout habitat conditions in the Priest River drainage to prioritize where restoration efforts would best be spent.

15.4 Strategies Currently Being Implemented Through Existing Projects

15.4.1 Limiting Factors and Strategies Currently Being Implemented

As described in Section 2.4.2, a database was developed that lists the recent projects that have been implemented in the Subbasin. Each project was coded for the limiting factors that were addressed, and the strategies that were employed.

In the Pend Oreille Subbasin, 102 recent restoration and conservation projects were identified. Of the projects identified, 70 were focused on resident fish, 16 primarily benefited wildlife, and 16 benefited both fish and wildlife.

The focus of most of the recent projects in the Pend Oreille Subbasin (71 percent) has been on addressing habitat related limiting factors, including habitat quality (30 percent), water quality or quantity (17 percent), habitat quantity (15 percent) or barriers (9 percent) (Figure 15.1). The lack of information has been addressed by 15 percent of the recent projects. Disease, competition, predation, and hybridization are limiting factors that have been addressed by 9 percent of the recent projects. Indirect mitigation is addressed with 2 percent of projects.

Projects have implemented a diverse array of strategies in the Pend Oreille Subbasin (Figure 15.2). Habitat improvement or restoration activities have been undertaken by 47 percent of the projects. Research, monitoring, and evaluation are the next largest category of projects by strategy, with 14 percent of projects engaged in this activity.

