Intermountain Province Subbasin Plan EXECUTIVE SUMMARY

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Northwest Power and Conservation Council
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ON BEHALF OF:
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EXECUTIVE SUMMARY – Intermountain Province Subbasin Plan

ES.1 Introduction to Subbasin Planning in the Intermountain Province

The Northwest Power Planning Council[1]'s (Council) 2000 Fish and Wildlife Program (Program) introduced substantial changes from past Programs. The Program established a basin-wide vision for fish and wildlife, and included broad biological objectives, and a corollary set of action strategies to achieve that vision. The Council plans on implementing the Program through subbasin plans developed locally in most of the 50 tributary subbasins of the Columbia River, which will ultimately be amended into the Program. Subbasin plans will be used to help direct Bonneville Power Administration (BPA) funding of projects that protect, mitigate and enhance fish and wildlife that have been adversely impacted by the development and operation of the Columbia River hydropower system.

The Intermountain Province (IMP) is located in the northeast corner of Washington State and the northern Idaho panhandle (Figure ES-1). There are six subbasins in the IMP, including Coeur d' Alene, Pend Oreille, Spokane, Upper Columbia, San Poil, and Lake Rufus Woods. The Coeur d' Alene Subbasin is in Idaho. The Pend Oreille and Spokane subbasins are in Washington and Idaho. The remaining subbasins are within Washington. Additionally, portions of the Upper Columbia and Pend Oreille subbasins extend into Canada geographically.

This IMP Subbasin Plan is a response to the Council's request to develop locally derived Subbasin plans for this region. This plan was developed in an open public process, which provided opportunities for participation by a wide range of state, federal, Tribal and local managers, experts, landowners, local governments, and stakeholders. The IMP subbasin plan includes:

- an assessment providing the technical foundation for the plan by describing the current condition of fish and wildlife in the subbasin and identifying limiting factors;
- an inventory providing a summary of recent and ongoing projects to protect, mitigate, and enhance fish and wildlife in the subbasin, along with an analysis of evident gaps; and
- a management plan describing the vision, objectives and prioritized implementation strategies in the subbasin.

Subbasin planners in the IMP generally followed guidelines presented in the Council's, *Technical Guide for Subbasin Planners* (Council 2001) in development of the IMP

[1] Renamed in 2003 as the Northwest Power and Conservation Council. In this document, the organization under both the previous and current names is referred to as "Council."

Subbasin plan. The plan was developed in accordance with the Council's vision, scientific principles, and biological objectives for the Columbia River Subbasin, as described in the 2000 Fish and Wildlife Program (refer to Appendix A for a summary of key elements of the Program).

The IMP Subbasin Planners chose to take Subbasin planning one step farther by coordinating the planning process at both a subbasin and provincial level. This approach included a strong emphasis on consistency between the six subbasins, discussion of province level considerations in both the assessment and the inventory, and development of a province level vision and biological objectives for fish and wildlife.

The technical assessment of aquatic and terrestrial resources was compiled from existing subbasin summaries, other scientific literature, and data provided by province resource managers. The assessment describes the biological and physical characteristics of the subbasin in terms of selected focal fish and wildlife species. Limiting factors for the analysis species were identified and summarized; where insufficient data exists, specific research needs were noted.

The inventory identifies and describes fish and wildlife programs and projects that are in place or currently underway. Existing laws, regulations, and management objectives of the natural resource management entities in the province and six subbasins are also noted. In addition to listing programs and projects, the inventory includes an assessment of the gaps, which are clearly evident when comparing the assessment with the inventory.

Based on the results of the assessment and inventory, teams of resource managers, technical experts, and subbasin stakeholders developed biological objectives and strategies that respond to the limiting factors and resource needs of each subbasin. Biological objectives were developed using a tiered approach, beginning with review of the Columbia River Basin biological objectives and scientific principles identified in the Council's 2000 Fish and Wildlife Program (Appendix A). Subbasin level objectives tiering to the Program objectives and principles were developed by each of the six Subbasin Work Teams. A set of province level objectives was developed by reviewing objectives developed in all of the subbasins, looking for commonalities, and developing a third tier of objective statements intermediate to the basin and subbasin levels.

Finally, a Research, Monitoring, and Evaluation (RM&E) plan was developed to assess the effectiveness of strategies at reaching the desired biological objectives. In light of the various ongoing efforts to develop a regional monitoring plan, subbasin planners in the Intermountain Province (IMP) chose to develop a monitoring plan based on existing monitoring methods described in the scientific literature. The items in the RM&E plan were based on the appropriate objectives and strategies from the management plan. Additional RM&E items were added to the plan by the Technical Coordination Group as needed to complete the plan. Each subbasin has a chapter on RM&E included in this plan.

Figure ES-1. Overview map of the IMP. The inset map shows the location of the IMP in relation to the rest of the Columbia River Basin, including the Canadian portion.

One of the directions from the Council to subbasin planners was to establish a clear logic path within the subbasin plans. In the IMP, we established a logic path between the assessment and inventory and the management plan (the limiting factors logic path). We also established a logic path between the objectives in the Council's 2000 Fish and Wildlife Plan and IMP Provincial Objectives and Subbasin-level objectives (the management plan logic path). In addition, there was a logic path within the process used to develop the IMP subbasin plan whereby a dialogue was established between technical experts and interested stakeholders to allow for the assessment, inventory, and management plan to be developed simultaneously (the process logic path). In the IMP, the working hypothesis was established at the provincial level to draw a logic path between the development of the hydropower system, the limiting factors for fish and wildlife that developed as a result of the hydropower system, and the objectives that were developed in the IMP management plan. These logic paths are described below (Figure ES-2).

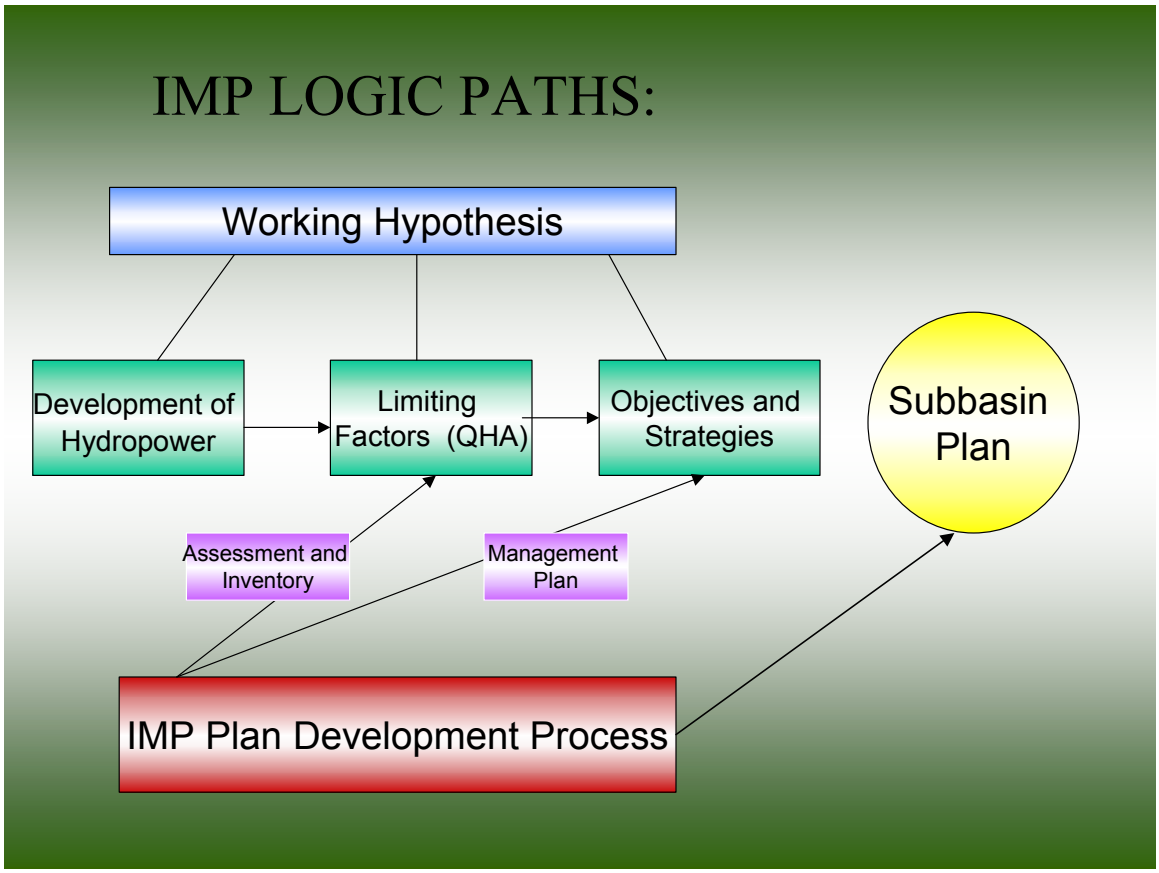

Figure ES-2. IMP Logic Paths. The working hypothesis was established to draw a logic path between the development of the hydropower system, the limiting factors for fish and wildlife that developed as a result of the hydropower system, and the objectives that were developed in the IMP management plan. The plan development logic path was the means to developing the components of the plan.

ES.1.1 The Process Logic Path

Subbasin planners in the IMP had several goals when they established the subbasin planning process. Planners desired to:

- Coordinate subbasin planning at the provincial level.
- Provide a forum in which local, state and Tribal governments, and other interested stakeholders collaborate and coordinate on the creation of subbasin plans
- Have an open public process with multiple opportunities for comment from all interested parties
- Maintain a dialogue between local technical experts and stakeholders during development of the subbasin plan
- Create the assessment, inventory and assessment simultaneously

The IMP subbasin planners chose to develop a coordinated set of plans for the six subbasins within the province, rather than six independent plans. This approach included a strong emphasis on striving for consistency in subbasin planning approach and format across all six subbasins, discussion of province level considerations in the assessment and inventory, development of a province level vision, and where possible, a "roll up" of province level biological objectives, to which each subbasin would tier.

A major commonality between all six subbasins is their location within the 'blocked area', that portion of the Columbia River Basin from which all anadromous fish species are blocked due to the construction of Chief Joseph and Grand Coulee dams. Although each subbasin has individual fish and wildlife management needs, there are a number of management issues that are more appropriately and effectively addressed at the province level.

Public outreach and involvement of all interested stakeholders in all stages of the IMP subbasin plans was a priority in the IMP and a key component of the approach used in the IMP. Subbasin Work Teams were established in each subbasin that involved a cross section of representatives of county, state, Tribal, and federal government, conservation districts, industry, environmental groups, and interested citizens. Subbasin Work Team meetings were the heart of subbasin plan development in the IMP. Subbasin planners in the IMP used the six Subbasin Work Team meetings, one about every two months, to provide stakeholder education about the planning process and the Council's Program; to provide opportunities for public participation; and to actually develop the management plan portion of the IMP subbasin plan.

The process for development of the IMP subbasin plan is depicted in Figure ES-3. The graphic shows how the IMP Provincial vision, objectives, and guiding principals were developed from the Council's guidance, how the assessment and inventory were developed by the GEI Team with support from the Technical Coordination Group, and how the Subbasin Work Teams developed the management plan at the same time as, and in coordination with, the assessment and inventory development.

In addition to the stakeholder outreach conducted through the subbasin work teams, two evening open houses were held in each of the six subbasins to educate the public about the planning process and provide opportunities for comment. Two newsletters and meeting notices were distributed to the Advisory Council mailing list of over 500 interested individuals. Meeting notices and meeting minutes, drafts of the IMP subbasin plans, maps, newsletters, links and other information about the subbasin planning process in the IMP were maintained throughout the process on an IMP web page on the Council's website at: http://www.nwcouncil.org/fw/subbasinplanning/admin/level2/intermtn/
In these ways, communication and public participation were emphasized throughout the IMP Subbasin Plan preparation.

ES.2 Fish and Wildlife in the Intermountain Province

Several over-riding issues are of critical importance in the IMP: the loss of anadromous fish, the historic lack of funding provided to the Province for fish and wildlife mitigation, the lack of information about fish and wildlife in the IMP (a problem related to the lack of funding), and water management of mainstem dams.

The complete loss of the anadromous life history has had a wide array of impacts within the Province and is a major focus of this plan. This topic is discussed in depth in the assessment portions of this plan and it is also addressed in objectives and strategies outlined in the management plan.

The lack of funding for fish and wildlife in the IMP is, in part, a direct consequence of the loss of anadromous fish. The BPA currently allocates approximately $139 million annually to protect, mitigate, and enhance fish and wildlife in the Columbia River Basin (CBFWA 2004). The 2000 Fish and Wildlife Program calls for 70 percent of fish and wildlife mitigation funding to go to anadromous fish. Historically, the IMP has not received funding for anadromous fish mitigation because anadromous fish have been lost due to the construction of Chief Joseph and Grand Coulee dams without upstream fish passage facilities. The IMP has received between $6 and $11.5 million per year for fish and wildlife between 2001 and 2003, or between 5 and 8 percent of the total mitigation funds available (CBFWA 2004). This level of funding is not proportionate to the magnitude of the impacts experienced by the IMP, which total approximately 40 percent of the wildlife habitat and anadromous fish losses documented to date.

The lack of data is reflected in the assessment and management plan portions of this plan. For example, several of the aquatic focal species, such as white sturgeon and burbot, are addressed only briefly in the assessment because very little is known about them. In addition, in many cases objectives are, of necessity, broad and general. It was not possible to include numeric targets in most of the management objectives because of a lack of quantitative information.

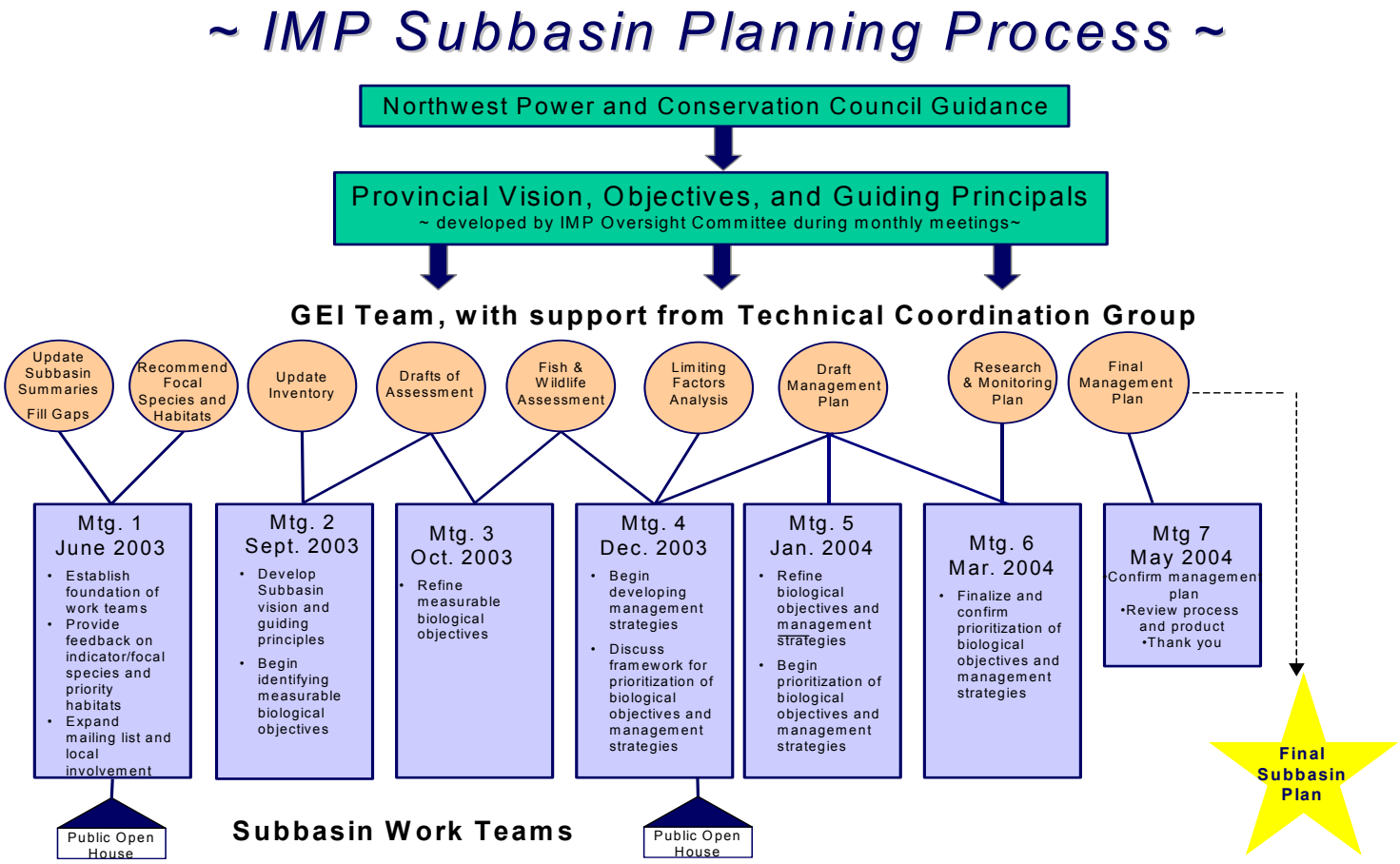

Figure ES-3. The subbasin planning process logic path in the IMP

Water management in the mainstem rivers has a profound effect on fish and wildlife in the IMP. Water levels in all the mainstem reservoirs in the IMP, including Lake Pend Oreille, Coeur d' Alene Lake, Lake Roosevelt, and Lake Rufus Woods are controlled by the hydropower system. Decisions about water management affect people throughout the Columbia River Basin and beyond. Therefore, decisions about water management are made on a system-wide basis. Not all of the key decision makers for water management participated in the process to develop the IMP Subbasin Plan.

In the IMP Subbasin Plan, the management planning work focused on issues that were conceivably within the control of the local Subbasin Work Teams and fish and wildlife managers. Therefore, although water management in the mainstem is an extremely important issue to the Province, this plan largely does not address the topic. Nevertheless, the timing and extent of fill and drawdown has a profound effect on the ability of the reservoirs in the IMP to sustain fish and also affects many species wildlife. Many of the artificial production objectives and strategies described in the management plan are necessary because of operations of the reservoirs.

ES.2.1 Limiting Factors - Aquatic Resources

At the turn of the twentieth century, anadromous Pacific salmon runs in the Columbia River Basin ranged from an estimated 10 to 16 million fish annually (Council 1986), more than any other river system in the world. Today, current annual run size estimates average about 2.5 million fish (Dauble et al. 2003). Although the exact amount of fish lost as a result of hydropower development is unknown, the development of the Federal Columbia River Power System (FCRPS) clearly had, and continues to have, a significant impact on anadromous fish abundance in the Columbia River.

