SECTION 31 – Table of Contents

31 Upper Columbia Subbasin Inventory of Existing Programs – Aquatic[1]

31.1 Current Management Directions

The State of Washington Department of Fish and Wildlife (WDFW), Colville Confederated Tribes (CCT), and the Spokane Tribe of Indians (STOI) are the primary resource managers in the Upper Columbia Subbasin. These three management agencies with fisheries management responsibility within the Subbasin have initiated numerous projects through the Northwest Power and Conservation Council's (Council) Fish and Wildlife Program as partial substitution for the loss of anadromous fish due to the federal hydropower system utilizing resident fish (resident fish substitution).

State and Federal agencies and Tribal governments that have management authority over fish and wildlife and their habitats in the Upper Columbia Subbasin include the U.S. Fish and Wildlife Service (USFWS), U.S. Forest Service (USFS), Washington Department of Fish and Wildlife (WDFW), Colville Confederated Tribes (CCT), and the Spokane Tribe of Indians (STOI). Other agencies, including, but not limited to, the Environmental Protection Agency (EPA), the Natural Resources Conservation Service (NRCS), and the Washington State Department of Ecology (WDOE) 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.

Native species recovery is a priority in areas where such efforts are feasible; however, providing subsistence and recreational fisheries in severely altered habitats may be accomplished using nonnative species/stocks. It must be recognized that the extirpation of anadromous fish from the Subbasin has severely limited the fishery. Until anadromous fish can feasibly be recovered in the Subbasin, on-site and off-site resident fish projects will be used as partial substitution for anadromous losses.

The following section describes the local government entities that are involved in natural resources management in the Upper Columbia Subbasin

31.1.1 Local Government

31.1.1.1 Ferry Conservation District (FCD) Current Management Strategies

FCD is involved in several partnership efforts from individuals and agencies, to school districts and tribes. As a political subdivision of Washington State government (under the umbrella of the Washington State Conservation Commission), the FCD serves the public in a manner that best provides for the interest and management of natural resources and environmental protection. As the last non-regulatory entity left in the State of Washington, it provides a service to individuals, associations, local government, etc. in a neutral manner that promotes being proactive in the planning and management for natural resources.

Though only receiving approximately $9,700 a year from the Conservation Commission for basic funding, FCD has sought out and applied moneys to the planning and implementation that improves and enhances water quality, as well as fish and wildlife-habitat. FCD was the first in the northwest to use DNA microbial source sampling as a tool to identify problems and problem areas, to start focusing project dollars where the money can do the most good and return the most benefit-to-dollar ratio. The shade and water temperature studies have produced valuable data that are now being used by the USFS and WDOE to implement TMDL programs throughout northeastern Washington. The District is involved in the partnership efforts with WDOE TMDL projects in three different counties so far, and is contributing equipment and manpower towards these efforts at no charge.

FCD currently is receiving grants for projects (that were not recorded in the IMP reports because they are currently being implemented) to include: Implementation Grants from Washington Conservation Commission, WDOE, National Fish and Wildlife Foundation, EPA, and the USFS. Much of the implementation dollars are being used to finish projects individuals and agencies have prioritized, but didn't have the finances to start or complete. The most recent grant from WDOE is the Headwaters of the San Poil (HOSP). This grant serves to implement projects for landowners, the USFS, Ferry County, State Department of Transportation, and the CCT on projects on the headwaters and main body of the San Poil River.

Many of the primary priorities are to reduce the problems that caused water bodies to get listed on the EPA 303(d) list in the first place. With the focus on improving water quality standards, the District implements Best Management Practices (BMPs) that will also create, restore, or enhance fish and wildlife-habitat. Projects being implemented are primarily for the improvement of fish and wildlife-habitat. FCD has attracted partners from the Audubon Society and the Bonneville Environmental Foundation who have taken a serious interest in the management FCD is involved in for habitat, dam removal projects, etc., as well as the use of FCD lands for fish and wildlife education.

Next year, FCD will be applying for two more Centennial Clean Water Funded Grants from DOE. One is to focus on fecal coliform problems and solutions (and other water quality standards) with implementation projects throughout Ferry County. The other is to team with the Forest Service, who has received funding to do an environmental analysis on the proposed action of removing a dam. FCD has been successful in receiving the maximum funded grants from WDOE (over $300,000 total budgets), and want to continue to match these efforts towards the efforts of others to improve and protect the environment. Funding efforts will continue for other dollars through various means for the same kinds of resource implementation.

FCD participates in many local and regional planning efforts. The District has also been quite involved in local Water Resource Inventory Area (WRIA) processes and plans on pursuing the Lead Entity on the San Poil WRIA (52). The District's involvement in these planning processes, attendance at local association meetings, starting watershed planning

groups, and other stakeholder functions, will keep will keep the District aware of the current resource management concerns.

FCD staff is also involved on State Natural Resource committees and associations to assist others with natural resource concerns, and to secure additional funding for the implementation of those solutions. In addition, FCD serves on a three-county Local Working Group to assist the NRCS in the selection and implementation of the Environmental Quality and Incentives Program (EQIP) to allocate funding from the U.S. Farm Bill.

As FCD teams with many agencies, often as the liaison between all the partners, it plans to have the same kinds of past success to help landowners and agencies become and/or stay proactive in their efforts to improve and protect their resources. The primary function is providing cost-share incentives for projects, and educating the general public about the need for natural resource protection and environmental enhancement. This is a part of the management strategies for the future.