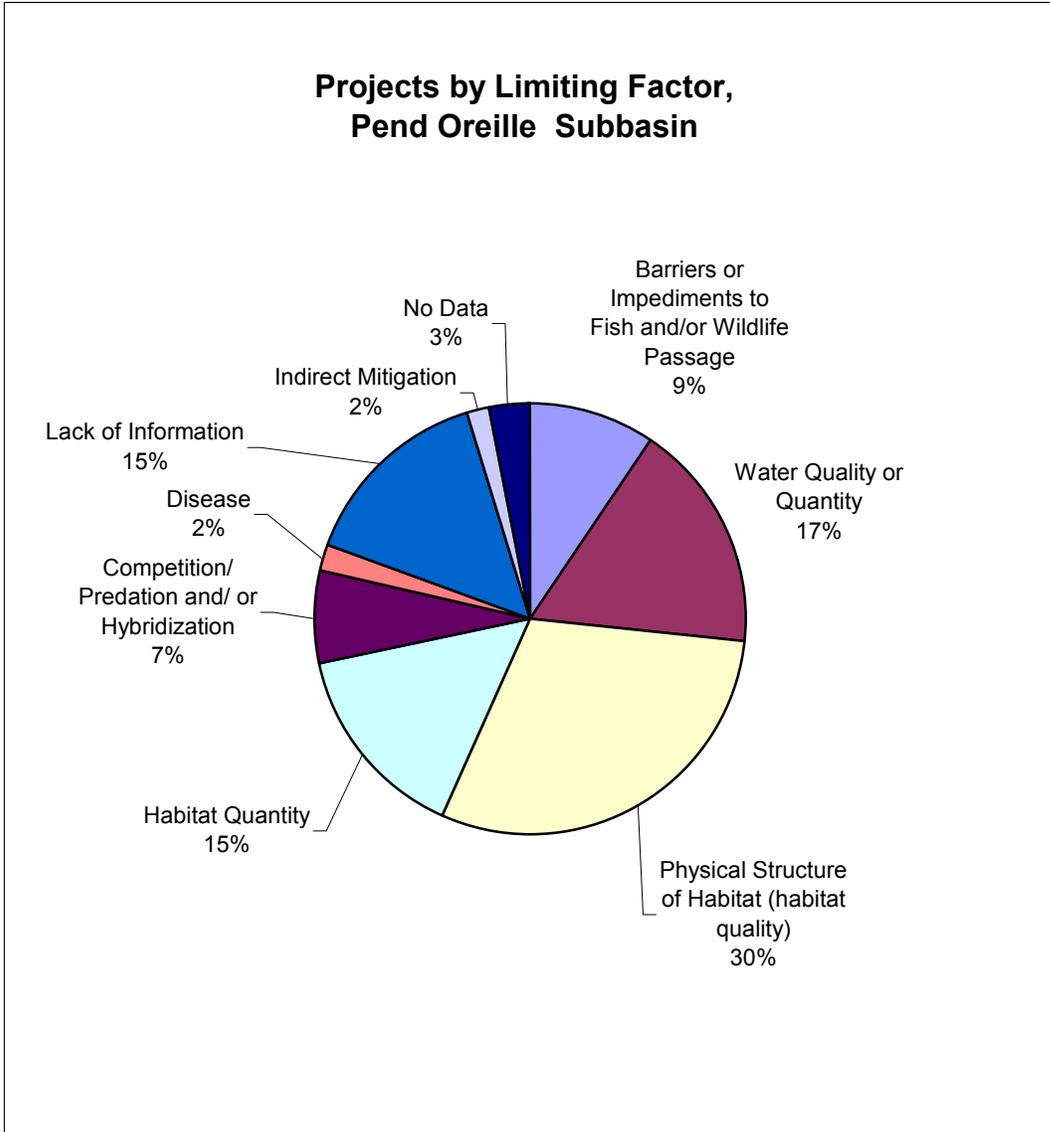


Figure 15.1. The percentage of the 102 recent restoration and conservation projects that addressed various limiting factors within the Pend Oreille Subbasin. Note that some projects addressed more than one type of limiting factor.