The upper reaches of the Columbia River once fostered some of the most bountiful anadromous fish runs in the entire Columbia Basin, including the famous "June hogs". Among all the Columbia's fisheries, the fishery at Kettle Falls - which is presently submerged under the waters of Lake Roosevelt - was second only to the renowned Celilo Falls in its overall cultural significance and productivity. In the 1800s, prior to over harvest by commercial fisheries in the lower Columbia River, and the extensive habitat degradation that occurred throughout the Columbia Basin, the combined salmon and steelhead harvest of the Indian tribes in the upper Columbia River was estimated in excess of two million pounds annually (Koch 1976).

In the Intermountain Province, anadromous fish were eradicated upstream of RM 596.6 (River Kilometer 959.9) on the Columbia River when Grand Coulee Dam was constructed without fish passage facilities in 1939. The completion of Grand Coulee blocked access by all anadromous fish to approximately 1,140 lineal miles of habitat above it (Scholz et al. 1985). Subsequently, in 1958, Chief Joseph Dam was constructed, also without fish passage facilities, at a location 50 miles downstream of Grand Coulee. The area above these dams is commonly referred to as the "blocked area" (Figure ES-4).

The creation of these impoundments has changed the once connected fluvial system into a series of slack water environments that are connected hydrologically, but quite isolated biologically. The low velocity impoundments often have non-stratified deep environments with fine sediments, elevated dissolved atmospheric gasses, and unnatural flow regimes. These facilities also converted flowing rivers into slow moving reservoirs. In addition, large storage dams built in Canada in the 1960s dramatically changed flow regimes in the upper Columbia River system.

The creation of hydropower caused rapid economic expansion within the Columbia River Basin, which resulted in secondary impacts to fisheries resources. The region's economy shifted from river- and salmon-based to agrarian based. The economic shift resulted in mostly extractive uses of the natural resources. Consumptive use of natural resources is closely associated with aquatic and terrestrial habitat degradation.

Also devastating to the native fish has been the introduction of no fewer than 21 exotic fish species that out-compete or directly prey on native species adding further harm to the native species. Additionally, the reservoirs benefit nonnative species, which further increase nonnative pressure on native species. At present only remnant populations of native resident salmonids remain, including Interior Columbia River redband trout, westslope cutthroat trout, bull trout, and mountain whitefish.

Another impact of the loss of anadromous salmon has only recently been recognized, that is the consequences of the loss of nutrient transport from oceans to freshwater environments. When migratory adult fish leave their ocean rearing grounds and migrate to lakes, rivers, and streams to spawn, they convey nutrients from one location to another. Since Pacific salmon die within a few days of spawning, the nutrients contained in their carcasses become available to the ecosystem, sometimes far inland from where the nutrients were derived. These salmon-transported nutrients are important for the maintenance of ecosystem biodiversity and fish production.

Biological changes created by dams are substantial and well documented. Dams sever the river's historic connection with its floodplain, leading to reduced productivity in both habitats. The river exchanges material and nutrients between the terrestrial environment and aquatic environment creating a symbiotic effect. The river needs to purge itself of fine sediments and detritus and recruit new materials like large woody debris. The process of purge and recruit helps promote a healthy and diverse ecosystem.

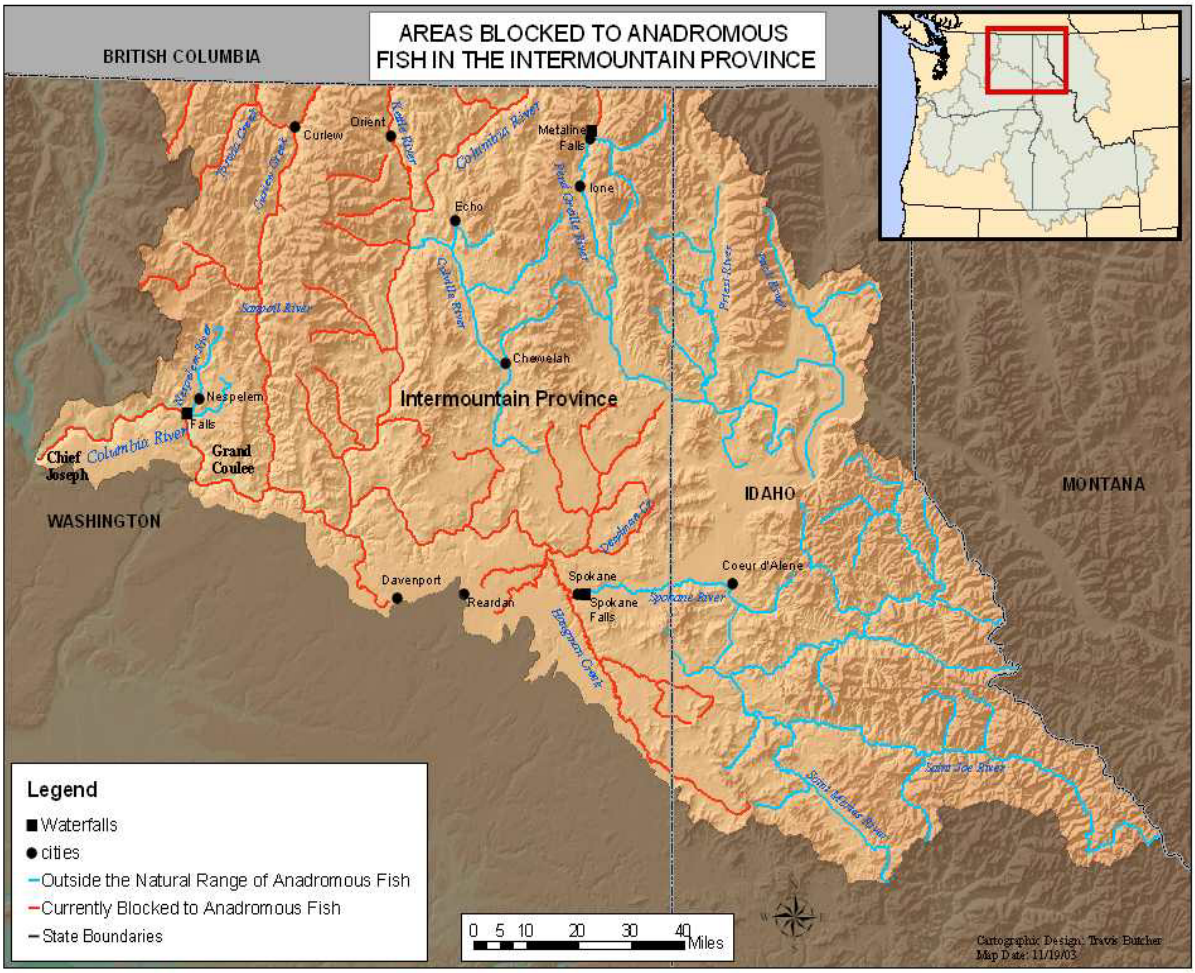

Figure ES-4. Areas blocked to anadromous fish as a result of the lack of fish passage at Grand Coulee and Chief Joseph dams

ES.2.3 Limiting Factors - Terrestrial Resources

Development of the FCRPS projects in the IMP resulted in direct effects on wildlife populations and habitats through construction of facilities and reservoir inundation. Wildlife continue to be affected via operational and secondary, or indirect, effects of the FCRPS. Population growth, and the combined effects of industrial, agricultural, and residential development also have had widespread effects on wildlife and their habitats in the IMP. Much of the province has been converted to developed and agricultural land uses, the majority of forest stands are managed for timber production, naturally-occurring fires have been suppressed, and human presence provides a source of disturbance to native wildlife. Habitat conversion and degradation are the two primary limiting factors to native focal wildlife species in the province. Although some of the direct effects can clearly be linked to the FCRPS, secondary effects of the hydrosystem are tightly intermingled with the effects of other land uses in the province.

Habitat loss assessments were conducted for each of the three FCRPS projects in the IMP to determine the effects of project construction and reservoir inundation on wildlife. Many of the habitats that were inundated by the reservoirs were of high ecological value, including wetlands, riparian areas, and shrub-steppe. The loss assessments used the Habitat Evaluation Procedures (HEP) methodology developed by the U.S. Fish and Wildlife Service to evaluate the quantity and quality of wildlife habitats affected by project construction. The HEP models provided an estimate of the value of the lost habitats to various indicator species of wildlife. HEP models provide results in terms of Habitat Units, which are units of value based on both quality and quantity of habitat. A loss of 149,276 Habitat Units was determined for all three projects in total; approximately 75 percent of the wildlife Habitat Unit losses are associated with the Grand Coulee Project.

The Council's Fish and Wildlife Program includes a summary of the Habitat Unit losses (Table 11-4 of Appendix C of the Program) and provides a commitment to complete the acquisition of Habitat Units. As of February 2004, the Habitat Units acquired for Albeni Falls total 4,822, Grand Coulee totals 56,680, and Chief Joseph totals 1,433. Fifty-eight percent of the Habitat Units (86,341) remain to be acquired in total for the three FCRPS projects in the province.

The Council's Fish and Wildlife Program also includes a commitment to mitigate for operational and secondary effects of the FCRPS projects. Operational impact assessments have not been conducted for any of the three FCRPS hydroelectric projects. Operational effects to wildlife include water fluctuations within the drawdown zone, continuing erosion of reservoir shoreline habitats, transmission line and other facility maintenance, and wildlife disturbance associated with project activities. Secondary effects of development of the FCRPS projects, as defined in the IMP, include increased harvest pressure on other wildlife due to the loss of salmon, increased natural resource extraction such as timber harvest and mining, irrigated and dryland agriculture development, and residential and industrial development. Assessments of secondary effects of the FCRPS have not been prepared by the Council or other federal agencies.

Comparison of current to historic habitat conditions in the IMP shows that habitats have been greatly modified through direct and secondary effects of the FCRPS and through other land uses and development. Habitat conversion is most evident in the lands currently mapped as urban (about 1 percent of the province) and those mapped as agriculture/pasture/mixed development (about 12 percent of the province).

ES.3 Intermountain Province Working Hypothesis

A working hypothesis summarizes a scientifically based understanding of the subbasin at the time the Management Plan was developed and begins to bridge the gap between the science and strategies (Council 2001). The working hypothesis is used to evaluate and derive biological objectives and strategies in relation to the subbasin vision.

The connection between the IMP working hypothesis, the limiting factors in the IMP, and the IMP objectives are displayed in Figure ES-5. The purpose of this figure is to visually

display the linkage between the working hypothesis, limiting factors, and biological objectives. It is also designed to depict the connection to the Council's 2000 Fish and Wildlife Plan. In the IMP, the overarching working hypothesis for the province is that the major hydroelectric facilities in, and upstream of, the IMP are expected to remain in place for the life of the IMP Subbasin Plan. In Figure ES-5, the overarching working hypothesis is displayed in the blue box at the top of the first sheet. The corollaries to this hypothesis are:

(1) Anadromous fisheries will not be restored in the IMP during the 10-year planning period (with the possible exception of experimental actions).
(2) The reservoirs will continue to inundate fish and wildlife habitats.
(3) Operational impacts of the hydroelectric projects will continue to occur to fish, wildlife, and their habitats.
(4) Secondary impacts of the hydroelectric projects will continue to affect fish, wildlife, and their habitats.

The working hypothesis is based on the expectation that the major hydroelectric facilities in the IMP, both FCRPS and FERC-licensed, are relatively permanent structures, and are likely to remain in place for the foreseeable future. In addition, restoration of anadromy in the IMP is a complex issue that is not likely to be resolved in the first 10-year planning period of the subbasin plan. While experimental fish passage facilities could be installed and tested within the next ten years, it is unlikely that significant restoration of anadromous fish runs will occur in this time frame. Thus, four major types of effects are expected to continue to influence fish and wildlife of the IMP: loss of anadromous fish, inundation of fish and wildlife habitats, operational effects of the projects, and secondary effects of the projects. The four major types of effects of the dams are displayed on sheet one of Figure ES-5, with the resulting impacts depicted in subsequent pages.

The continued loss of anadromous fish results in (sheet 2 of Figure ES-5):

- Continued loss of marine derived nutrients to the aquatic and terrestrial resource. This leads to:
    - Continued reduction of fish and wildlife abundance and diversity
- Subsistence salmon fishing loss continues. This leads to:
    - Tribal loss of traditions and values
    - Tribal loss of culture and ceremony
    - Tribal loss of gatherings and ways of life
    - Tribal loss of a healthy food resource
    - Increased Tribal harvest of wildlife and resident fish
    - Increased pressure on game species of wildlife
    - Continued reduction of fish and wildlife abundance and diversity
- Fishing continues to be limited to resident fish species. This leads to:
    - Continued decrease in fishing opportunities
    - Increased fishing pressure on resident fish

The operational impacts of the dams and reservoirs include, but are not limited to (sheet 4 of Figure ES-5):

- Loss of spawning habitat.
- Continuing shoreline erosion
- Continued loss of riparian and littoral habitats
- Modified hydrographs impact riparian/wetland areas, fish habitat, and fluvial processes
- Disruption of hydrologic connectivity between river and floodplains
- Change in pioneering species recruitment
- Altered aquatic/terrestrial primary and secondary production
- Continued fish entrainment
- Elevated total dissolved gas
- Changes in flood frequency
- Creation of fish passage barriers

The reservoirs affect fish and wildlife through (sheet 3 of Figure ES-5):

- Declining water quality
- Loss of terrestrial habitats, including wetlands, riparian areas, and uplands
- Loss of cold aquatic riverine habitats which continue to be replaced by warmer water reservoir habitats supporting nonnative fishes
- Connectivity of native fish and wildlife habitats continues to be disrupted by reservoirs
- Nutrient sinks
- Loss of habitat diversity

The secondary impacts of the hydrosystem include (sheet 5 of Figure ES-5):

- Flood Control
    - Past flooded areas available for development
        - Aesthetics of river and open water
        - Agricultural conversions of highly fertile floodplain/wetlands
        - Increased access to river

- Low cost electricity continues to provide economic growth incentive in IMP. This leads to:
    - More people live and work in the IMP. This leads to:
        - Hunting, fishing, and recreation pressure continues to increase.
        - Increased human demands for water resulting in loss of aquatic habitat and hydrologic function.
        - Increased pollution
        - Changes in plant community and diversity
        - Increased road densities
        - Increased human development of fish and wildlife habitats
        - Increased conflicts between fish, wildlife, and humans
        - Increased need for regulation, management, habitat protection, habitat restoration and use of hatcheries

The impact of all this is that fish and wildlife habitat continues to decrease and the abundance of fish and wildlife declines as a result of hydroelectric development in the IMP. The objectives developed for the IMP help to address the above impacts from the development, operations, and indirect influences of the FCRPS are designed to address known limiting factors for fish and wildlife. The objectives also attempt to balance the human uses with environmental requirements for fish and wildlife by using an inclusive process involving all stakeholders.

Figure ES-5, sheet 1. IMP Working hypothesis. Plan hypothesis is that the hydroelectric facilities will remain in place for the life of the plan. This will lead to limiting factors which are addressed by objectives in the IMP management plan.

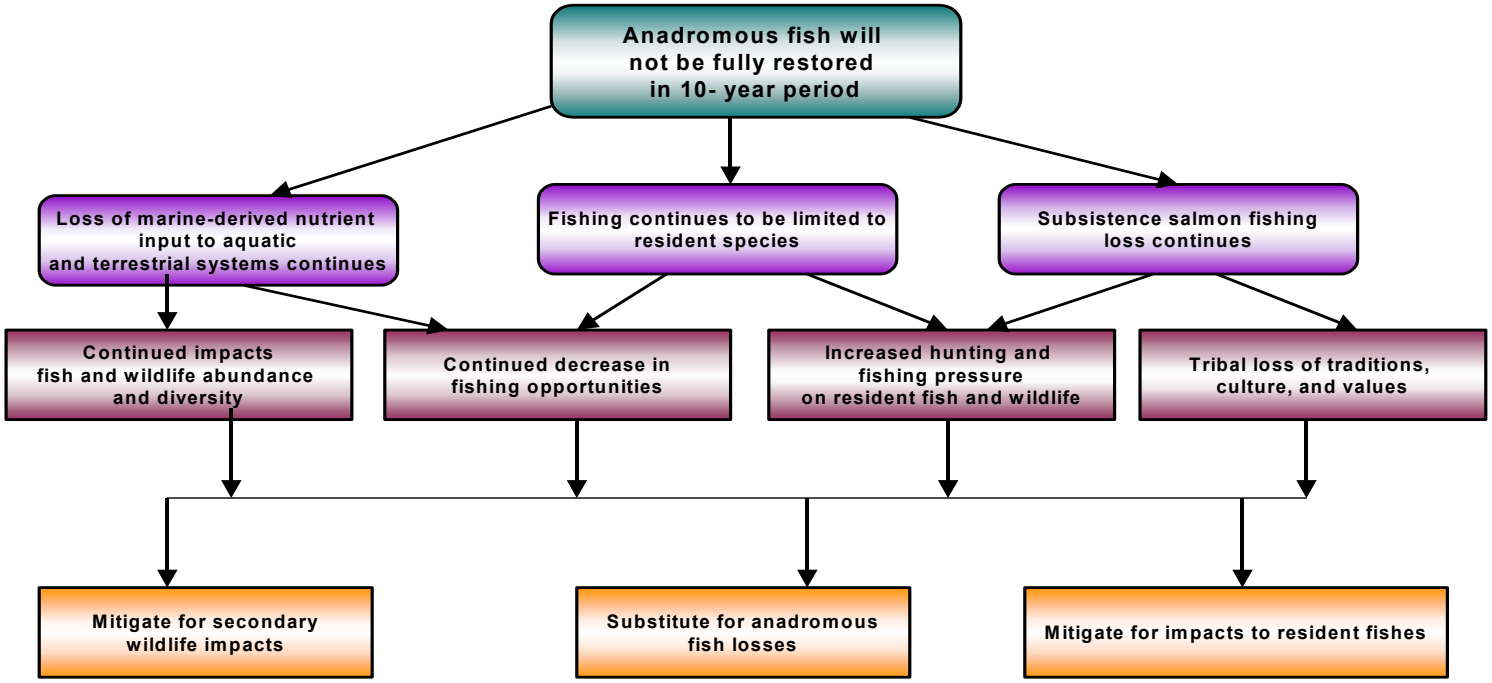

Figure ES-5, sheet 2. IMP Working hypothesis. Loss of the anadromous life history leads to limiting factors which are addressed by objectives in the IMP management plan.