31.1.1.2 Lincoln County Conservation District (LCCD)

Mission Statement

The philosophy of the District is that all natural resources are integrated. Their mission is to protect and enhance Soil, Water, Air, Plants, Animals, and Humans (SWAPAH) of Lincoln County through an integrated approach and educate the general public about the responsible use of SWAPAH, through economically viable and socially acceptable programs. Their intention is to promote the responsible use, increase knowledge and research of our natural resource base.

Current Management Strategies

LCCD's current management strategies can be summarized from excerpts of the District's updated Long Range Plan. The goals and objectives include:

<u>Water Quality</u>

- Address water quality concerns in streams and lakes in Lincoln County
- Address groundwater issues in Lincoln County
- Implement restoration projects that would improve water quality
- Work with NRCS, WDFW, WDOE and Lincoln County to address water quality complaints

<u>Wildlife</u>

- Establish wildlife habitat and enhance forest/wetland resources through NRCS programs that include: Conservation Reserve Program (CRP), Environmental Quality Incentives Program (EQIP), and Wildlife Habitat Incentives Program (WHIP)

Education / Information / Communication

- Increase public awareness of District activities

- Provide educational conservation information to the public through newsletters, public meetings, newspaper articles, etc.

District Operations and Management

- Maintain an active and effective LCCD board
- Promote district programs and activities
- Insure adequate funding for LCCD operations

In the last five years, LCCD has been involved in a minimal number of projects in Spokane and Upper Columbia subbasins. Many landowners in these subbasins have taken advantage of NRCS programs that include CRP, EQIP, and WHIP. Currently, funding sources are focused on finding solutions to improve water quality in the Upper Crab/Wilson Creek Watershed WRIA #43.

31.2 Existing and Imminent Protections

Currently, bull trout are the only federally-listed fish species within the Upper Columbia Subbasin. However, it is presumed the distribution of bull trout are not widespread within the Subbasin. Habitat within the Upper Columbia Subbasin has not been determined to be within the critical habitat area as outlined by the USFWS. Fish species that are potential candidates for ESA listing may include redband trout and white sturgeon.

31.3 Inventory of Recent Restoration and Conservation Projects

Numerous projects through the Northwest Power and Conservation Council's Fish and Wildlife Program have been initiated. These projects were undertaken as partial substitution for the loss of anadromous fish due to the creation of the federal hydropower system utilizing resident fish (resident fish substitution). Projects designed to enhance the resident fishery (both native and nonnative) in the "blocked area" include:

- Habitat/passage improvements (Lake Roosevelt Rainbow Trout Habitat/Passage Improvement project, #9001800)
- Stock assessment activities (Habitat/Passage Improvement project, #9001800, Chief Joseph Kokanee Enhancement Project, #9501100, Lake Roosevelt Fisheries Evaluation Program, #944300 and the Lake Roosevelt Sturgeon Recovery Project, #199502700)
- Artificial production enhancement activities (Colville Tribal Fish Hatchery, #8503800, Spokane Tribal Hatchery, #9104600, Sherman Creek Hatchery, #9104700 and Lake Roosevelt Rainbow Trout Net Pens, #9500900)
- Lake Roosevelt Emergency Fish Restoration Project

Other fish management efforts include the WDFW Colville Hatchery. Hatchery production programs are being monitored to evaluate their contribution to existing fisheries in the Subbasin. Habitat improvement projects are currently being monitored/evaluated for effectiveness, while existing habitat and fish population evaluations are proceeding throughout the basin. In addition, the WDFW is constructing a

native redband rainbow trout broodstock trapping facility located 16 miles north of Colville, WA. This facility will aid in native fish restoration within the subbasin.

The following describes the projects listed above in more detail.

31.3.1 BPA Funded Projects

Colville Tribal Hatchery (#8503800)

Operations began at the hatchery in 1990 and have continued to the present time. Originally the project was production goal oriented (1990-1994). However, in 1995 more fisheries-related goals and objectives were developed for the program to assess the program impact on subsistence and recreational fisheries (Truscott 1995). Objectives include short-term (annual production objectives and administrative objectives) and long-term (for example, average creel size fish, catch per unit efforts, average fish condition factor in creel, increases in natural production fishery component, maintenance and development of free-ranging brood stock sources, monitoring and evaluation and development of comprehensive fishery management plans) fishery-related objectives. Reports and technical papers developed during this period include annual operating plans and reports.

Fourteen lakes and streams of the Colville Reservation, included in the Lake Roosevelt Subbasin, are stocked annually with fish originating in the Colville Tribal Hatchery (Truscott 1997). Stocking density from the Colville Tribal Hatchery in Reservation waters of the Lake Roosevelt subbasin averages over 812,000 fish with an average weight of 38,298 pounds (Truscott 1997). This stocking program has been successful at providing subsistence and recreational opportunities. For example, creel surveys on North and South Twin Lakes between 1991 and 1997 estimate that anglers harvested rainbow trout at a rate of 0.446 fish per angler hour and maintained an average fish condition factor of 132×10^{-7} (Truscott 1997). During the same period, anglers harvested brook trout at a 0.11 fish per angler hour rate, while maintaining an average fish condition factor of
129.6×10^{-7}(Truscott 1997). However, the brook trout fishery in the two lakes was conducted in the spring and fall months in the littoral zone of the lakes. The creel survey was conducted from April through October, which was likely the reason for the low catch rate for brook trout. A monthly evaluation of the catch would likely reveal a more accurate description of the fishery.