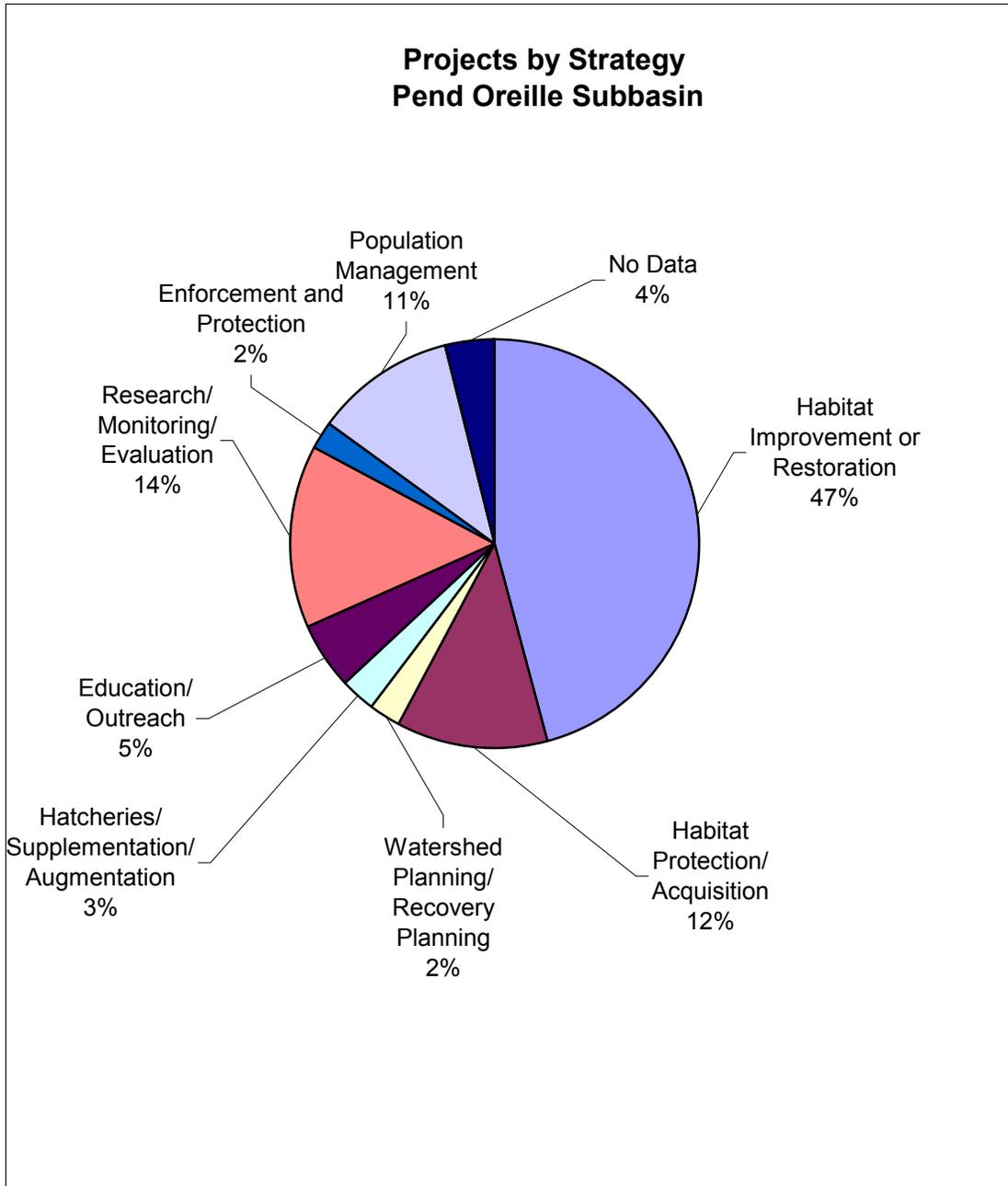


Figure 15.2. The percentage of the 102 recent restoration and conservation projects that addressed various limiting factors within the Pend Oreille Subbasin. Note that some projects employed more than one type of strategy and so are counted in multiple categories.

15.4.2 Gaps Between Actions Taken and Actions Needed

The information for this section was gathered at a meeting of the IMP Technical Coordination Group. The group was asked for their input on the degree to which past projects have addressed fish and wildlife issues in the Pend Oreille Subbasin. In addition, they were asked what needs the subbasin has for future projects. Table 15.1 provides a

summary of the needs that were identified through the inventory, with corresponding objectives and strategies from the management plan that address these needs.

The Pend Oreille Subbasin has some significant research needs. There is substantial information available about bull trout adults in tributaries to Lake Pend Oreille, but there is no information on bull trout habitat use in Lake Pend Oreille itself. In addition, there is very little information about juvenile bull trout. More research is needed on these topics. Numerous bull trout objectives and strategies are identified in the management plan, and several of these are research oriented (Table 15.1).

In addition, there is a need for a comprehensive evaluation of adfluvial westslope cutthroat trout in the Subbasin. The study should include an evaluation of population abundance and habitat conditions in streams, identification of limiting factors, and a prioritized list of habitat restoration projects. The concern about cutthroat trout is reflected in the management plan in Pend Oreille objective 2A4 (Table 15.1).

Another research need is the role of lake whitefish in Lake Pend Oreille. Lake whitefish are a potential forage fish for predacious species. They may have an effect on mysis abundance, kokanee, and the lake food web in general. There is almost no existing information on the status and distribution of pygmy whitefish in Lake Pend Oreille, Priest Lake, or Spirit Lake for mountain whitefish there is a need for data subbasin-wide. There is also a need for a kokanee and mysis shrimp monitoring project for Priest and Upper Priest lakes.

A comprehensive evaluation of fish passage barriers in this Subbasin is needed. Once barriers have been identified, they should be removed as appropriate. The management plan includes a strategy to develop entire drainage restoration plans to improve fish habitat. This would logically include a review of fish barriers.

In the Priest River drainage, there is a need for funding for the installation of a strobe light weir in the Thorofare between Priest Lake and Upper Priest Lake to limit lake trout access to upper Priest Lake for enhancement and protection of bull trout.

Subbasin-wide there is a need for funding of habitat restoration efforts to conserve and enhance vulnerable populations. In the lower Pend Oreille, there is a need for land acquisition and conservation easements for protection of bull trout.