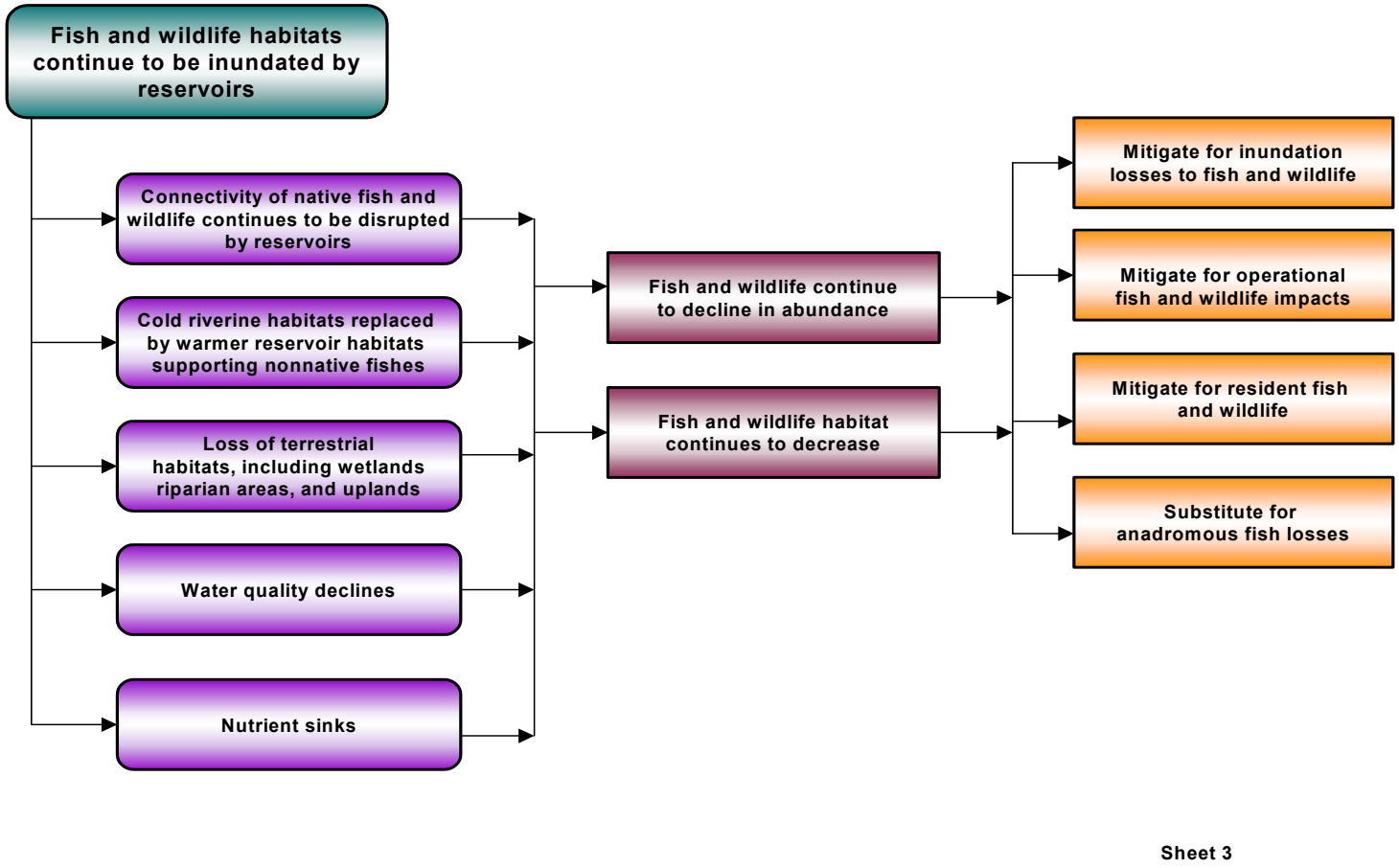

Figure ES-5, sheet 3. IMP Working hypothesis. Construction of the dams inundated land and rivers and led to limiting factors which are addressed by objectives in the IMP management plan.

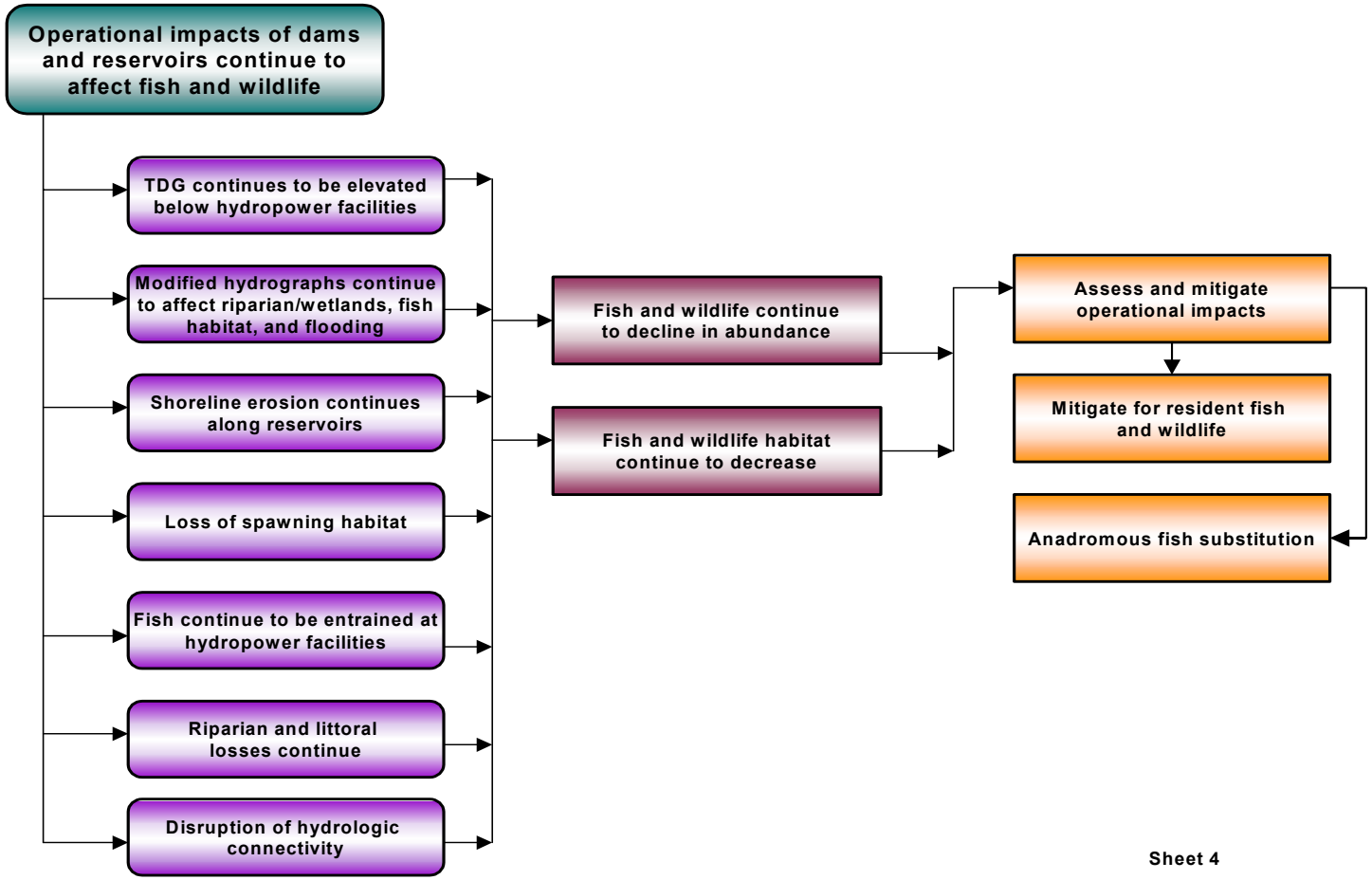

Figure ES-5, sheet 4. IMP Working hypothesis. Operational impacts of the hydropower system lead to limiting factors which are addressed by objectives in the IMP management plan.

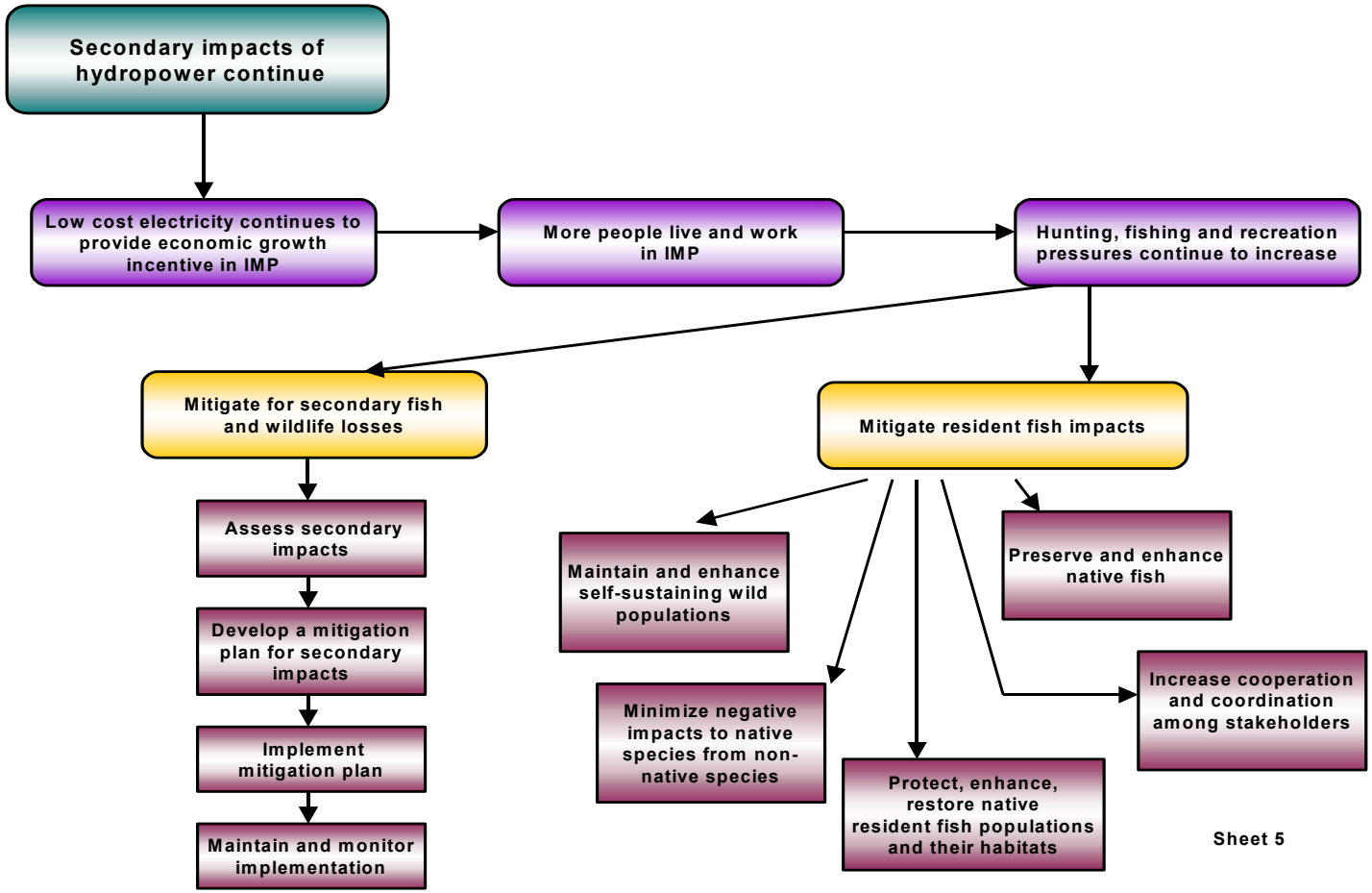

Figure ES-5, sheet 5. IMP Working hypothesis. Secondary impacts of the hydropower system lead to limiting factors which are addressed by objectives in the IMP management plan.

ES.4 Overview of the Intermountain Province Management Plan

The IMP Oversight Committee (OC) developed the province-level vision and objectives for the IMP, as follows:

> ***"We envision the Intermountain Province being comprised of and supporting viable, diverse, fish and wildlife populations, and their habitats, that contribute to the social, cultural, and economic wellbeing of the Pacific Northwest."***

The OC also developed the following guiding principles:

- The role of the IMP OC is to facilitate development of subbasin plans at the subbasin level.
- Public outreach is essential for successful plan development and implementation.
- Human interests can be balanced with fish and wildlife needs.
- All people are stewards for future generations.
- Integrated subbasin plans should consider ecological, not political, boundaries.
- Subbasin plans will address cultural and subsistence issues.
- Subbasin planning should be consistent with the Northwest Power Act, the Council's Fish and Wildlife Program, and technical guidance for subbasin planning, while complimenting existing plans, policies, and planning efforts.
- Fish and wildlife species and habitat should be managed in perpetuity based on scientific, ecological, and biological principles.

These are the supporting objectives developed by the OC:

- Manage the natural resources of the Province for human use and a healthy environment.
- Emphasize ecological principles and apply an inclusive approach to restore, enhance, and maintain fish and wildlife and their habitats and our quality of life.
- Include monitoring, research, and adaptive management to support achievement of the vision.
- Develop subbasin plans within the framework of the Northwest Power Act, the Council's Fish and Wildlife Program, and subbasin technical advice.

The objectives and strategies were developed in response to the results of the assessment and determination of limiting factors for the Province and each subbasin. The IMP Province vision, guiding principles, and objectives were developed consistent with the Columbia River Basin 2000 Fish and Wildlife Program, as shown in the logic path diagram in Figure ES-6. Each subbasin developed a set of measurable biological objectives using a tiered approach. The Columbia River Basin level objectives were identified through review of the Council's 2000 Fish and Wildlife Program objectives (the green boxes on Figure ES-6), which are based on the eight scientific principles identified in the plan. Subbasin specific objectives were developed in response to limiting factors, and were categorized by tiering to the Columbia River Basin objectives. Province level biological objectives were developed as a third tier, intermediate to both the

Columbia River Basin and the subbasins; the province level objectives summarize resource objectives common across the Province. By tiering the objectives into subbasin, province and basin levels, we could be confident that we were developing objectives that were consistent with the Council's Fish and Wildlife program. In addition, we could clearly display the linkage between the Council's objectives and the IMP objectives.

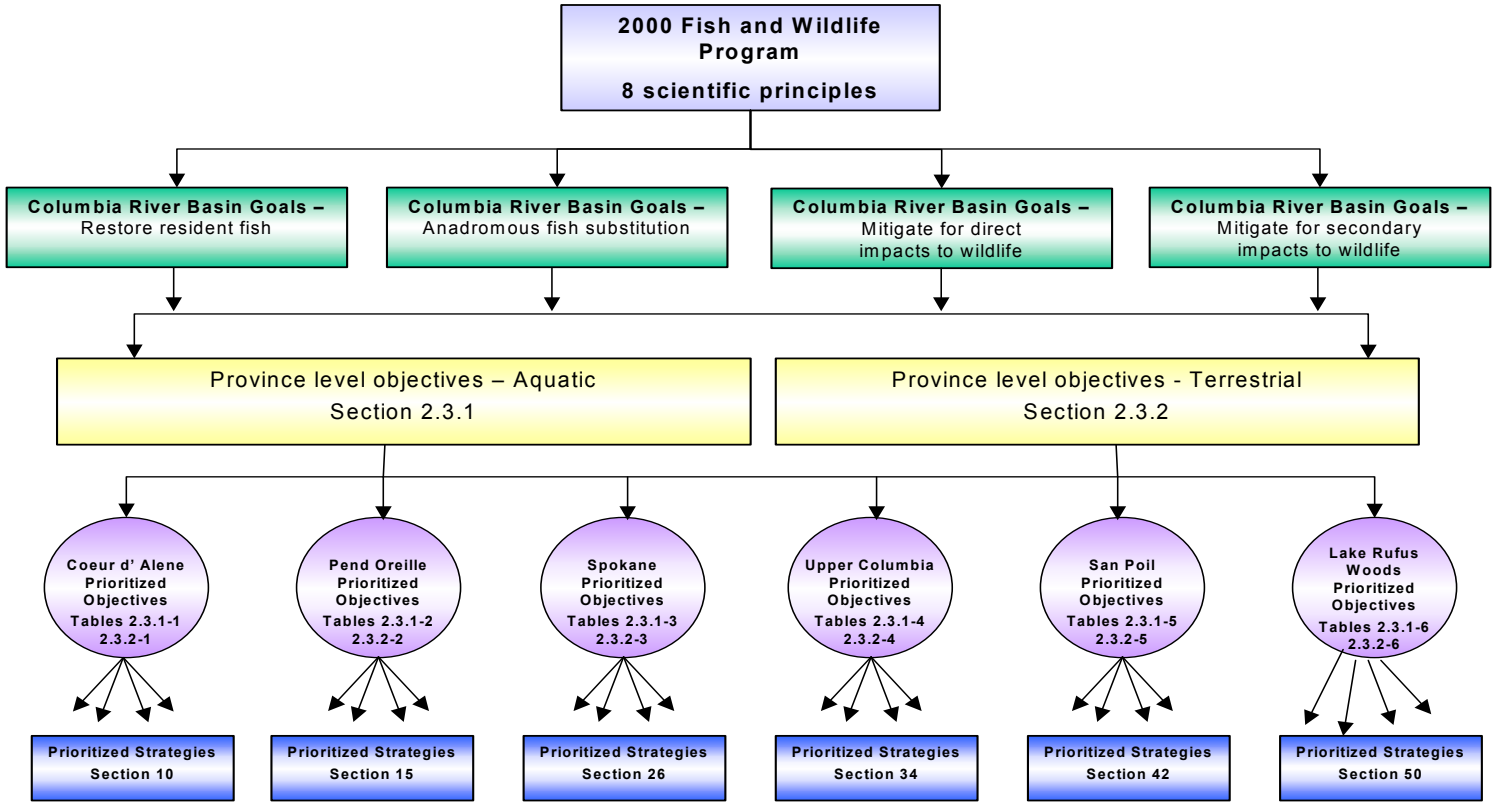

Figure ES-6. Management plan logic path: IMP objectives and strategies are tiered from the Council's Fish and Wildlife Program. Sections where more information is available are shown.

ES.4.1 Provincial Objectives for the Intermountain Province

Figure ES-7 shows each of the ten provincial objectives and illustrates the logic path connecting the provincial objectives to the limiting factors and the provincial vision. Each objective also has examples strategies and RM&E from the subbasin chapters.