Spokane Tribal Hatchery (#9104600)

The Spokane Tribal Hatchery (STH) (located at Galbraith Springs) project originated from the Northwest Power Planning Council (NPPC) 1987 Columbia Basin Fish and Wildlife Program. The goal of this project is to aid in the restoration and enhancement of the Lake Roosevelt and Banks Lake fisheries adversely affected by the construction and operation of Grand Coulee Dam. The objective is to produce kokanee salmon and rainbow trout for release into Lake Roosevelt for maintaining a viable fishery. The goal and objective of this project adheres to the Council's Resident Fish Substitution Policy and specifically to the biological objectives addressed in the Council's Columbia River

Basin Fish and Wildlife Program to mitigate for hydropower related fish losses in the blocked area above Chief Joseph/Grand Coulee Dams.

The STH (managed by the STOI) is one component of 4 artificial production *projects* operated complementary of one another as part of a *program* to restore and enhance the Grand Coulee impoundment fisheries (Lake Roosevelt and Banks Lake). The other artificial production components include the Sherman Creek Hatchery (SCH), Ford Trout Hatchery and the Lake Roosevelt Kokanee and Rainbow Trout Net Pen Projects. The Spokane Tribe operates the Spokane Tribal Hatchery, the WDFW operates the Sherman Creek Hatchery, Ford Trout Hatchery and the Kokanee Net Pen Project and the Lake Roosevelt Development Association operates the Rainbow Trout Net Pen Project.

Each project has its own production goal to collectively produce up to 1,000,000 kokanee yearlings, 1.4 million kokanee fry/fingerlings and 500,000 rainbow trout yearlings for annual stocking into Lake Roosevelt and Banks Lake. Fishery managers from the WDFW, STOI and CCT comprise the Lake Roosevelt Hatcheries Coordination Team responsible for directing hatchery and net pen rearing operations. Performance and evaluation of hatchery and net pen reared fish released into the project area and the impact on the biota is monitored and evaluated by the Lake Roosevelt and Banks Lake Fisheries Evaluation Programs.

Sherman Creek Hatchery (#9104700)

SCH's (managed by WDFW) primary objective is the restoration and enhancement of the recreational and subsistence fishery in Lake Roosevelt and Banks Lake. SCH was designed to rear 1.7 million kokanee fry for acclimation and imprinting during the spring and early summer. Additionally, it was designed to trap all available returning adult kokanee during the fall for broodstock operations and evaluations. Since the start of this program, the operations on Lake Roosevelt have been modified to better achieve program goals.

The WDFW, STOI and the CCT form the interagency Lake Roosevelt Hatcheries Coordination Team (LRHCT), which sets goals and objectives for both SCH and the Spokane Tribal Hatchery, and serves to coordinate enhancement efforts on Lake Roosevelt and Banks Lake.

The primary changes have been to replace the kokanee fingerling program with a yearling (post smolt) program of up to 1,000,000 fish. To handle the increased production, twenty net pens were constructed and are currently operated. The second significant change was to rear up to 300,000 rainbow trout fingerling at SCH from July through October, for stocking into the volunteer net pens. This enables the STH to rear additional kokanee to further the enhancement efforts on Lake Roosevelt.

Current objectives include increased use of native/indigenous stocks where available for propagation into Upper Columbia Subbasin waters.

The Lake Roosevelt Fisheries Evaluation Program (LRFEP) is responsible for monitoring and evaluation on the Lake Roosevelt Projects. From 1988 to 1998, the principal sport fishery on Lake Roosevelt has shifted from walleye to include ainbow trout and kokanee salmon (Underwood et al. 1997; Tilson and Scholz 1997). The angler use, harvest rates for rainbow and kokanee, and the economic value of the fishery have increased substantially during this ten-year period. The investigations on the lake also suggest that the hatchery and net pen programs have enhanced the Lake Roosevelt fishery while not negatively impacting wild and native stocks within the lake.

Lake Roosevelt Trout Net Pen Project (#9500900)

The Lake Roosevelt Net Pen Project is a grass roots, community based, effort to enhance rainbow trout harvest opportunities. This project began in the 1980s with local anglers looking for a method to enhance the Lake Roosevelt fishery. In 1996, BPA provided a coordinator to assure this program continued. Today the project produces approximately 500,000 rainbow trout and 250,000 kokanee salmon for the Lake Roosevelt sport and subsistence fishery. The STH rears the rainbow trout from eggs in November to fry in September. The hatchery then transfers the fish to the net pens in September, where they are reared to catchable size by June. The rainbow trout are released ideally in June, but in years of deep drawdown, physical limitations require earlier releases. The net pen program produces the most successful fishery in the lake. Over 95 percent of all rainbow trout captured in the lake are from the net pens.

Chief Joseph Kokanee Enhancement Project (#9501100)

The goal of the Chief Joseph Kokanee Enhancement Project is to protect and enhance the natural production of kokanee stocks above Chief Joseph and Grand Coulee dams. Further goals are to provide successful subsistence and recreational fisheries and a broodstock source for artificial production in Lake Roosevelt.