On-site mitigation needs for fisheries includes a need for warmwater fish habitat improvements in Pend Oreille River.

Table 15.1. Summary of objectives and strategies from the management plan that address unmet needs that were highlighted in the inventory

Identified Needs	Examples of management plan objectives and strategies that address needs
Bull trout research	<p>Subbasin Objective 1C2: Research the effects of lake trout competition on bull trout and cutthroat trout in Priest Lake by 2015; implement corrective measures in accordance with recovery/restoration objectives.</p> <p>Subbasin Objective 1C5: Pursue the objectives in the U.S Fish and Wildlife Service Draft Bull Trout Recovery Plan (2002). The goal of the bull trout recovery plan is to ensure the long-term persistence of self-sustaining, complex, interacting groups of bull trout distributed throughout the species' native range, so that the species can be delisted.</p> <p>Subbasin Objective 1A1*: By 2010, quantitatively evaluate the impacts of hydropower facility construction and operation on water level fluctuation in Lake Pend Oreille, and other waterbodies in the subbasin, including effects on near shore productivity.</p> <p>Subbasin Objective 1C1: Restore bull trout to a harvestable surplus (i.e., create and maintain a sport fishery) in the Pend Oreille Subbasin by 2030. Targets: Lake Pend Oreille: capable of providing 1,000 fish annually based on historic harvest rates of the 1960's through 1980's. Pend Oreille River: to be determined. Priest Lake: to be determined.</p>
Westslope cutthroat trout Research	<p>Subbasin Objective 1B1: Protect, enhance, and restore native fish habitat function to maintain or enhance ecological diversity and long-term viability of native and desirable nonnative fish species, including westslope cutthroat and bull trout, using a watershed-based approach.</p> <p>Subbasin Objective 1C3: In Lake Pend Oreille reduce competition and predation by lake trout on bull and cutthroat trout by reducing lake trout abundance to <4000 adults, if feasible.</p> <p>Subbasin Objective 1C2: Research the effects of lake trout competition on bull trout and cutthroat trout in Priest Lake by 2015; implement corrective measures in accordance with recovery/restoration objectives.</p>
Lake whitefish research	<p>Subbasin Objective 1C11*: By 2010, gain a better understanding of the kokanee food habits, potential competition with Mysid shrimp, and the ecological role of lake whitefish in reducing shrimp abundance.</p>
Thorofare strobe light to repel lake trout	<p>Subbasin Objective 1C4: Remove 90% or more of the lake trout from Upper Priest Lake and prevent re-establishment through the Thorofare.</p>
Habitat restoration	<p>Subbasin Objective 1B1: Protect, enhance, and restore native fish habitat function to maintain or enhance ecological diversity and long-term viability of native and desirable nonnative fish species, including westslope cutthroat and bull trout, using a watershed-based approach.</p> <p>Subbasin Objective 1B5: Maintain 1.7 million square feet of clean shoreline gravel areas for kokanee spawning in Lake Pend Oreille throughout the duration of this plan. Note: Any studies should include evaluation of effects of proposed actions on flood control capability relative to current hydropower facility operations.</p> <p>Subbasin Objective 1B7: Increase bass over-winter habitat in the Pend Oreille River above Albeni Falls Dam from its current 45 ha to >300 ha to provide an improved sport fishery.</p> <p>Subbasin Objective 1B8: Enhance, conserve and protect riparian habitats to the extent that they are intact and functional.</p>
Warmwater fish habitat	<p>Subbasin Objective 2C1: Increase the amount of harvestable largemouth bass in Box Canyon Reservoir from the current levels of 6 pounds per acre to 12 pounds per acre by 2010, as long as this activity does not adversely impact native fish.</p> <p>Subbasin Objective 1B7: Increase bass over-winter habitat in the Pend Oreille River above Albeni Falls Dam from its current 45 ha to >300 ha to provide an improved sport fishery.</p>