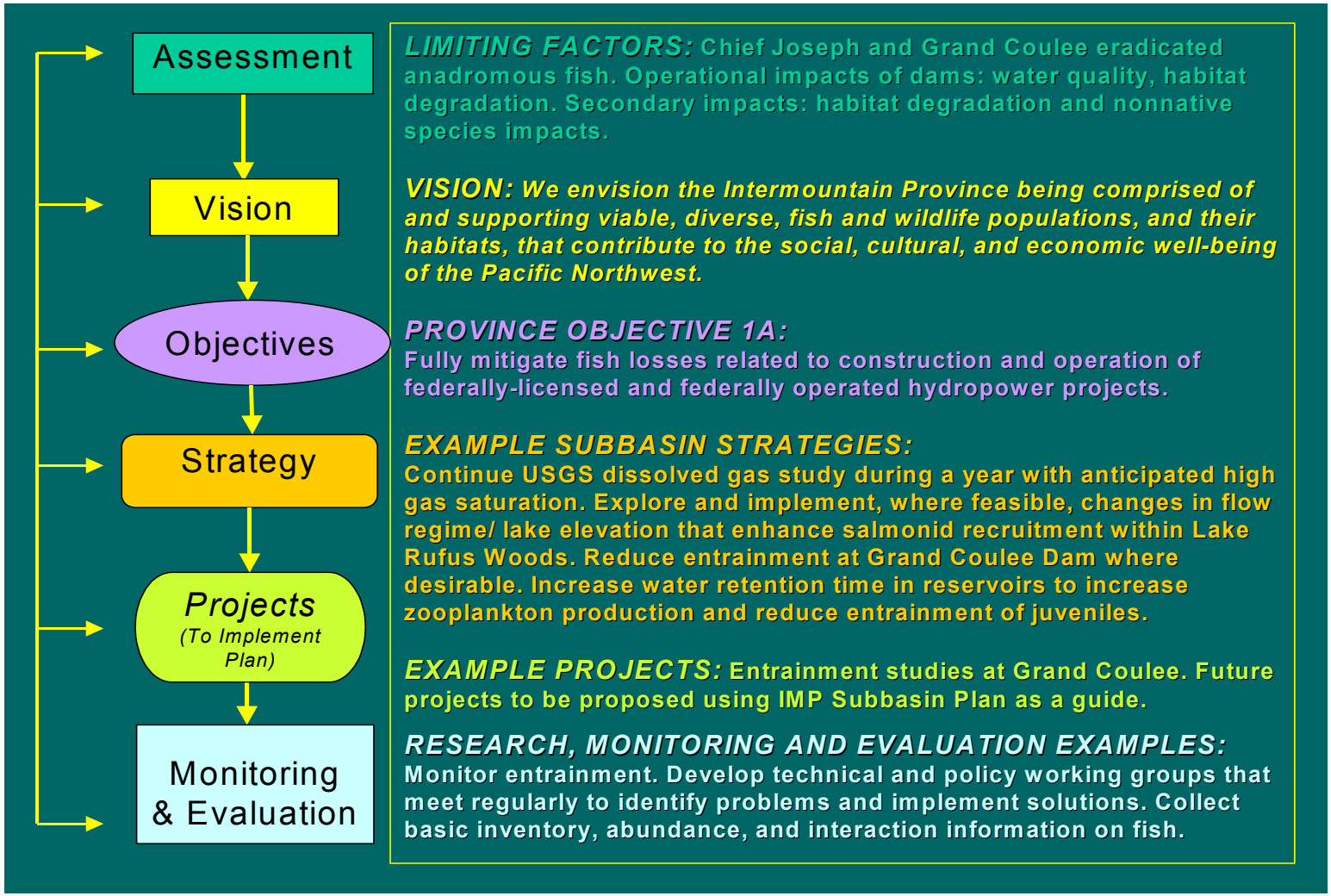

Figure ES-7, sheet 1. Connection between the limiting factors for aquatic life and Province Objective 1A and the subbasin strategies and RM&E

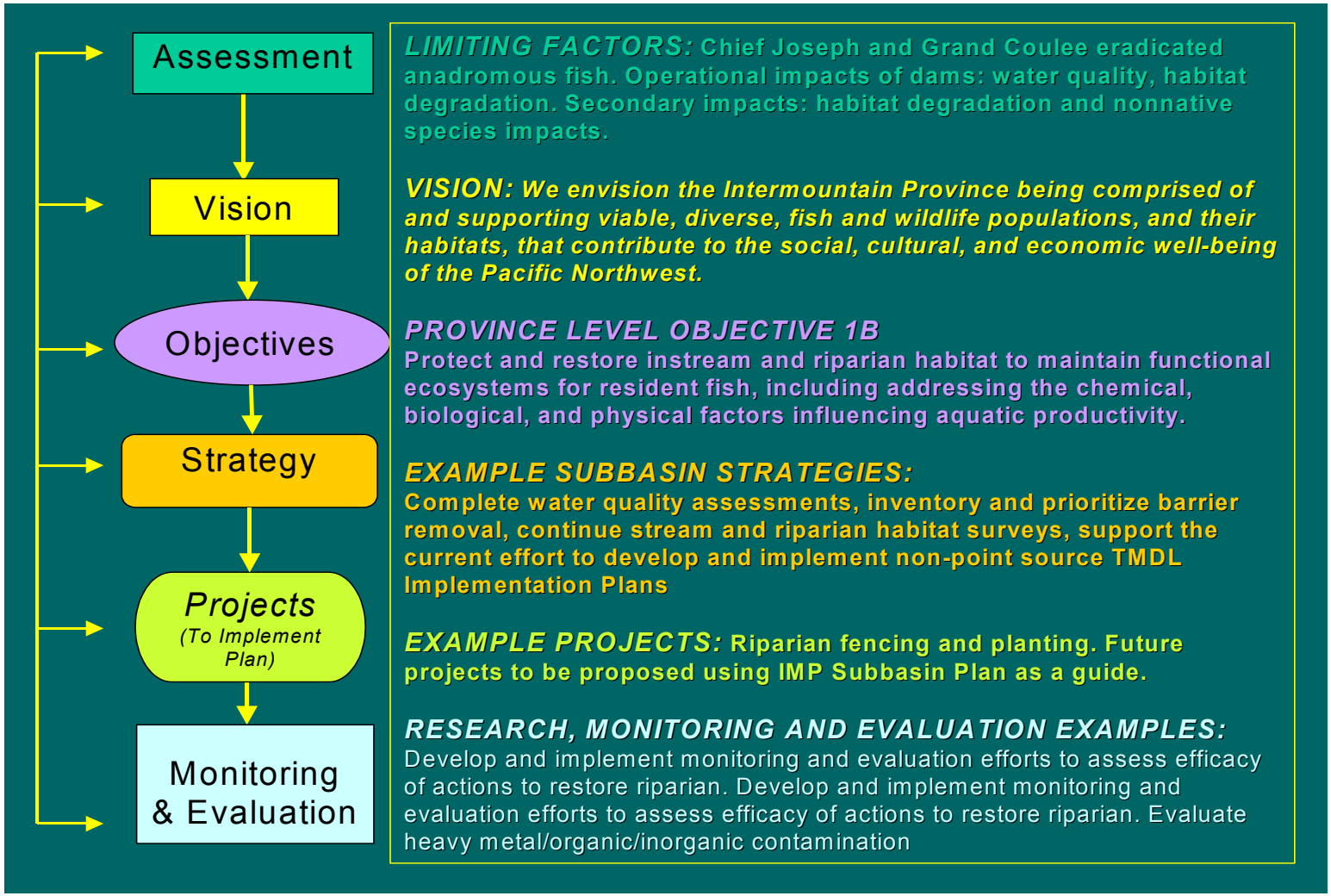

Figure ES-7, sheet 2. Connection between the limiting factors for aquatic life and Province Objective 1B and the subbasin strategies and RM&E

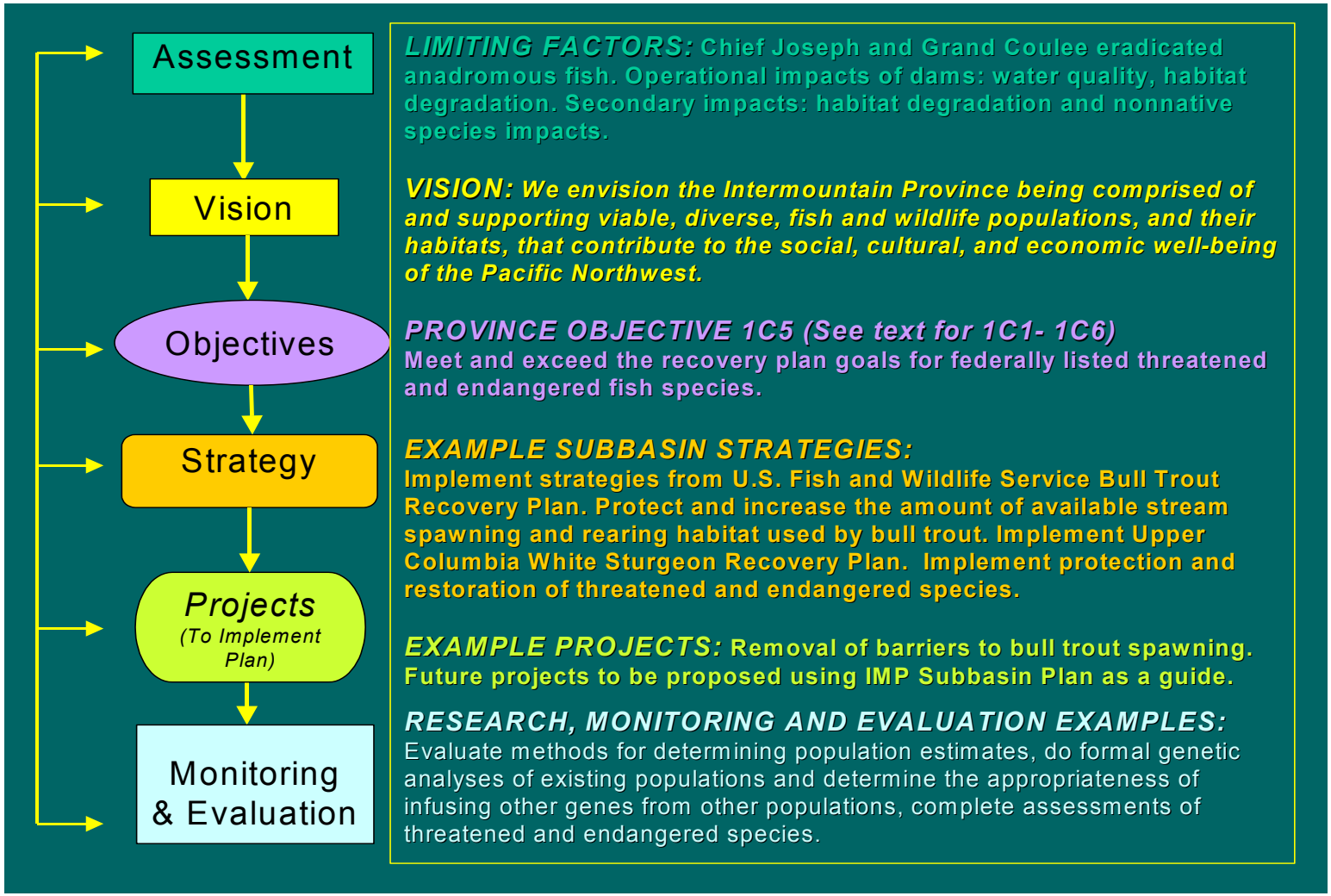

Figure ES-7, sheet 3. Connection between the limiting factors for aquatic life and Province Objective 1C5 and the subbasin strategies and RM&E

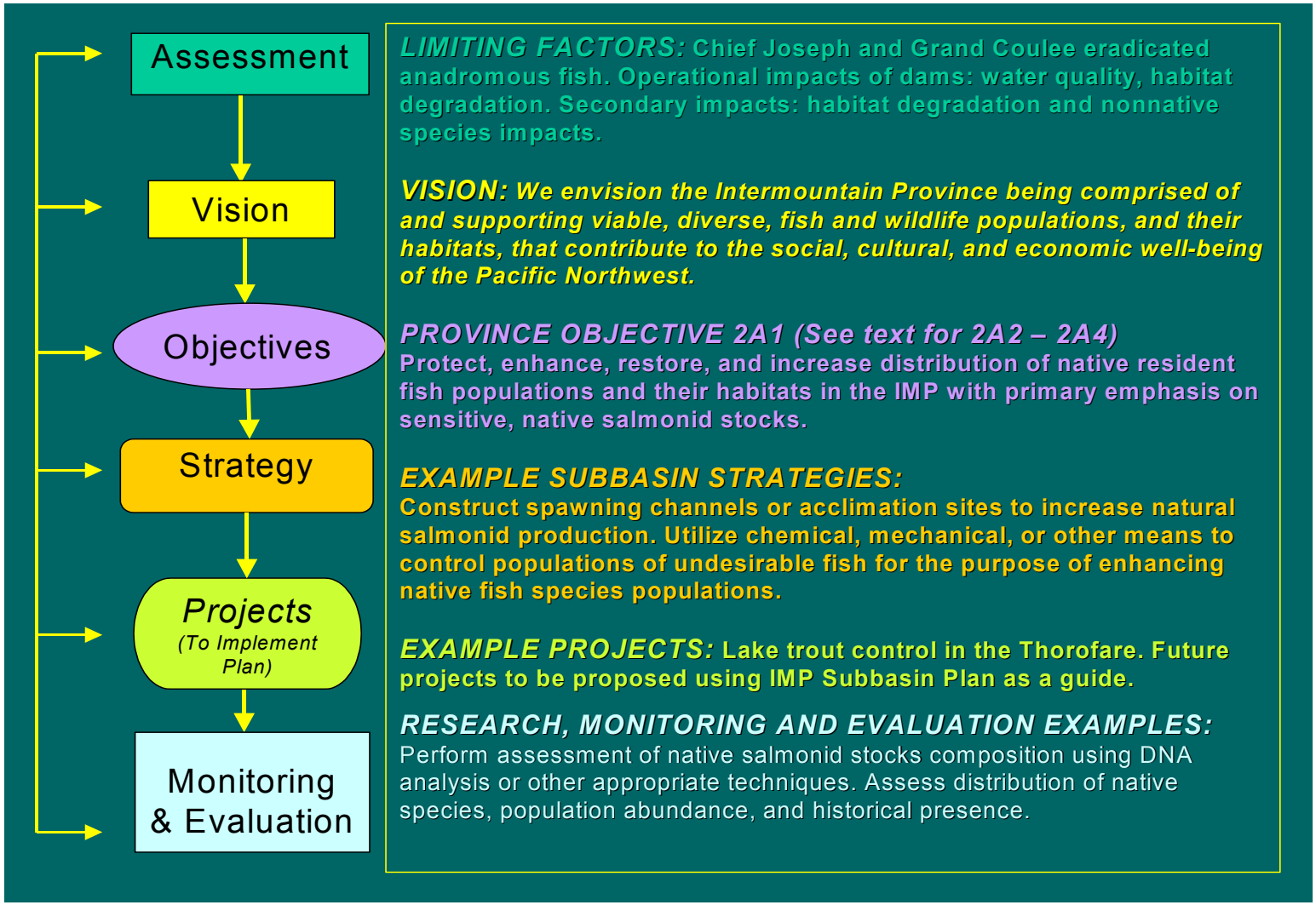

Figure ES-7, sheet 4. Connection between the limiting factors for aquatic life and Province Objective 2A1and the subbasin strategies and RM&E

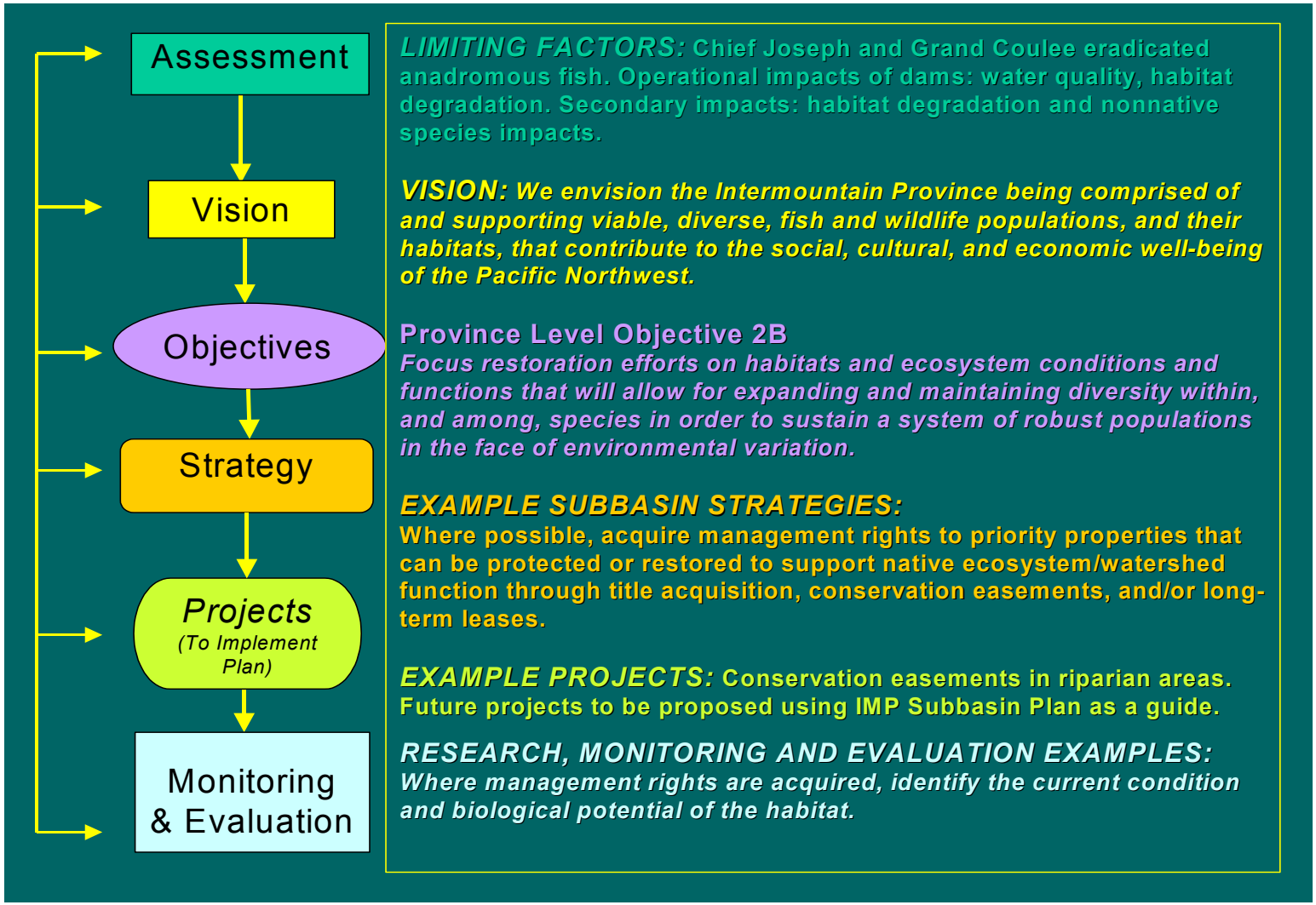

Figure ES-7, sheet 5. Connection between the limiting factors for aquatic life and Province Objective 2B and the subbasin strategies and RM&E