Field activities began in the fall of 1995 and continue today. Activities include: (1) Ongoing annual monitoring of adult spawner escapement, (2) Continued research into genetic profiles of all known kokanee stocks, (3) Fine scale fish behavior study at Grand Coulee Dam's third power plant using multi/split beam acoustic assessment of strobe light efficacy in conjunction with sonic tags and underwater hydrophones. Small-scale assessment of Grand Coulee Pumping/generation station entrainment into Banks Lake, (4) Conduct kokanee reintroduction (300,000) into Big Sheep Creek using Meadow Creek, B.C. stocks, (5) spawning escapement monitoring and enumeration of adult kokanee present in Lake Roosevelt and Rufus Woods Reservoir tributaries (San Poil River, Big Sheep Creek, Deep Creek, Onion Creek, Ora-Pa-Ken Creek and Nespelem River respectively), (6) collection of genetic material from adult tributary spawning populations in the aforementioned streams and free-ranging kokanee in Lake Roosevelt kokanee, (7) collection of kokanee "swim-up" from redds and monitoring fry emigration from the San Poil River to Lake Roosevelt.

Critical project accomplishments include the determination that a minimum of seven different kokanee stocks exist, all of which may be inhabiting lake Roosevelt, with one other stock currently being examined. Entrainment at Grand Coulee Dam was

determined to be considerable (LeCaire 1999). Over forty-two month acoustic assessment showed 1,655,000 fish targets entrained through Grand Coulee Dam; eighty five percent of the entrainment was determined to take place at the third power plant during peaking operations (Sullivan 1999). Naturally producing kokanee are comprising a large portion of the existing fishery, however naturally producing tributary stocks seem to be in jeopardy. Strobe light efficacy testing reveals that the use as a deterrent may be more effective during night, however stronger results are seen when higher flows are present at the forebay during power-peaking operations. The project is beginning a reintroduction effort using an indigenous wild origin kokanee stock (Meadow Creek, B.C.). Additionally, important data have and continue to be collected relating entrainment characteristics to project operations (flood control draft, power draft, power peaking, spring and summer flow augmentation, temperature profile mapping, current profiles, plankton populations and associated forebay conditions.

Lake Roosevelt Monitoring Program (#944300)

Project Description:

This program has two primary goals. The first is to monitor and evaluate the performance of fish released into Lake Roosevelt by the STH and SCH. The second goal is to develop a fisheries management plan for Lake Roosevelt that prescribes mitigation/substitution actions and hydro-operations that will maximize ecosystem diversity, complexity, and sustainability. In order to develop an achievable fisheries management plan, a better understanding of this dynamic reservoir ecosystem is required. The Lake Roosevelt Ecology Model is being developed to improve knowledge of physical and chemical limnology, hydrology, and biological production of the reservoir to better predict the effects of single actions on the ecosystem and fishery. Objectives include: development of a Lake Roosevelt Fishery Management Plan with hydro-operation recommendations; refined analyses of trophic interactions and effects of various parameters on trophic levels; maintenance of databases in order to validate, refine, and maintain the Lake Roosevelt Ecology Model; validation and refinement of the Lake Roosevelt Ecology Model; monitoring and evaluation of impacts of hatchery origin fish on native species and the lower trophic levels of Lake Roosevelt; monitoring and evaluation of wild fish and different hatchery stocks of kokanee salmon and rainbow trout performance in Lake Roosevelt.

Associated Monitoring:

This program is the monitoring and evaluation tool for the SCH and STH.

Accomplishments:

Accomplishments include identification of changes in the fish assemblage and community structure of resident fish species, identification of diet preferences and dietary overlaps that could lead to competition (inter- and intraspecific), evaluation of various hatchery stocks performance through tagging studies, tracking of the economic value of the Lake Roosevelt fishery through fishing pressure and harvest in Lake Roosevelt as identified by a reservoir-wide creel study, and establishing a limnological data set for the Lake Roosevelt Ecology Model.

Lake Roosevelt Sturgeon Recovery Project #1995-027-00

Project Description:

Without effective intervention, white sturgeon population appears headed for extinction in the Columbia River upstream from Grand Coulee Dam. Natural recruitment has failed and the population now consists of an aging cohort of adults whose numbers are steadily dwindling. Concern has arisen over the declining status of native sturgeon populations throughout the Columbia River Basin. White sturgeon populations above Grand Coulee Dam were closed to harvest in 1996, and closed to sturgeon fishing in both Lake Rufus Woods and Lake Roosevelt in 2002, due to increasing concerns over the apparent declining status of the population. Mitigative and/or restorative efforts have become necessary to maintain this particular white sturgeon stock, which possesses genetic traits different from other Columbia River stocks (Setter and Brannon 1992). Similar genetic differences and recruitment failure for the Kootenai River white sturgeon stock led to its listing as an endangered species in 1994. In 1998, the WDFW and the Spokane Tribe of Indians sampled an aged white sturgeon population above Grand Coulee Dam and confirmed that virtually no recruitment has occurred during the past 20 to 25 years.

The Upper Columbia River White Sturgeon Recovery Plan, initiated in Canada and completed with involvement by U.S. parties, identifies the lack of information on the actual numbers and limiting factors of white sturgeon in U.S. waters of the transboundary reach between Lake Roosevelt and Keenleyside Dam as a critical uncertainty. The overall goal is to prevent the extinction of upper Columbia River white sturgeon and to recover the population to a level that allows for harvest.

Objectives of the program include development of recovery plans for white sturgeon in the Upper Columbia River in coordination with U.S., Canadian, Federal, State, and Tribal parties; to determine abundance, distribution, and population productivity of adult white sturgeon, whether one or multiple white sturgeon populations exist; to conduct a limiting factors analysis of white sturgeon in the Upper Columbia River between Grand Coulee Dam and the international border; to determine whether suitable white sturgeon spawning habitat and conditions exist between Grand Coulee Dam and the international border; to determine abundance, distribution, and relative year class strength of juvenile white sturgeon between Grand Coulee Dam and the international border; and to evaluate the feasibility of prospective recovery measures for white sturgeon in the transboundary reach.

Associated Monitoring:

The program will do initial studies to determine current status of white sturgeon in the Upper Columbia River between Grand Coulee Dam and the international border. The program, now and in the future, will monitor implementation of recovery efforts.

Accomplishments:

During 2001-2002, this project assisted in the development of an Upper Columbia River White Sturgeon Recovery Plan that reviewed available information on sturgeon status and biology, identified objectives, strategies, and measures for sturgeon recovery, and outlined a coordinated effort on both sides of the border.

Special Notes:
Delays in contracting in 2001-2002 delayed adult sampling for an additional year, and minimized juvenile sampling in 2002. Currently, the program is fully staffed for needs in 2003-2004. Monitoring to determine current population status, and evaluation of artificial production feasibility as a conservation interim action are moving forward.

Lake Roosevelt Emergency Fish Restoration Project
Project Description:
This project was a one-time funded project by BPA to compensate for power system operations during the power emergency period. A solicitation was developed by the Colville Confederated Tribes Fish and Wildlife Department and submitted to BPA for funding.

Several factors were involved in creating the request for funding. These included safety of the volunteers that maintain the project during the cold, windy winter months. Many of the net pens were badly worn and damaged from the recent untimely drawdown period. The final concern was that the drawdown occurred during a time when high entrainment traditionally occurred. New net pen complexes were purchased that had safety walkways and handrails installed. A total of four pen complexes of four pens each were purchased and installed.

Several thousand triploid steelhead were purchased and planted at various locations within the lake. The initial lot of triploids averaged 1.84 pounds each, while the second lot averaged 2.2 pounds each. An additional lot of 100,000 were purchased, reared, and released into the lake. All of the large fish were tagged with flow tags. In addition, 10 percent of the small fish were tagged. Floy tag returns to Eastern Washington University indicated that the planted triploids supported a winter fishery in 2000 and still are making a considerable contribution to the fishery.

Associated Monitoring:
The project was a total success as evidenced by tag recovery documented by the Lake Roosevelt Monitoring Project. While no monitoring efforts were undertaken by the project, the Lake Roosevelt Monitoring Project is collecting data pertinent to the project's success. Current Lake Roosevelt monitoring efforts are still documenting the recruitment of the triploids to the creel.

Accomplishments:
- Replaced many old degraded net pens with new net pens and docks that have a safety handrail attached and a skid resistant walkway.
- Purchased needed equipment and waterproof storage boxes for fish feed.
- Contributed to a very successful winter steelhead fishery along Lake Roosevelt.
- Helped generate further positive public feelings for the Tribal and BPA funded fishery enhancement effort.
- As evidenced by the number of letters from the local business operators, the project created a windfall for local restaurants and motel owners.
- Planted 12,000 pounds of catchable triploid steelhead trout all along the reservoir

from Spring Canyon to as far north as Northport.
- Planted 100,000 fingerling trout from the spring transfers.
- The fish planted by the project are still recruiting to the creel.
- Used triploids to supplement the Lake Roosevelt fishery which is not only cost-effective but the fish seem to remain in the lake (not entraining out) over time, which may suggest that they should be used on a continuing basis. Unfortunately the project was only funded for a single year.

31.3.2 Non-BPA Funded Projects

Colville Hatchery (WDFW)

The WDFW Colville Trout Hatchery manages a locally adapted native rainbow trout broodstock currently being used to augment Lake Roosevelt tributary populations (Phalon Lake). In addition, it is providing fish to the Lake Roosevelt Net Pen Project to evaluate this stock's ability to resist entrainment at Grand Coulee Dam, while providing an enhanced recreational fishery.

Phalon Lake Native Redband Rainbow Trout Broodstock Trapping Facility (WDFW)

The WDFW has constructed a concrete vault trap with a ladder for fish attraction and entry, approximately 16 miles north of Colville, WA. The trap has an electric pump that supplies water to the trap and ladder (1-2 cfs). The facility supplies native redband trout eggs for the Lake Roosevelt net pen program funded by BPA, and other tributary augmentation programs when required. Facility operations run during April and May of each year, and possibly September and October. Operations are monitored three to four times per week during these months. The project is co-funded by Alcoa Foundation, Spokane Fly Clubs, Meyers Falls Hydro Project, and WDFW. The facility will be completed in the spring of

Graham Lake Native Trout / Remote Site Incubator Research

The project is intended to determine the practical use of remote egg incubators to establish and/or perpetuate native trout species in native habitats. Incubators were stocked with native westslope cutthroat trout eggs for three brood years, 1999, 2000, and 2001. At the same time, fall cutthroat fry and yearling cutthroat were stocked from the same brood years to evaluate the three different stocking strategies. The three groups were thermally marked each year (nine groups total) to differentiate them after capture. The last collection occurred in the summer of 2003. The 2001 and 2002 collections indicated a 3 percent and 6 percent presence in the catch, respectively, of the incubator hatched fish. These percentages are relative to the number of fish captured in those years, not the total survival of the incubator-hatched fish. Analysis will be completed and a report generated. This project was co-funded by Boise Cascade Corp, Vaagen Brothers Lumber Company, and Pend Oreille Newsprint Plant and was facilitated by Washington State Senator Bob Morton. The project is sponsored by the WDFW with collaboration from Patrick Graham and Stevens County Conservation District.