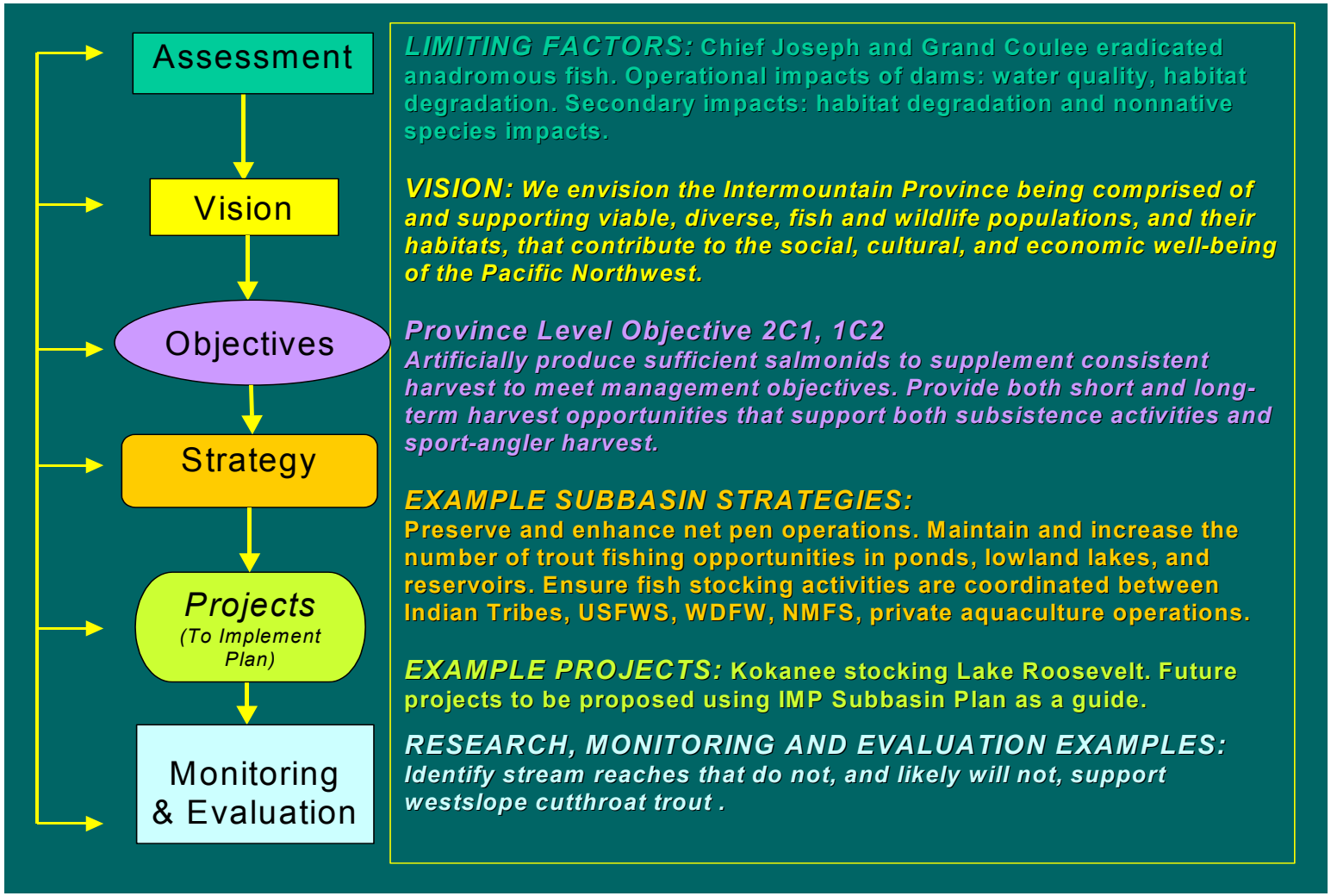

Figure ES-7, sheet 6. Connection between the limiting factors for aquatic life and Province Objectives 2C1 and 2C2 and the subbasin strategies and RM&E

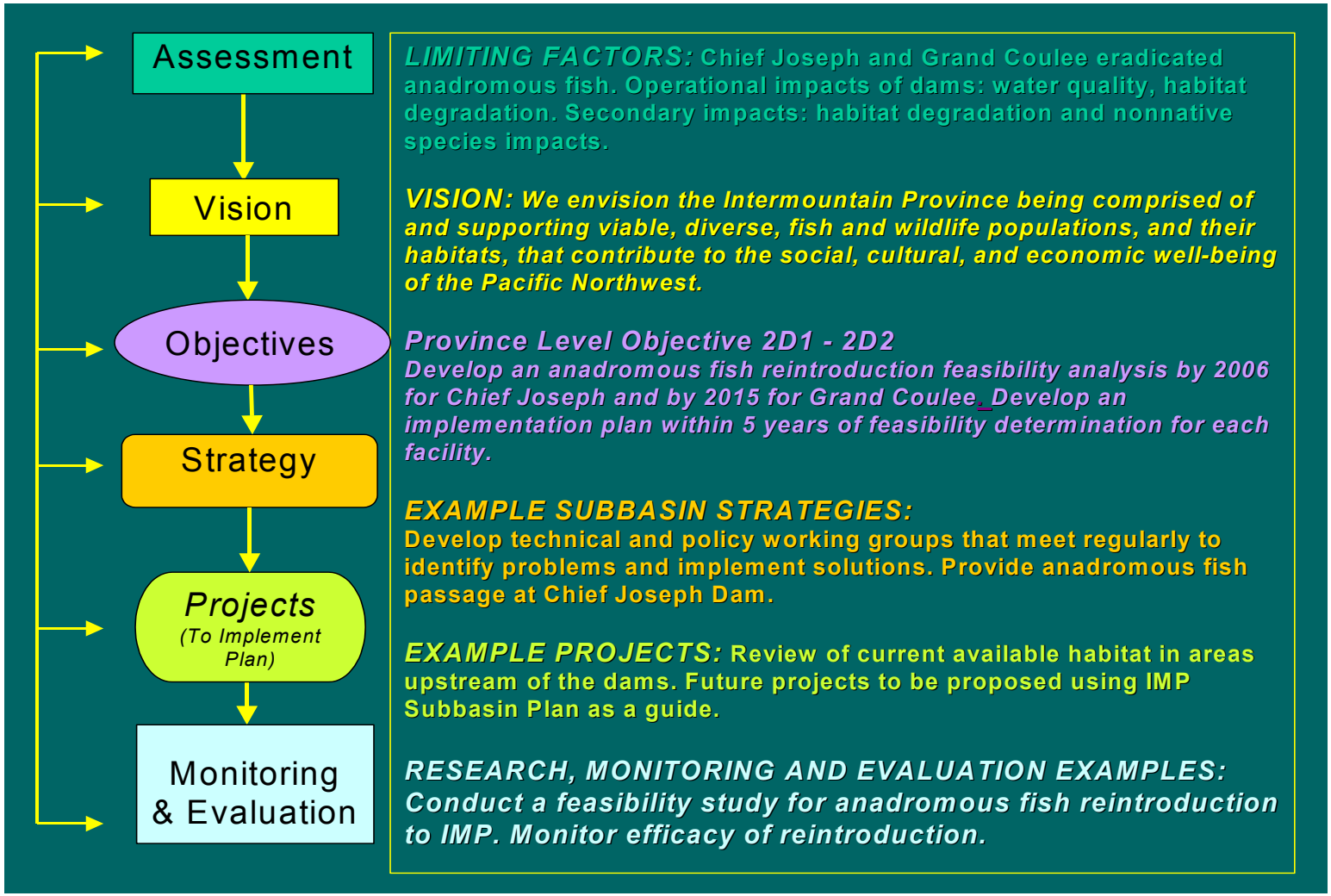

Figure ES-7, sheet 7. Connection between the limiting factors for aquatic life and Province Objective 2D1, 2D2 and the subbasin strategies and RM&E

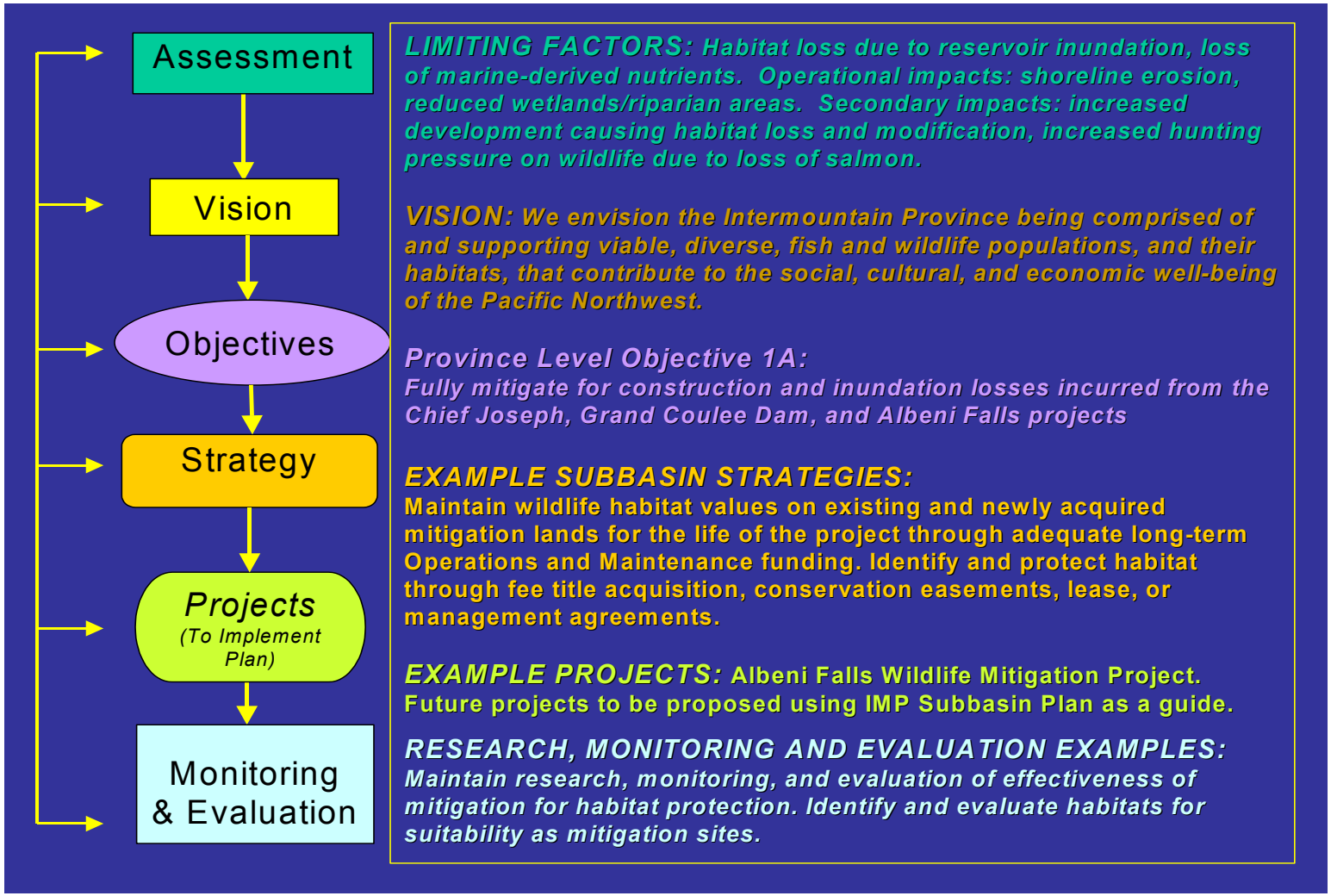

Figure ES-7, sheet 8. Connection between the limiting factors for terrestrial wildlife and habitats and Province Objective 1A and the subbasin strategies and RM&E

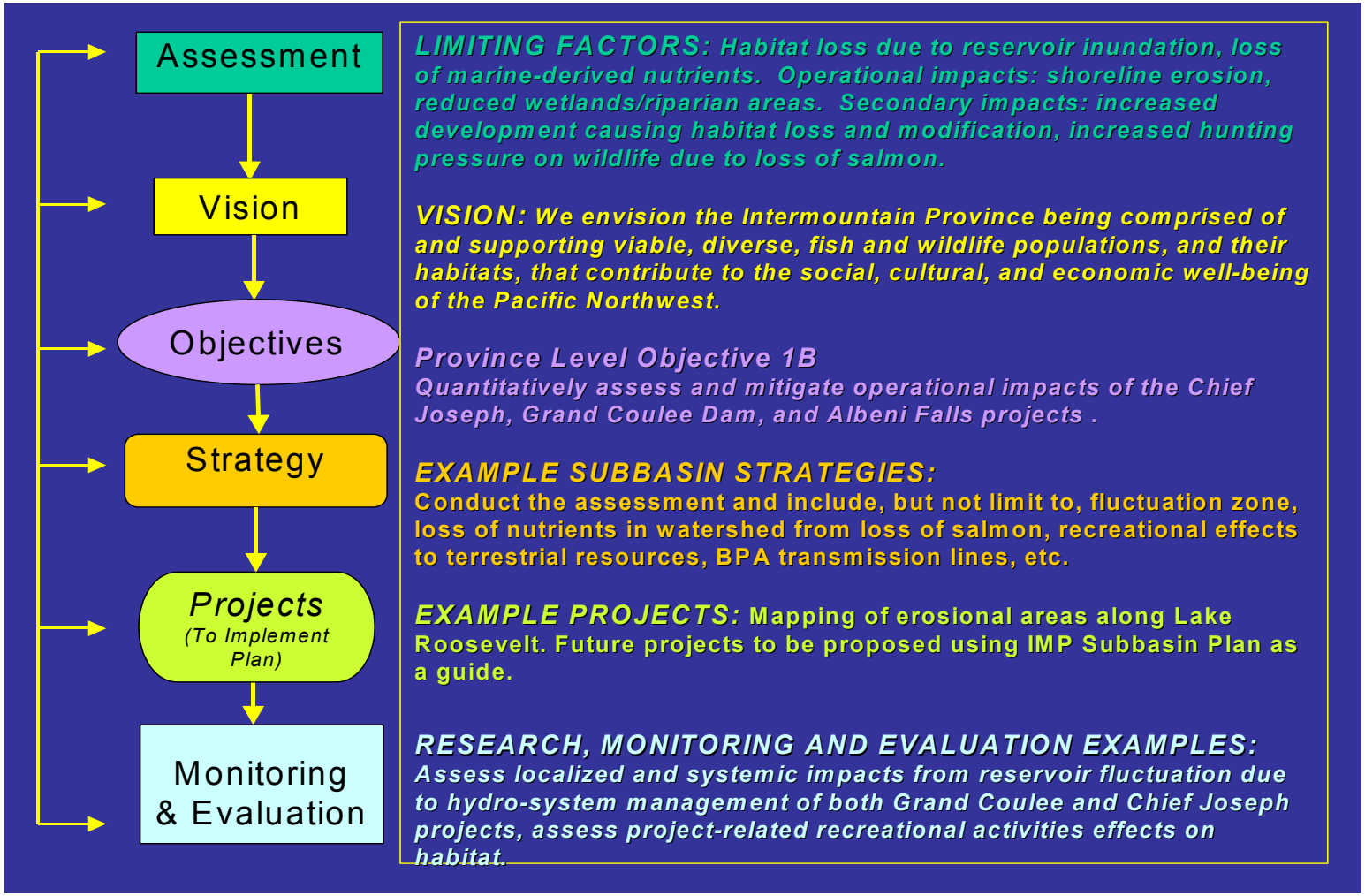

Figure ES-7, sheet 9. Connection between the limiting factors for terrestrial wildlife and habitats and Province Objective 1B and the subbasin strategies and RM&E

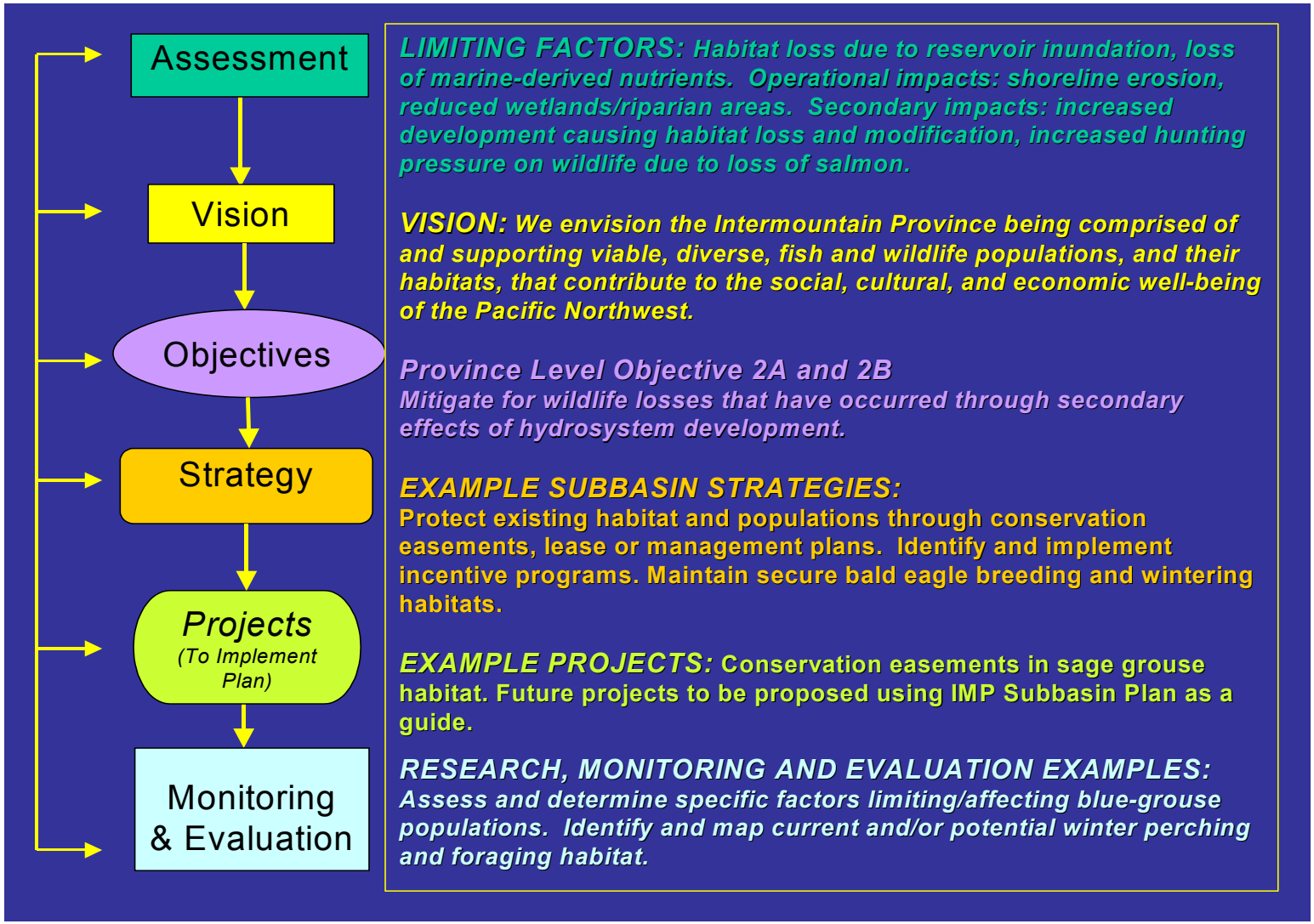

Figure ES-7, sheet 10. Connection between the limiting factors for terrestrial wildlife and habitats and Province Objective 2A and 2B and the subbasin strategies and RM&E

ES.5 How to Get More Information About the IMP Subbasin Plan

The complete IMP Subbasin Plan can be viewed or downloaded at this website: http://www.nwcouncil.org . This website also has other information about the IMP planning process, meeting notices, newsletters, contact information, maps, and more. If you would like a CD with the final IMP Subbasin Plan, please send an email with your mailing address to Lynn Palensky at lpalensky@nwcouncil.org.