Kettle Tri-Watershed Project

Project Description:

FCD took this excellent opportunity to establish agency and private citizen cooperation to specifically improve the water quality and overall management of three watersheds in the

Kettle River WRIA (60). The establishment of such a co-management team will provide Ferry County with future contributors to water quality improvement, and education on other 303(d) listed water bodies. Therefore, the purpose of this project was to conduct water quality monitoring (including fecal coliform source tracking DNA analysis providing specific characterization of what is otherwise considered to be a non-point source) and design, adopt, and implement on-the-ground and BMPs. The intent was to remove each of these watersheds from the 303(d) list. The cooperative Kettle Tri-Watershed Management Team (KTWMT) provided guidance of all project efforts, participated in monitoring efforts, and helped implement BMPs. This project was funded by the WDOE and ended in 2002.

Associated Monitoring
FCD Staff and USFS are continuing monitoring efforts.

Accomplishments:
1. Establishment of the Kettle Tri-Watershed Management Team
2. Successful demonstration of a scientifically sound, innovative, DNA analysis methodology for determining animal species sources and their relative percentages of fecal coliform contamination of water and establishing a fecal coliform source DNA library.
3. Comprehensive characterization of overall water quality by qualitative monitoring of parameters including fecal coliform, temperature, total nitrates, total phosphorous, dissolved oxygen, pH, conductivity, turbidity and discharge flow.
4. Inventory and survey existing riparian and upland conditions and practices affecting water quality.
5. Implementation of specific BMPs and a water quality protection plan to protect and enhance these three watersheds and remove them from the 303(d) list.
6. Leveraging of grant BMP "seed" funds by active solicitation of affected agencies and citizens to contribute needed funding and resources to complete selected BMPs.

Sherman Creek Study
Project Description:
The grant was approved and funded through the Centennial Clean Water Fund. The objectives of the grant are the (a) successful demonstration of a scientifically sound method for locating reaches of stream where temperature excursions are occurring, (b) implementation of site-specific BMPs to help reduce stream temperatures in affected areas, (c) stimulation of funds from other sources for implementing BMPs required to bring Sherman Creek into compliance with State water quality standards for temperature, (d) education of local citizens about the impacts on beneficial uses of water when temperatures exceed State parameters and how this project addresses this problem, and (e) development of a successful conservation partnership with local State and federal agencies with a vested interest in the study area. The project was funded by WDOE and ended in 2002.

Associated Monitoring:
Continued monitoring occurs through a partnership effort with FCD, USDA Forest Service and WDOE

Accomplishments:
The data from this study helped several agencies understand the effects of ambient air temperature on water temperature, and created some BMPs to use as tools to correct problems associated with high water temperatures and/or know where to treat and where not. The Sherman Management and Restoration Team (SMART), a multi-agency watershed team was created through this grant and will continue to meet periodically to address problems and issues, as well as work together on the implementation of projects. The partnership with FCD, USFS, and WDOE is already working together on the State's TMDL program to implement the TMDL cleanup on Sherman Creek. The WDOE is using the results of the data found in the Sherman Creek Study to create a modeling program for all similar streams east of the Kettle Range, and implementation strategies to use in the TMDL projects throughout the Upper Columbia Subbasin.

Ferry County Kettle River Park
Project Description:
Stabilize 375 feet of Kettle River bank, to preserve and enhance the community park and swim beach. The project is sponsored by Ferry County, Washington and has numerous collaborators. This project ends in 2003.

Associated Monitoring:
Regular inspection by community volunteers; annual inspection by FCD staff.

Accomplishments:
Bank is stabilized, allowing both natural and planted native vegetation to establish and stabilize streambank. The project design serves to protect the current streambank on the Kettle River, as well as capture sediments flowing down stream and placing them along the bank. The project preserves swim beach, which is an important community asset, while improving habitat for fish and wildlife, as well as addressing water quality problems associated with sediments and dissolved oxygen.

Palmanteer Fencing Project
Project Description:
Fence 2800 feet of streambank to exclude trespass cattle. This project ended in 2001 and was sponsored by the FCD.

Associated Monitoring:
Regular inspection by landowner; annual inspection by FCD staff.

Accomplishments:
Improved riparian vegetation; improved wildlife habitat; more stable streambanks; and reduce fecal coliform problems. Projects like this are designed to target several water quality issues, such as sediment loading, dissolved oxygen, fecal coliform.

Roberta Creek Restoration
Project Description:
Re-channel and return to PFC approximately 1000 feet of stream that borders an associated wetland. This project is sponsored by the FCD and ends in 2003.

Associated Monitoring:
Regular monitoring of changes in habitat quality.

Accomplishments:
Returning stream to PFC results in better wetland recharge, improved fish and wildlife habitat, reintroduction of native species in associated plants.

Brown Kettle River Bank Stabilization

Project Description:
Provided cost-share assistance to help landowner install rock veins and weirs, and plant native vegetation that helped to stabilize riverbank and improve habitat on over one-half mile of the Kettle River. This project is funded by the FCD and ends in 2003.

Associated Monitoring:
Regular inspection by FCD staff.

Accomplishments:
Project has just been installed; therefore it is too soon to assess results.

Stevens Fencing Project

Project Description:
Construct 500 feet of rail fence in a riparian area where falling trees knocked down wire fence, allowing livestock access to stream. This project was sponsored by the FCD and ended in 2001.

Associated Monitoring:
Regular inspection by landowner. Annual inspection by FCD staff.

Accomplishments:
Rail fence stays in place, denying livestock access. Banks remain more stable, water quality is improved.

Perry Septic System

Project Description:
Provided cost-share assistance, and engineering help to enable landowner to replace a defective septic system in a home on the shore of Curlew Lake. This project was completed in 1999 and was sponsored by the FCD.

Associated Monitoring:
Annual monitoring by FCD staff

Accomplishments:
Eliminated effluent discharge into the lake.

31.4 Strategies Currently Being Implemented Through Existing Projects

All three federal land managers (BLM, USFS, and NPS) enhance wildlife populations either actively with projects or passively through land use regulations. For example, the Colville National Forest has produced an Environmental Assessment with recommendations to the Washington State Department of Transportation (WDOT) on how to limit the current impacts of the state highway to instream and riparian habitat along Sherman Creek. The proposed removal or modification of Growden Dam on Sherman Creek, which is presently a barrier to fish passage (and also a safety issue), is a current example of WSDOT and the USFS working together.

31.4.1 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 Upper Columbia Subbasin, 45 recent restoration and conservation projects were identified. Of the projects identified, 26 were focused on resident fish, 8 primarily benefited wildlife, and 11 benefited both fish and wildlife.

The focus of many of the recent projects in the Upper Columbia Subbasin (52 percent) has been on addressing habitat related limiting factors (Figure 31.1). Habitat quality (21 percent), water quality or quantity (17 percent), habitat quantity (14 percent) and barriers (11 percent) have all received attention in recent years. The lack information has been addressed by 14 percent of the recent projects. Disease, competition, predation, and hybridization are limiting factors that have been addressed by 11 percent of the recent projects. Indirect mitigation was addressed by 11 percent of projects.

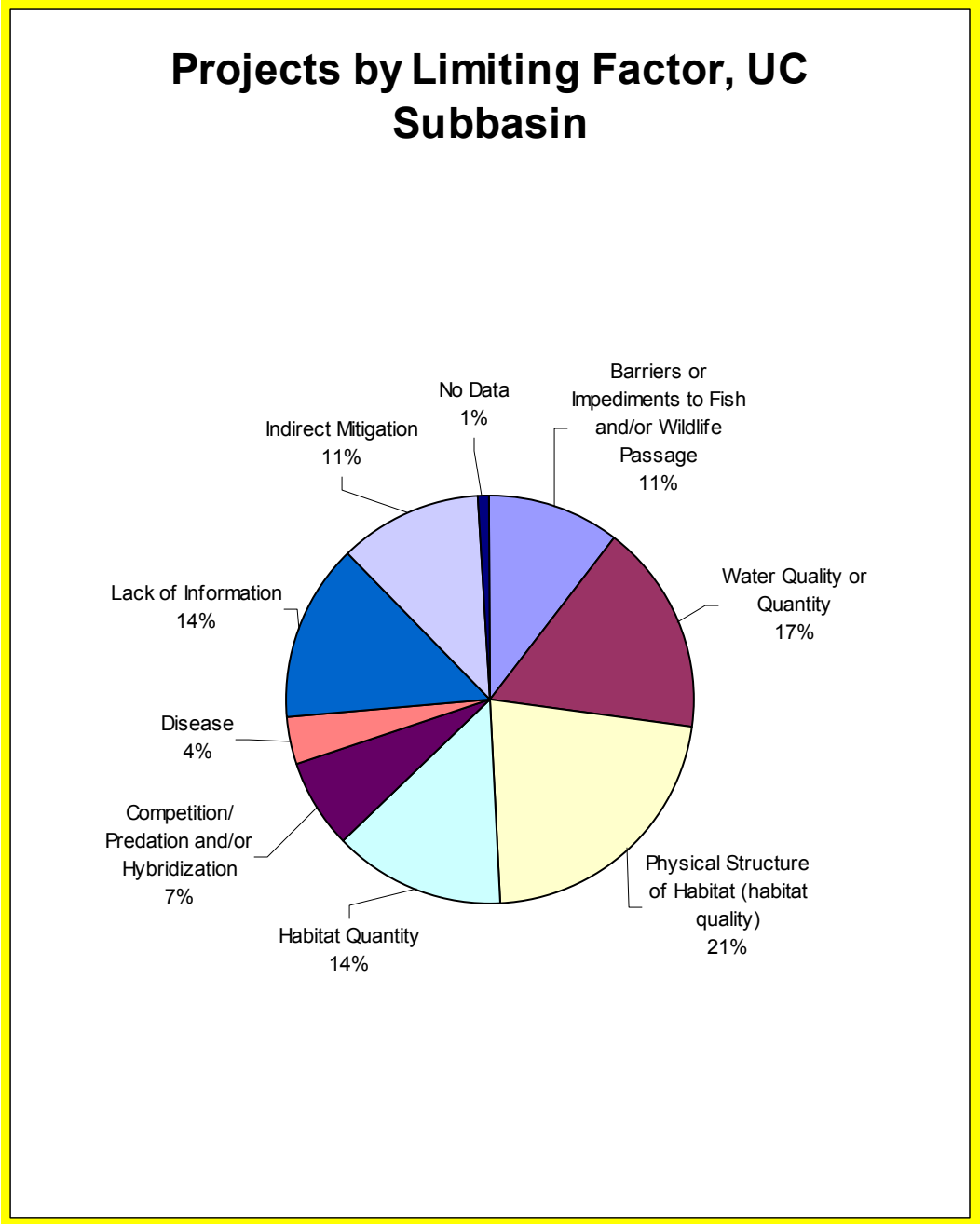

Figure 31.1 Proportion of projects in the Upper Columbia Subbasin that relate to specific limiting factors

A wide array of strategies have been employed in the Upper Columbia (Figure 31.2). The only strategy that has not been extensively employed by the projects in the database is enforcement/protection.