ES.6 Organization of This Document

Section	Contents
Executive Summary	Summary of key elements of the plan
1	Overview of IMP and subbasin planning
2	Province level management plan and inventory
3	Province level assessment of aquatic resources
4	Province level assessment of terrestrial resources
5 through 11	Coeur d' Alene Subbasin
12 through 19	Pend Oreille Subbasin
20 though 27	Spokane Subbasin
28 through 35	Upper Columbia Subbasin
36 through 43	San Poil Subbasin
44 through 52	Lake Rufus Woods Subbasin
53	References
Appendix A	2000 Fish and Wildlife Plan
Appendix B	Acronym index
Appendix C	Province level focal species
Appendix D	Association between focal wildlife species and specific habitats used for breeding
Appendix E	Critical ecological functions provided by certain focal wildlife species
Appendix F	Alternative funding sources (non-BPA) for future projects
Appendix G	Recent wildlife harvest data
Appendix H	Summary of ongoing or recently completed projects in the IMP
Appendix I	References for Research, Monitoring, and Evaluation Plan
Appendix J	Comments received on third and fourth draft

Intermountain Province Subbasin Plan

Spokane, Washington

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SUBMITTED TO:
Northwest Power and Conservation Council
Portland, Oregon

ON BEHALF OF:
Intermountain Province Oversight Committee
and
Intermountain Province Subbasin Work Teams

WITH ASSISTANCE FROM:
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May 2004

IMP SUBBASIN PLAN – Table of Contents

SECTION 1 – Table of Contents

1 Overview of the Intermountain Province Subbasin Planning Process

1.1 Introduction to Subbasin Planning and the Columbia River Basin Fish and Wildlife Program

The Northwest Power Planning Council's[1] (Council) 2000 Fish and Wildlife Program[2] (Program) introduced substantial changes from past Programs. The 2000 Program established a basin-wide vision for fish and wildlife, and included broad biological objectives and a corollary set of action strategies to achieve that vision. The Council plans to implement the Program through subbasin plans developed locally in most of the 50 tributary subbasins of the Columbia River; these subbasin plans will ultimately be amended into the Program.

Completed subbasin plans will provide a locally-derived management plan, which includes a subbasin vision, biological objectives, and prioritized strategies; this management plan will be based on an analysis of an assessment of fish and wildlife conditions in that subbasin, and take into consideration an inventory of actions which have been previously implemented in that subbasin. All of the subbasin plans must be consistent with the Council's Program, the Northwest Power Act, Endangered Species Act, Clean Water Act, and Tribal treaty and trust obligations. Subbasin plans are intended to complement, rather than duplicate other planning activities, including those of states, tribes, or the federal government.

Once amended into the Program, the Council will use the recommended management actions outlined in the subbasin plans to guide the review, selection, and funding of projects in that subbasin. Subbasin plans would then, presumably, be updated periodically to reflect: changing conditions in the subbasin; the results of research, monitoring and evaluation activities; and the results of projects that had been implemented in previous iterations. The biological objectives and/or strategies of the management plan would also be updated as appropriate to adaptively respond to changing conditions and new knowledge in each subbasin.

This IMP Subbasin Plan is a response to the Council's request to develop locally-derived subbasin plans for this region. This plan was developed in an open public process, which provided opportunities for participation by a wide range of state, federal, Tribal and local managers, experts, landowners, local governments, and stakeholders.

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[1] Renamed in 2003 as the Northwest Power and Conservation Council. In this document, the organization under both the previous and current names is referred to as "Council."

[2] For additional information about the Council, the Council's Fish and Wildlife Program, Subbasin Planning, the required process for amending the Council's Program, and other Council-related information, see the Council's website at http://www.nwcouncil.org. Appendix A presents a summary of key elements of the Council's 2000 Fish and Wildlife Program, including the vision, planning assumptions, scientific principles, and biological objectives.

Subbasin planners in the IMP generally followed guidelines presented in the Council's *Technical Guide for Subbasin Planners* (Council 2001) in development of the IMP Subbasin Plan. Consistent with the basic expectations of a subbasin plan, this subbasin plan includes: an assessment which provides the technical foundation for the plan by describing the current condition of fish and wildlife in the subbasin and identifying limiting factors; an inventory, which provides a summary of recent and ongoing projects to protect, mitigate, and enhance fish and wildlife in the subbasin, along with an analysis of evident gaps; and a management plan, which describes the vision, objectives and prioritized implementation strategies in the subbasin. The plan was developed in accordance with the Council's vision, scientific principles, and biological objectives for the Columbia River Subbasin, as described in the 2000 Fish and Wildlife Program (refer to Appendix A for a summary of key elements of the Program).

The IMP subbasin planners chose to take subbasin planning one step farther by coordinating the subbasin planning process at both a subbasin and provincial level. This approach included a strong emphasis on striving for consistency in subbasin planning approach and format across all six subbasins, discussion of province level considerations in both the assessment and the inventory, development of a province level vision, and where possible a "roll up" of province level biological objectives and strategies. This approach has provided unique opportunities and challenges as subbasin planning has progressed in the IMP. Specifics of the province and subbasin specific approach will be discussed further at appropriate points throughout this document.

1.2 Subbasin Planning in the Intermountain Province

The Intermountain Province is located in the northeast corner of Washington state and the northern Idaho panhandle. There are six subbasins in the IMP: Coeur d' Alene, Pend Oreille, Spokane, Upper Columbia, San Poil, and Lake Rufus Woods.[3] The Coeur d' Alene Subbasin is in Idaho. The Pend Oreille and Spokane subbasins are in Washington and Idaho. The remaining subbasins are within Washington. Additionally, portions of the Upper Columbia and Pend Oreille subbasins extend into Canada geographically (Figure 1.1).

1.2.1 Intermountain Province Approach to Subbasin Planning

In launching the subbasin planning process the Council allowed each subbasin planning group substantial discretion in selecting a specific approach to developing a subbasin plan. Each of the Council's four member states took a slightly different approach to coordinating planning efforts at the state level. The IMP is located in both Idaho and Washington, therefore both state's approaches influenced the preliminary IMP subbasin planning activities.

[3] When subbasin summaries were initially developed, Lake Rufus Woods was identified as a separate subbasin. Lake Rufus Woods was also treated as a separate subbasin in the last rolling provincial review. When the Council initiated subbasin planning activities, a number of the subbasin boundaries throughout the Columbia basin were changed. As a result of whatever process was used to redefine subbasin boundaries, Lake Rufus Woods was combined with the Upper Columbia Subbasin. Early in the subbasin planning process, subbasin planners in the IMP elected to continue to treat Lake Rufus Woods as a separate subbasin even though no separate funding existed for the subbasin.

Figure 1.1. Map of the Intermountain Province. Inset map shows the location of the IMP in relation to the Columbia River Basin, including that portion in Canada.

In Washington, subbasin planning coordination generally occurs at the province scale or the geographic areas covered by already existing state salmon recovery boards. In areas not covered by recovery boards or provincial coordination groups, other accommodations had to be made. In Idaho, a statewide coordination group comprised of state and Tribal governments leads the process for developing subbasin plans in specific subbasins.

Section 4(h)(2) of the Northwest Power Act establishes the requirements the Council follows in developing and amending a program to protect, mitigate and enhance fish and wildlife in the Columbia River Basin and its tributaries. The approach of asking states and Tribes to work with a broad range of participants in developing subbasin plans was developed by the Council to address requirements of the Act related to fish and wildlife program development. The Council's final decision on adopting the completed subbasin plans will be guided by the substantive and procedural requirements of the Northwest Power Act.

In the IMP no preexisting structure (salmon recovery board or statewide coordinating group) was in effect within which to implement subbasin planning. Therefore, beginning in January of 2002, a group of interested stakeholders (later named the Advisory Council) from both Idaho and Washington convened for the express purpose of determining how to coordinate subbasin planning activities in the IMP. The Advisory Council had no fixed membership and all meetings were open to anyone who was interested in attending. Substantial ongoing attempts were made to notify and invite a broad range of stakeholders to participate. The Advisory Council developed a preliminary approach to subbasin planning and an organization with which to implement that planning in the IMP. This approach included: identification of a "Level II" group, a provincial coordination group called the IMP Oversight Committee; agreement to pool financial and technical resources in the IMP at a province level; development of a Technical Coordination Group; and preliminary selection of assessment tools. This group also agreed to secure the services of a contractor or contractors to assist local subbasin planners in development of a complete subbasin plan.

The IMP Advisory Council chose to implement subbasin planning in the IMP at a provincial and subbasin level. This approach was chosen, in part, because the IMP planners recognized that coordination and cooperation is key to the success of fish and wildlife management. Planning at a province level enhanced this cooperation. IMP planners also hoped relationships built during the course of the subbasin planning activities would help establish a framework for additional cooperation in the future.

One of the guiding principles developed in the IMP was to favor ecological boundaries over political boundaries. The six subbasins in the IMP are spread over two states and affect five Tribes. Geographically, two of the subbasins in the IMP also extend into Canada. The focus on ecological boundaries was carried through by having extensive public outreach, diverse participation in the technical group, and by inviting the participation of federal, state, Tribal, Canadian, and county representatives in the Subbasin Work Teams.

In addition, the province approach was selected to provide consistency across all six subbasins when they shared common features. For example, the entire IMP is situated in the "blocked area," that portion of the basin from which anadromous fish have been blocked as a result of construction of Grand Coulee and Chief Joseph dams without provisions for fish passage. In addition, the system of hydroelectric projects in the basin affects aquatic resources, not only in the subbasin where the project occurs, but in adjacent subbasins as well. Therefore, the Advisory Council found that it made sense to look at aquatic resources across the province holistically. For some analyses, the province was a more scientifically appropriate ecological unit than the subbasins individually. Terrestrial resources, in particular, were often better addressed at a provincial scale than at a subbasin scale because terrestrial resources shared similar limiting factors throughout the IMP.

The provincial approach had an added advantage of allowing for economies of scale. Planners in the IMP had limited financial resources, so by pooling resources, more thorough review and analysis could be conducted. This approach allowed the evaluation of the Lake Rufus Woods Subbasin independently of the Upper Columbia Subbasin, which was important to fish and wildlife managers due to the great differences in the physical and biotic environments.

Finally, the provincial approach eliminated much repetition by moving significant portions of the assessment to the province level.

The following sections provide additional detail on the subbasin planning structure and development processes used in the IMP.

1.2.2 Structure of Subbasin Planning Groups in the IMP

The IMP structure and organization was designed to gather the participation of broad range of stakeholders, county governments, agencies and Tribes. These entities collaborated and coordinated on the creation of the subbasin plan and helped to solve problems that arose during the planning process. Towards this end a variety of planning groups were set up. The following sections describe these groups.

An IMP Coordinator, Alison Squier, was hired under contract to the Council to coordinate and manage subbasin planning in the IMP. She served as the communication link between all the contractors, individuals, and committees who worked on this subbasin plan, as well as planning and facilitating advisory council and oversight committee meetings, and preparing agendas, notices, and meeting notes.

1.2.2.1 Advisory Council

The Advisory Council is the overall outreach group in the IMP. The Advisory Council outreach list includes just over 500 individuals. The group includes private citizens, representatives of non-profit organizations, business, county government, state and federal government, and Tribes. Most of the individuals included in the Advisory Council are local to the IMP but the group also includes individuals from throughout the Columbia River basin. The Advisory Council has no fixed membership.

The Advisory Council met regularly until Subbasin Work Teams were organized and began meeting formally. All Advisory Council meetings were open to anyone who was interested in attending. The regular Advisory Council meetings were replaced by local Subbasin Work Teams meetings after formal subbasin planning activities were initiated in the IMP. The Advisory Council outreach list was used as the update tool, in addition to postings on the Council's website, to provide meeting notification and announce the posting of draft documents, review deadlines, and other subbasin planning news.

1.2.2.2 Oversight Committee

The Oversight Committee (OC) serves as the lead entity (Level II group) in the IMP. The OC is guided by a "Terms of Reference" document and fixed membership includes representatives from local counties, state and federal agencies, Tribes, and ex-officio Council members. Under the Council's guidelines, the role of the Level II group is to provide subbasin planning policy guidance, organize resources to assist in the planning process, review and package plans for submittal to the Council, and provide coordination and project management. Members of the OC are listed in Table 1.2.2-1.

The OC in coordination with the Advisory Council developed and issued a Request for Qualifications and then a Request for Proposals (RFP) for a contractor or contractors to coordinate outreach and develop the written subbasin plan in the IMP. The RFP stipulated that development of the IMP Subbasin Plan would involve extensive collaboration and coordination with local stakeholders, as well as state, federal and Tribal representatives. The OC in collaboration with the Advisory Council selected through a competitive bid process, two contractors to fulfill the RFP. One of those contractors, GEI Consultants, Inc., was hired to write the subbasin plan on behalf of the OC. The second contractor, Ferry Conservation District, served as the umbrella for a large group of technical subcontractors providing fish and wildlife management expertise in the province. The Ferry Conservation District subcontractors consisted of four tribes: Coeur d' Alene Tribe, Confederated Tribes of the Colville Reservation, Kootenai Tribe of Idaho, the Spokane Tribe of Indians; two state agencies: Idaho Department of Fish and Game and Washington Department of Fish and Wildlife; and eight Conservation Districts: Benewah, Bonner, Ferry, Foster Creek, Kootenai-Shoshone, Lincoln, Pend Oreille, and Spokane. These subcontractors provided technical data used in the assessment, inventory, and research, monitoring, and evaluation plan.

Once the contractors were on board, the OC served in an oversight role to monitor the performance of the contractors, and to ensure consistency in the development of subbasin plans across the six IMP subbasins. Upon request from the Subbasin Work Teams, the OC also resolved questions or provided specific guidance. The OC also provided province level guidance for specific sections of the subbasin plan. For example, at the request of some of the Subbasin Work Teams, the OC identified the duration of the IMP Subbasin Plan as ten years, although this does not preclude development of management objectives and strategies which extend beyond the plan's duration.

Based on review and approval from the Subbasin Work Teams, and consistency with the Council's guidelines, the OC approved the final subbasin plan for submission to the Council. The OC met on an as-needed basis throughout the subbasin planning process (on average every four to six weeks).

Table 1.2.2-1. Members of the Oversight Committee

Last Name	First Name	Agency/Organization
Arterburn	John	Confederated Tribes of the Colville Reservation
Bagdovich	Mark	US Fish and Wildlife Service
Berger	Matt	Confederated Tribes of the Colville Reservation
Caswell	Jim	Idaho Office of Species Conservation (Chairman)
Dayley	Tom	Northwest Power and Conservation Council (Ex officio member)
Entz	Ray	Kalispel Tribe
Flory	Jason	US Fish and Wildlife Service
Gardinier	Lyle	Ferry Conservation District
Grover	Tony	Northwest Power and Conservation Council (Ex officio member)
Horton	Stacy	Northwest Power and Conservation Council (Ex officio member)
Heuser	Cam	Coeur d' Alene Tribe of Indians
Ireland	Sue	Kootenai Tribe
Kieffer	BJ	Spokane Tribe of Indians
Lembcke	Sandy	Washington Department of Fish and Wildlife
Maroney	Joe	Kalispel Tribe
Mikkelson	Anders	Coeur d' Alene Tribe of Indians
Palensky	Lynn	Northwest Power and Conservation Council (Ex officio member)
Peters	Ron	Coeur d' Alene Tribe of Indians
Robinette	Kevin	Washington Department of Fish and Wildlife
Servheen	Gregg	Idaho Department of Fish and Game
Singer	Kelly	Spokane Tribe of Indians
Soults	Scott	Kootenai Tribe of Idaho
Squier	Alison	IMP Coordinator

1.2.2.3 Technical Coordination Group

The ad-hoc Technical Coordination Group is composed of local experts and other interested parties who provided assistance with the technical aspects of subbasin planning. The Technical Coordination Group provided information and data for use in development of the assessment; inventory; and research, monitoring, and evaluation plan. They also served as technical liaison with Subbasin Work Teams, and coordinated with the IMP contractors to review draft documents, and provide technical recommendations or assistance.

The ad-hoc Technical Coordination Group has no fixed membership and all meetings were open to any interested persons. Notices of technical group meetings were sent to a mailing list of approximately 50 individuals and were also posted on the IMP website. The group met on an as-needed basis throughout the planning process (approximately

every four to six weeks). The following persons were on the technical group mailing list (Table 1.2.2-2). Many attended one or more technical coordination group meeting, or participated by assisting in the development of the technical portions of the plan.

Table 1.2.2-2. Technical Coordination Group mailing list

Last Name	First Name	Agency/Organization
Allen	Doug	Washington State Dept of Ecology
Andrews	John	Washington Department of Fish and Wildlife
Arterburn	John	Confederated Tribes of the Colville Reservation
Ashley	Paul	Washington Department of Fish and Wildlife
Baden	Rich	Spokane Conservation District
Bagdovich	Mark	US Fish and Wildlife Service
Baldwin	Casey	Washington Department of Fish and Wildlife
Beals	Jon	Idaho Department of Fish and Game
Beaty	Roy	Bonneville Power Administration
Beich	Dennis	Washington Department of Fish and Wildlife
Berger	Matt	Confederated Tribes of the Colville Reservation
Black	Ross	Eastern Washington University
Brown	Lew	US Bureau of Land Management
Combs	Mitch	Washington Department of Fish and Wildlife
Croft	Linda	US Forest Service
Crossley	Brian	Spokane Tribe of Indians
Dasher	Rhonda	Pend Oreille Conservation District
Dawson	Shallan	Kootenai Shoshone Soil and Water Conservation District
Decker	Meg	Pend Oreille Environmental Team/Selkirk Conservation Alliance
Dekome	Shanda	Idaho Panhandle National Forest
Demers	Dinah	Washington Department of Fish and Wildlife
Donley	Chris	Washington Department of Fish and Wildlife
Duncan	Bill	Teck Cominco Metals Ltd.
Edelen	Walt	Spokane County Conservation District
Edson	Scott	Confederated Tribes of the Colville Reservation
Entz	Ray	Kalispel Tribe
Farmer	Brian G.	Washington Department of Ecology
Fields	Scott	Coeur d' Alene Tribe of Indians
Flory	Jason	US Fish and Wildlife Service
Green	Gerry	Coeur d' Alene Tribe of Indians
Haber	John	USFS – Missoula Office
Hackworthy	K.J.	The Nature Conservancy
Harvey	Geoff	Idaho Department of Environmental Quality

Last Name	First Name	Agency/Organization
Hayden	Jim	Idaho Department of Fish and Game
Hennecky	Ray	Idaho Department of Fish and Game
Heusser	Cam	Coeur d' Alene Tribe of Indians
Horner	Ned	Idaho Department of Fish and Game
Ireland	Sue	Kootenai Tribe
Iverson	Tom	Columbia Basin Fish and Wildlife Authority
Kaney	Lynn	Colville National Forest
Kedish	Gary	US Fish and Wildlife Service
Kieffer	BJ	Spokane Tribe of Indians
Korth	Jeff	Washington Department of Fish and Wildlife
LeCaire	Richard	Confederated Tribes of the Colville Reservation
Lembcke	Sandy	Washington Department of Fish and Wildlife
Maiolie	Melo	Idaho Fish and Game
Marco	Jerry	Confederated Tribes of the Colville Reservation
Maroney	Joe	Kalispel Tribe
Matt	Robert	Coeur d' Alene Tribe of Indians
Mikkelson	Anders	Coeur d' Alene Tribe of Indians
Miller	Monte	Confederated Tribes of the Colville Reservation
Mosier	Dave	Idaho Department of Environmental Quality
Osterman	Deanne	Kalispel Tribe
Paragamian	Vaughn	Idaho Department of Fish and Game
Pavlik	Deanne	Spokane Tribe of Indians
Peone	Tim	Spokane Tribe of Indians
Perry	Patty	Kootenai Tribe
Peters	Ron	Coeur d' Alene Tribe of Indians
Peterson	Pete	Upper Columbia United Tribes, Fish and Forest Agreement
Powell	Scott	Seattle City Light
Robinette	Kevin	Washington Department of Fish and Wildlife
Sawyer	Suzanne	Bonner Soil and Water Conservation District
Servheen	Gregg	Idaho Department of Fish and Game
Shuhda	Tom	US Forest Service
Singer	Kelly	Spokane Tribe of Indians
Smelser	Emily	Kootenai Shoshone Soil and Water Conservation District
Soults	Scott	Kootenai Tribe of Idaho
Spicer	Dave	Idaho Department of Fish and Game
Terra Burns	Mary	Idaho Department of Fish and Game
Thomson	Eric	US Bureau of Land Management
Upton	Carolyn	Idaho Panhandle National Forest

Last Name	First Name	Agency/Organization
Vail	Curt	Washington Department of Fish and Wildlife
Vitale	Angelo	Coeur d' Alene Tribe of Indians
Wainwright	Mimi	Washington Department of Ecology
Ward	Neil	Columbia Basin Fish and Wildlife Authority
Whalen	John	Washington Department of Fish and Wildlife
Yergens	Charlotte	Pend Oreille Conservation District
Young	Frank	Columbia Basin Fish and Wildlife Authority
Zender	Steve	Washington Department of Fish and Wildlife

1.2.2.4 GEI Consultants, Inc. Team

A team of scientists, professional facilitators, GIS analysts, writers and editors assembled by GEI Consultants, Inc. facilitated development of the IMP Subbasin Plan under the direction of the OC. The GEI Team provided services including meeting facilitation for IMP kickoff and closing sessions; six sets of Subbasin Work Team meetings in each of the subbasins; technical development of the aquatic and terrestrial resources assessments, inventory, and management plans for the province and six subbasins; and writing, editing, and graphic preparation of the subbasin plan documents. Members of the GEI Team are listed in Table 1.2.2-3

Table 1.2.2-3. GEI Consultants, Inc. Team

Last Name	First Name	Organization
Project Management		
Pizzimenti	John	Project Manager, GEI Consultants, Inc
Gillin	Ginger	Assistant Project Manager, Lead Fisheries Biologist, GEI Consultants, Inc.
Technical Team		
Smayda	Kathy	Lead Terrestrial Biologist, Smayda Environmental Associates, Inc.
Cox	Dalton	GIS Specialist, Ecosystem Research Group
Haddix	Tyler	Environmental Scientist, GEI Consultants, Inc.
Hartwell	Gibson	Environmental Scientist, Ecosystem Research Group
Overberg	Kristi	Environmental Scientist, GEI Consultants, Inc.
Powell	Madison	University of Idaho / HFCES
Smith	Melanie	GIS Specialist, Ecosystem Research Group
Styskel	Ed	Terrestrial Biologist, Ecological Services, Inc.
Outreach Team		
Hubbard-Gray	Sarah	Outreach Team Leader, Hubbard-Gray Consulting, Inc.
Tribe	Ginny	Facilitator, Professional Facilitator Inc.
Munther	Sherry	Facilitator, Munther Mediation Services
Support Team		
Gable	Gigi	Office Manager, GEI Consultants, Inc.
McClinton	Janie	Administrative Support, GEI Consultants, Inc.
Watson	Beth	Marketing, GEI Consultants, Inc.

1.2.2.5 Subbasin Work Teams

Subbasin Work Teams were the heart of the subbasin planning effort in the IMP. The Subbasin Work Teams were responsible for development of the IMP subbasin management plans. Each IMP subbasin established its own unique Subbasin Work Team. In a series of six meetings between June 2003 and March 2004, these teams developed a subbasin vision, guiding principles, biological objectives, and strategies for each of the IMP subbasins (Figure 1.2.2-1). Subbasin Work Teams also prioritized the objectives and strategies for the subbasin management plan and contributed to subsequent reviews of drafts of the subbasin plan.

Figure 1.2.2-1. Upper Columbia Subbasin Work Team participants consider objectives and strategies at a Work Team meeting. Pictured are (from l to r) Bill Duncan, Teck Cominco; Tom Shuhda, U.S. Forest Service; Merrill Ott, Stevens County Commissioner; Lyle Gardinier, Ferry Conservation District; Nancy Fritz Cressey, National Park Service; and John Arterburn, Confederated Tribes of the Colville Reservation.

In establishing the Subbasin Work Team, subbasin planners in the IMP wanted to ensure to the fullest extent possible 1) the participation by a broad range of stakeholders, agencies and Tribes; 2) a balance of stakeholder interests and participation on each Subbasin Work Team; 3) an open, fair and collaborative process; 4) consistent

participation throughout the development of subbasin plans; and 5) accountability by Subbasin Work Team members.

To achieve these objectives, the IMP Advisory Council, Oversight Committee, Technical Coordination Group and other interested stakeholders were asked to help identify potential candidates to participate in the Subbasin Work Teams. Formal letters of invitation were sent to prospective candidates, and they were invited to identify other potential participants in the event that they were not the ideal candidate or were unable to participate. Invited participants included county commissioners from all counties in the IMP, local landowners, local business and industry, conservation districts, non-profit groups, representatives of a range of state and federal agencies, and Tribes.

Fixed membership for each Subbasin Work Team was established based on the responses to these letters and participation at the meetings. Each Subbasin Work Team consisted of approximately 10 to 15 members and included a broad representation of interests as well as both technically oriented and non-technically oriented participants. The fixed membership of the Subbasin Work Teams was designed to ensure an equitable and balanced representation of interests on each work team. Members of the Subbasin Work Teams are listed in Tables 1.2.2-4 to 1.2.2-9. Each member participated in at least one meeting; invitees who declined to participate after one or two meetings are not listed as work team members. The hard work of the work team members is greatly appreciated.

Table 1.2.2-4 Coeur d' Alene Subbasin Work Team

Last Name	First Name	Agency/Organization
Bourque	Tom	Terra Graphics Environmental Engineering
Dawson	Shallan	Kootenai Shoshone Soil and Water Conservation District
DeKome	Shanda	US Forest Service (alternate)
Flagor	Bob	Benewah SWCD
Flory	Jason	US Fish and Wildlife Service (replaced Scott Deeds)
Haber	Jon	US Forest Service (visitor)
Hanson	Jerry	Kootenai Shoshone Soil and Water Conservation District
Harvey	Geoff	Idaho Department of Environmental Quality
Heusser	Cam	Coeur d' Alene Tribe of Indians
Horner	Ned	Idaho Department of Fish and Game (replaced Greg Servheen)
Kincaid	Bruce	Coeur d' Alene Tribe of Indians
Mikkelsen	Anders	Coeur d' Alene Tribe of Indians (alternate)
Miller	Charles	Silver Valley Natural Resources Committee
Miller	Stan	Spokane County Utilities Division (retired)
Mosier	Dave	Idaho Department of Environmental Quality
Mikkelsen	Anders	Coeur d' Alene Tribe of Indians (alternate)
Peters	Ron	Coeur d' Alene Tribe of Indians
Ralphs	Bob	Idaho Panhandle National Forest (alternate)
Stevens	Rebecca	Kootenai Shoshone Soil and Water Conservation District
Schlepp	Mike	Kootenai Shoshone Soil and Water Conservation District
Albrecht	Nathan	Coeur d' Alene Tribe of Indians
Upton	Carolyn	Idaho Panhandle National Forest
Vore	Tim	Avista Corporation

Table 1.2.2-5 Pend Oreille Subbasin Work Team

Last Name	First Name	Organization
Blau	Lori	Ponderay Newsprint Company
Buckley	Pat	Pend Oreille PUD (Alternate: Marty Robinson)
Carney	Jim	Landowner
Cobb	Jill	USFS - Idaho Panhandle Nat'l Forest - Priest Lake R.D.
Comins	Don	Pend Oreille Conservation District
Decker	Meg	Pend Oreille Environmental Team/Selkirk Conservation Alliance
Dekome	Shanda	Idaho Panhandle National Forest
Entz	Ray	Kalispel Tribe
Farmer	Brian G.	Washington Department of Ecology
Flory	Jason	US Fish and Wildlife Service
Harvey	Geoff	Idaho Department of Environmental Quality
Jungblom	Scott	Pend Oreille Conservation District
Kaney	Lynn	Colville National Forest (Alternate: Randy Carstens)
Kedish	Gary	US Fish and Wildlife Service
Lembcke	Sandy	Washington Department of Fish and Wildlife
Mack	Carol	Washington State University Extension
Maiolie	Melo	Idaho Fish and Game (Alternate: Tom Bassista)
Maroney	Joe	Kalispel Tribe
Mosier	Dave	Idaho Department of Environmental Quality
Nicholas	Sam	Pend Oreille County Commissioners
O'Hare	Linda	Bonner Soil and Water Conservation District
Peters	Ron	Coeur d'Alene Tribe of Indians
Pineo	Doug	Washington Department of Ecology
Powell	Scott	Seattle City Light
Sawyer	Suzanne	Bonner Soil and Water Conservation District
Soults	Scott	Kootenai Tribe of Idaho
Upton	Carolyn	Idaho Panhandle National Forest
Wainwright	Mimi	Washington Department of Ecology

Table 1.2.2-6 Spokane Subbasin Work Team

Last Name	First Name	Agency/Organization
Allen	Doug	Washington State Dept of Ecology
Crossley	Brian	Spokane Tribe of Indians
DeGraffenreid	Jim	Lincoln County Planning Dept.
Donley	Chris	Washington Department of Fish and Wildlife
Edelen	Walt	Spokane County Conservation District (alternate: Rick Noll)
Farmer	Brian G.	Washington Department of Ecology
Fletcher	Russ	Pend Oreille Conservation District
Flory	Jason	US Fish and Wildlife Service
Green	Gerald I.	Coeur d' Alene Tribe of Indians
Haggin	Bart	Friends of Little Spokane River Valley

Last Name	First Name	Agency/Organization
Howard	Bruce	Avista Corporation
Kedish	Gary	US Fish and Wildlife Service
Kieffer	BJ	Spokane Tribe of Indians
Kinkead	Bruce	Coeur d' Alene Tribe of Indians
Lee	Chuck	Spokane Tribe of Indians
Miller	Stan	Spokane County Utilities Division (alternate: Bill Gilmour)
Mosier	Dave	Idaho Department of Environmental Quality
Pavlik	Deanne	Spokane Tribe of Indians
Peone	Tim	Spokane Tribe of Indians
Peters	Ron	Coeur d' Alene Tribe of Indians
Robinette	Kevin	Washington Department of Fish and Wildlife
Singer	Kelly	Spokane Tribe of Indians
Vore	Tim	Avista Corporation

Table 1.2.2-7 Upper Columbia Subbasin Work Team

Last Name	First Name	Agency/Organization
Arterburn	John	Confederated Tribes of the Colville Reservation
Berger	Matt	Confederated Tribes of the Colville Reservation (or alternate Richard Whitney)
Delgado	Tony	Stevens County Commissioner
Duncan	Bill	Teck Cominco Metals Ltd.
Friedman	Malcom	Stevens County Commissioner
Gardinier	Lyle	Ferry Conservation District (or alternate Lloyd Odell)
Gosal	Kindy	Columbia Basin Trust
Kedish	Gary	US Fish and Wildlife Service
Kelley	Pam	Lincoln
Larsen	Russ	SCPLAC
LeCaire	Richard	Confederated Tribes of the Colville Reservation
Lembcke	Sandy	Washington Department of Fish and Wildlife
Ott	Merrill	Stevens County Commissioner
Pavlik	Deanne	Spokane Tribe of Indians
Picavet	Alexandra	National Park Service (or alternate Nancy Fritz Cressey)
Playfair	Bob	Landowner
Roney	Mike	Three Rivers Ranger District (or alternates Tom Shuhda or Sherri Schwenke)
Simmons	Scott (Pete)	FAST/NRI
Singer	Kelly	Spokane Tribe of Indians
Smith	Gene	Lake Roosevelt Trout Net Pen Coordinator
Sprankle	Craig	US Bureau of Reclamation (participated as a resource to the work team)
Wainwright	Mimi	Washington Department of Ecology

Table 1.2.2-8 San Poil Subbasin Work Team

Last Name	First Name	Agency/Organization
Arterburn	John	Confederated Tribes of the Colville Reservation (or alternate Sheryl Sears)
Berger	Matt	Confederated Tribes of the Colville Reservation (or alternate Richard Whitney)
Boyd	Carol	US Forest Service
Bremner	Bryan	Citizen
Caudell	Gregg B.	PUD #1 of Ferry County (or alternate Ryan Walsh)
Gardinier	Lyle	Ferry Conservation District (or alternate Lloyd Odell)
Lembcke	Sandy	Washington Department of Fish and Wildlife
Sprankle	Craig	US Bureau of Reclamation (participated as a resource to the work team)

Table 1.2.2-9 Lake Rufus Woods Subbasin Work Team

Last Name	First Name	Agency/Organization
Arterburn	John	Confederated Tribes of the Colville Reservation (or alternate Sheryl Sears)
Berger	Matt	Confederated Tribes of the Colville Reservation (or alternate Richard Whitney)
Delano	David	Chief Joseph Fish Farm (or alternate Dennis Delano)
Egbert	Jim	Landowner
Fischer	Bob	US Army Corps of Engineers
Jones	Chuck	Douglas County
Lembcke	Sandy	Washington Department of Fish and Wildlife
Lynn	Marilynn	Foster Creek Conservation District
McClure	Norman	Landowner
Poulson	Mike	Washington Farm Bureau
Shallenberger	Ed	Columbia River Fish Farms
Sprankle	Craig	US Bureau of Reclamation (participated as a resource to the work team)

Consistent with province level guidelines, the province level vision, and the Council's guidelines, each of the Subbasin Work Teams established their own ground rules and decision-making processes. All Subbasin Work Team meetings were open to the public, and public participation in the meetings was encouraged, however only the identified Subbasin Work Team members were able to participate in formal decision-making within the group. Each of the six day-long meetings was professionally facilitated and structured around the development and review of specific pieces of the management plan (vision, guiding principles, biological objectives, development of strategies, and prioritization of objectives and strategies). The GEI Consultants team presented summaries of key information derived from the assessment (limiting factors, summary of assessment tools, key considerations) and inventory to assist the Subbasin Work Teams in achieving their tasks. The Technical Coordination Group also assisted and, in some cases, advised the Subbasin Work Teams in their development of biological objectives and strategies. Subbasin Work Team members were asked to complete "homework assignments" between meetings including review of the draft subbasin plans and other pertinent information.

At the start of subbasin planning activities, in order to alert members of the public to the subbasin planning process and invited them to participate, advertisements were placed in a limited number of major newspapers and press releases were sent to approximately 50 newspapers in the IMP. Two open houses were held in each subbasin immediately following the Subbasin Work Team meetings. The first open house was designed as a tool to recruit additional Subbasin Work Team members who might not have been identified through other outreach mechanisms. The open houses were also designed to inform members of the public who were not otherwise able to participate in the Subbasin Work Team meetings about the process and gather their input.