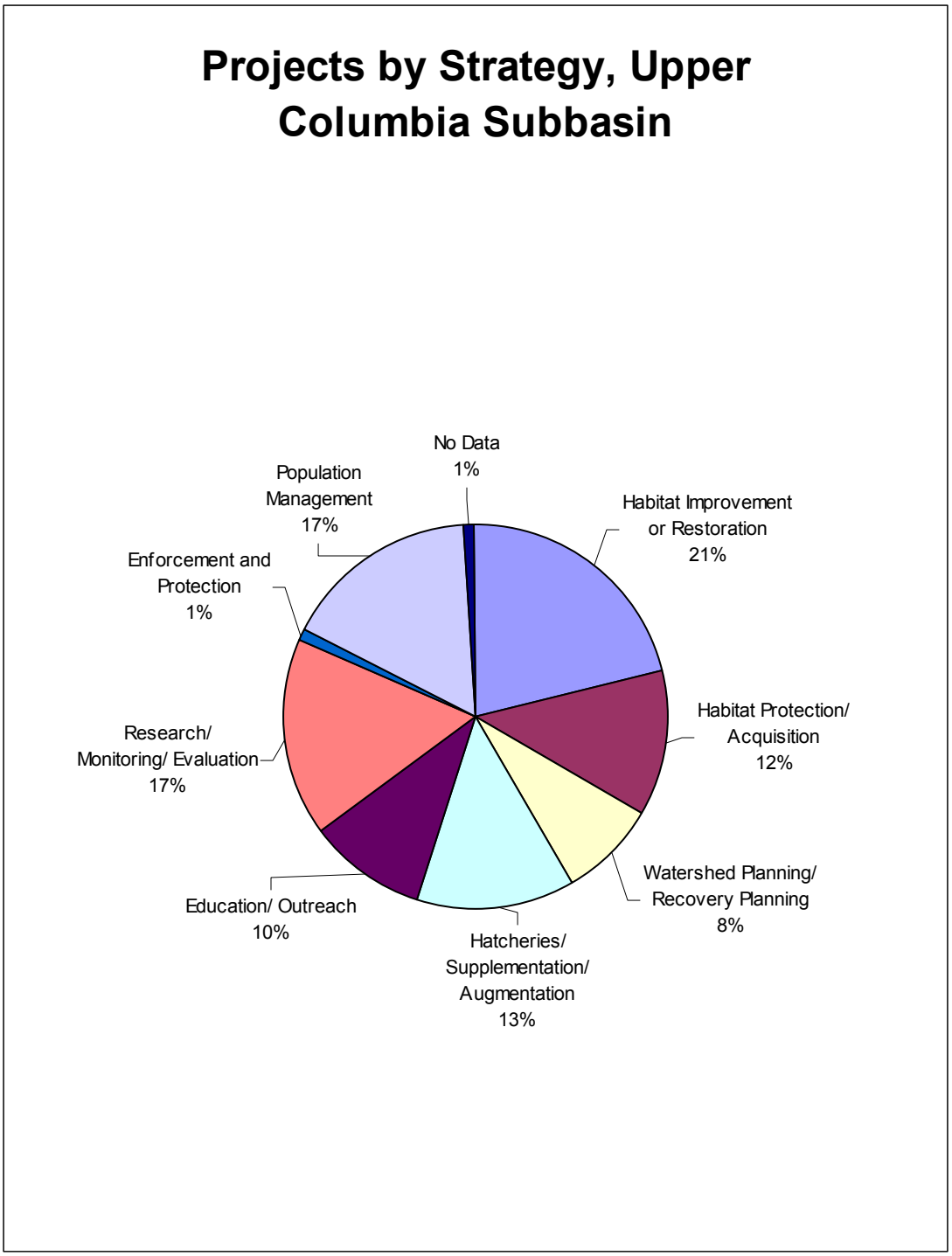

Figure 31.2. Proportion of projects in the Upper Columbia Subbasin that relate to specific strategies

31.4.2 Gaps Between Actions Taken and Actions Needed

The Technical Guide for Subbasin Planners requires that gaps between actions taken and actions needed be identified. This perspective will help determine whether ongoing activities are appropriate or should be modified and lead to new management activity considerations.

Few projects within the Upper Columbia Subbasin address restoring native fish and their habitats within tributaries to the Columbia River. Many current projects are aimed at improving the Lake Roosevelt fishery by substituting kokanee and rainbow trout for the loss of anadromous salmon. Few projects are focusing on tributary habitats where native fishes are currently or were historically present. While supplementing the Lake Roosevelt fishery is imperative in maintaining angler interest and reduce angling pressure on native stocks of fishes that are depressed, the restoration of tributary habitats may have benefits that are cost effective over the long-term. The number of current projects addressing native fish and habitats within tributary streams is lacking when compared to the number of objectives formulated by the Upper Columbia work team that are aimed at restoring native fish and their habitats within the Subbasin.