Three newsletters and Subbasin Work Team meeting notices were distributed to a mailing list of over 500 interested individuals. Meeting notices and meeting minutes, drafts of the IMP Subbasin plans, maps, newsletters, links, and other information about the subbasin planning process in the IMP were maintained throughout the process on an IMP web page on the Council's website at www.intermountainprovince.org.

A final one-day facilitated subbasin and provincial meeting was held in May 2004 to provide the Subbasin Work Teams an opportunity to review the completed plan and confirm the management plan contents.

1.2.3 Subbasin Planning Process in the Intermountain Province

The entire plan was developed based on the Council's guidance, specifically the *Technical Guide for Subbasin Planners* and the 2000 Fish and Wildlife Program. The first step was to establish a provincial vision, objectives, and guiding principles. Then the management plan, assessment, and inventory were all developed concurrently and in coordination. The assessment and inventory were developed by the GEI Team with support from the Technical Coordination Group. The management plan was developed by the Subbasin Work Teams with the support of the GEI Team and the Technical Coordination Group. The OC contributed leadership and provincial scale decision-making throughout the process. Public input was solicited throughout the process, including two public open houses held in each of the six subbasins. Figure 1.2.3-1 illustrates the overall planning process in the IMP.

One of the goals of the IMP subbasin planning process was to develop the subbasin plan in an open, inclusive, and transparent process. Toward that end, all drafts of the subbasin plan, as well as newsletters, meeting notices, and meeting minutes, were posted on the IMP page of the Council's website. The IMP was unique in the Columbia Basin for establishing this level of dialogue with the public.

The first draft IMP plan was posted in August 2003, when the document was in rough and incomplete form. Comments from any interested persons were invited. Comments were incorporated and as the process progressed, the plan became increasingly complete and sophisticated. The final document reflects the efforts of many people, including members of the general public, who contributed their time and expertise to enhance this plan.

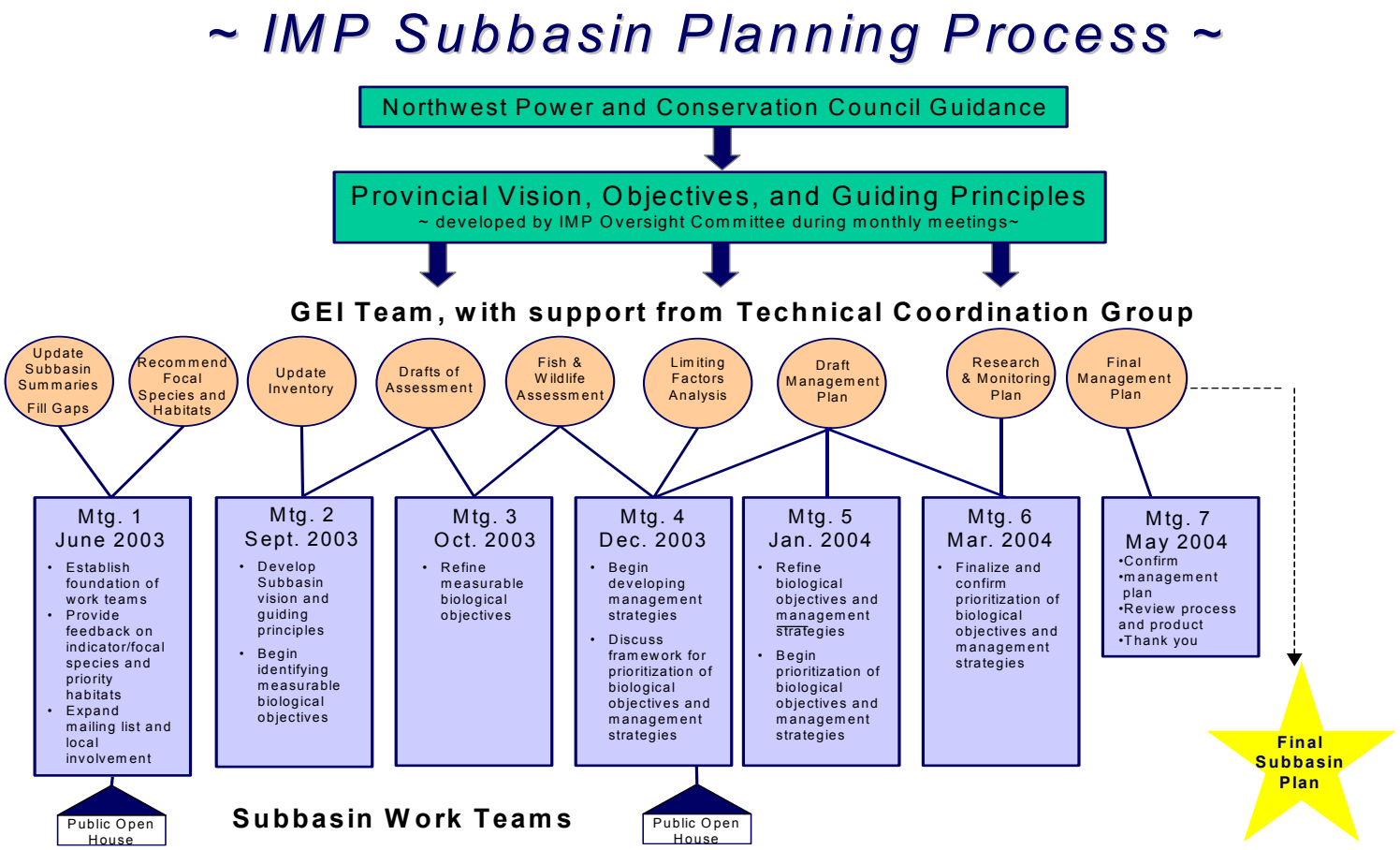

Figure 1.2.3-1. The subbasin planning process in the IMP. The graphic shows how the IMP Provincial vision, objectives, and guiding principles were developed from the Council's guidance, how the assessment and inventory were developed by the GEI Team with support from the Technical Coordination Group, and how the Subbasin Work Teams developed the management plan at the same time as, and in coordination with, the assessment and inventory development.

1.2.3.1 Development of the Provincial Vision and Guiding Principles

On-the-ground subbasin planning activities in the IMP began with a two-day facilitated meeting attended by the IMP OC and interested stakeholders. The purpose of this meeting was to 1) develop a provincial vision statement and broad guidelines for use by Subbasin Work Teams, 2) identify species of concern and key habitats in the province, and 3) identify potential Subbasin Work Team members. The meeting also served to confirm and clarify the overall approach to subbasin planning in the IMP. The Columbia River Basin vision and scientific foundation and principles of the Council's 2000 Fish and Wildlife Program formed the starting point for the provincial vision statement and guidelines.

1.2.3.2 Development of the Assessment

The technical assessment component of the IMP subbasin plans was developed by the GEI Team, in consultation with the Technical Coordination Group, and with ongoing review by the Subbasin Work Teams. Both the aquatic and terrestrial assessments relied on the existing subbasin summaries as starting points. The GEI Team reviewed the subbasin summaries in coordination with the Technical Coordination Group and identified missing data, inaccuracies, and other questions. The information in the subbasin summaries was supplemented with other existing technical information acquired through data searches or provided by province resource managers. The GEI Team used the information to prepare assessments describing the current condition of aquatic and terrestrial resources in each subbasin and the province. The Technical Coordination Group and the Subbasin Work Teams reviewed drafts of the assessment.

For aquatic resources, limiting factors for key focal salmonid fish species were assessed through the use of a Qualitative Habitat Assessment (QHA) model. Details of the methodologies used for the aquatic assessment, including the QHA and the focal species selection, are presented in Section 3, Aquatic Resources.

The assessment of terrestrial resources began with a review and update of the existing subbasin summaries with input from local and regional wildlife managers and current literature. A large number of focal wildlife species were analyzed using the Interactive Biodiversity Information System (IBIS 2003). Each subbasin also identified a list of priority wildlife species, for which local occurrence data were summarized. Key to the analysis of terrestrial resources were the three wildlife-habitat loss assessments conducted for the federal hydrosystem projects within the IMP (Creveling and Renfrow 1986; Kuehn and Berger 1992; Martin et al. 1988). These reports evaluated the quantity and quality of habitat losses for key indicator wildlife species and established the requirements for mitigation of the construction of the Chief Joseph, Grand Coulee, and Albeni Falls dams, and their associated reservoirs. Details of the methodologies used for the terrestrial assessment are found in Section 4, Terrestrial Resources.

1.2.3.3 Development of the Inventory

The inventory identifies and describes fish and wildlife programs and projects that are in place or currently underway. This section of the plan also identifies existing laws, regulations, and management of objectives of the natural resource management entities in

the subbasin. In addition to listing programs and projects, the inventory includes an assessment of the gaps, which are clearly evident when comparing the assessment with the inventory.

The inventory was developed by asking the Technical Coordination Group, conservation districts, state and federal agencies, and Tribes to provide a list of the their recent (last five years) and ongoing projects and programs in the IMP. The inventory information was then summarized in a spreadsheet.

Using the limiting factors identified in each of the subbasins, along with the evolving list of strategies being developed in the Subbasin Work Teams, the Technical Coordination Group and the GEI Team developed a condensed list of key limiting factors and strategy types. Each of these limiting factors and strategy types was assigned a numeric code. Then each project or program listed in the Inventory was categorized based on the limiting factor that the project or program was designed to address and the type of strategy that was employed. This information was used to help synthesize the inventory information and to identify gaps where the existing programs are inadequate to address the limiting factors present in the subbasin. A summary of this analysis is provided in the inventory sections for each subbasin.

1.2.3.4 Development of the Management Plan

The Management Plan includes the subbasin vision, guiding principles, biological objectives, and associated management strategies. The Subbasin Work Teams were responsible for developing and finalizing these Management Plan elements. A unique approach in the IMP was to have the Subbasin Work Teams start work immediately, while the assessment and inventory were still in development. This approach enabled the Subbasin Work Teams to be active participants in the development of the IMP Plan, to more fully consider the assessment and inventory elements, and to allow more time for review and revision of the management plan elements. In addition, the Subbasin Work Teams were able to ask for technical guidance from the technical coordination group as the management plan elements were developed.

The Subbasin Work Teams participated in six all-day meetings. Early meetings of the Subbasin Work Teams were used to educate participants about the Council, the Fish and Wildlife Program, the subbasin planning process, and the goals of subbasin planning. Each Subbasin Work Team established ground rules and agreed on the operating environment. The Subbasin Work Teams developed a subbasin-specific vision statement and guiding principles in the first three meetings. Biological objectives were developed in meetings two, three, and four. Strategies were prepared in meetings three, four, and five. Prioritization of objectives and strategies were completed in meetings five and six. Meeting agendas and notes for all subbasin Work Team meetings are posted on the Council's website for the IMP: www.intermountainprovince.org.

Subbasin Work Teams used information derived from the assessment and inventory to develop biological objectives and strategies. The GEI Team provided "technical briefings" to Subbasin Work Teams and the technical and non-technical representatives

on the teams provided additional information on local conditions and mitigation efforts, including a summary of objectives and strategies from each subbasin summary (prepared for the Council between 2000 and 2001). Over the course of the meetings, the Subbasin Work Teams requested assistance from the Technical Coordination Group to help provide clarification and technical guidance. This input from the Technical Coordination Group helped the work teams refine the subbasin specific biological objectives and strategies.

Biological objectives were developed using a tiered approach, beginning with review of the Columbia River Basin biological objectives identified in the Council's 2000 Fish and Wildlife Program. The Subbasin Work Teams developed subbasin level objectives tiered to the Program objectives. A set of province level objectives was developed by reviewing objectives developed in all of the subbasins, looking for commonalities, and developing a third tier of objective statements intermediate to the basin and subbasin levels. The province level objectives were developed through a number of iterations between the GEI Team and the OC. The Technical Coordination Group and the Subbasin Work Teams assisted in the review of the provincial objectives. Tiering the objectives into basin, province, and subbasin levels provided confidence that the objectives were consistent with the Council's Fish and Wildlife program, including the Council's eight scientific principles (Appendix A). In addition, the linkages between the Council's objectives and the IMP objectives could be displayed. Finally, the resource needs and issues specific to each subbasin could also be represented.

The Subbasin Work Teams developed biological objectives and strategies that relate to the limiting factors in each subbasin, but kept them somewhat broad so they would be adaptive to changing conditions and apply to multiple or refined mitigation measures. Opinions within the Subbasin Work Teams differed regarding the appropriate degree of specificity of the objectives and strategies. The *Technical Guide for Subbasin Planners* does not provide clear guidance on this topic. Some members felt that the objectives and strategies should be broad and simple, so that they could be easily understood and would apply to a wide range of situations. Other members felt that specific, detailed objectives would be more substantive and would provide better guidance for future activities. The final work team product is a compromise between these two perspectives, and is an attempt to capture the best of both approaches.

The decision-making process associated with the development of the objectives and strategies was challenging due to the variety of representatives on the work teams (both technical and non-technical and representing multiple interests). A lot of time was spent helping participants understand the Fish and Wildlife Program and the technical elements associated with evaluating hydropower impacts and the range of possible objectives and strategies associated with mitigation. All of the Subbasin Work Teams should be commended for being able to absorb all that they did and still develop the management plan elements within the limited time available.

The prioritization process began at the fourth Subbasin Work Team meeting when the participants began work on a set of provincial criteria for prioritizing the management

objectives and strategies. An initial set of core criteria were developed by the GEI Team based on the Council's Fish and Wildlife Plan, the IMP Guiding Principles, and OC prioritization guidelines. The Subbasin Work Teams provided comments on the initial set of criteria. Then the IMP OC considered the comments from all six Subbasin Work Teams when they finalized the provincial criteria.

The final provincial prioritization criteria were handed out at the fifth Subbasin Work Team meeting. Work teams were given the option of adding subbasin specific criteria to the provincial criteria if they desired. The Upper Columbia Subbasin and the San Poil Subbasin work teams chose to add specific criteria.

The final provincial prioritization criteria were:

1. Does the objective or strategy protect, mitigate, and enhance fish and wildlife resources likely to be addressed through funding from the NPCC's Fish and Wildlife Program?
2. Is the strategy consistent with addressing the limiting factors, and achieving the biological objectives, identified in this plan:
   at the subbasin level?
   at the provincial level?
3. Does the objective or strategy help to achieve multiple objectives within the province or subbasin (e.g., benefit both fish and wildlife, restoration of ecosystems rather than single species)?
4. Will implementation of the objective or strategy result in long-term biological benefits over short-term gains?
5. Does a federal, tribal treaty right, federal trust responsibility, state, or local law/regulation legally require the objective or strategy (e.g., ESA, CWA, federal trust responsibilities, etc.)?
6. Does the objective or strategy help to protect, mitigate, or restore habitat, while avoiding or minimizing impacts to native fish and wildlife species?
7. Does the objective or strategy emphasize restoration of, or provide benefits to, native over nonnative species?
8. Does the objective or strategy address Tribal fish and wildlife use for cultural and subsistence purposes?
9. Does the objective or strategy balance human interests[4] with fish and wildlife needs?
10. Is the objective or strategy feasible (in terms of politics, geography, economic viability, current state of science, achievable time frames, etc.)?

The *Technical Guide for Subbasin Planners* requires that the strategies be prioritized, but it was important to maintain the alignment of the strategies to the objectives since the objectives represent the measurable component that describes the desired outcome. Therefore, the Subbasin Work Teams were asked to prioritize the objectives using the

[4] For purposes of this exercise, human interests are defined as: recreation, land use (e.g., farming, industrial uses, real estate development), critical area use, customs and culture of local communities, economic stability, etc.

prioritization criteria and then also prioritize the strategies that are related to each of the objectives.

The Subbasin Work Teams were presented with a prioritization spreadsheet. Participants were asked to rank each objective for each criterion from one to ten. The scores for each objective were averaged, and the standard deviation (which indicates level of agreement between respondents) was calculated. Strategies were simply ranked as high, medium, or low. The high, medium and low values for the strategies were converted to numeric values (3, 2, and 1 respectively), and the individual scores were averaged.

The individual scores from this prioritization exercise were used as an initial prioritization effort. The prioritization results were reviewed by the work team at the sixth meeting and adjusted, if deemed appropriate, and confirmed by the work team. The final decisions about the prioritization were made as a consensus decision, with opportunities for people to have a minority opinion that is also presented in the management plans.

Four of the Subbasin Work Teams used the numeric approach described above to prioritize objectives and strategies. In the Pend Oreille Subbasin and the Coeur d' Alene Subbasin, work team members chose to consider the prioritization criteria informally, without using the scoring spreadsheets. Those subbasins also used a consensus decision-making approach to prioritization of objectives and strategies.

1.2.3.5 Development of the Research, Monitoring, and Evaluation Plan

The Council asked subbasin planners to include a Research, Monitoring and Evaluation (RM&E) plan in their subbasin plans. The Council provided guidelines for a very extensive RM&E section in the plans. The Council's guidelines call for a research agenda that describes the specific conditions and situations identified in the subbasin that requires specific research studies to help resolve management uncertainties. The monitoring and evaluation (M&E) portions of the plan are for the purpose of aiding implementation of the subbasin strategies. The Council suggested that subbasin planners should identify: 1) what indicator variables will be monitored, 2) who collects the information and how is it obtained, 3) how the information will be evaluated and used, and 4) how much it will cost.

The OC concluded that the degree of detail outlined in the Council's guidance documents looked more like project monitoring than a coordinated, subbasin-level RM&E plan. In addition, including full monitoring protocols for all monitoring approaches in the IMP would make our subbasin planning document extremely long and unwieldy. In addition, time and available funds do not permit the development of as extensive an RM&E plan as the Council identifies in their guidelines.

To meet the Council's RM&E recommendations to the best of its ability in the IMP, the OC identified a subcommittee to work out an initial approach to RM&E. This subcommittee reviewed federal, state, Tribal, and regional collaborative monitoring efforts. They found that these organizations use a variety of different monitoring

techniques. Typically, monitoring is done as independent efforts that address questions and management problems that are relatively unique to each entity. Monitoring efforts have evolved primarily in response to different organizational mandates, jurisdictional needs, funding availability, issues and questions. Such monitoring efforts have typically included little or no coordination with other agencies. Many of these monitoring efforts are conducted at a project level; however, there is starting to be a greater emphasis on complementing project level monitoring with large-scale efforts.

Several large-scale, comprehensive monitoring programs have operated in the Pacific Northwest in the recent past. Examples of such large-scale, comprehensive monitoring efforts include:

- Aquatic and Riparian Effectiveness Monitoring Program for the Northwest Forest Plan (AREMP),
- PACFISH/INFISH Biological Opinion for the Interior Columbia Basin (PIBO),
- Interior Columbia Basin Ecosystem Management Program (ICBEMP),
- Federal agencies developing a Columbia River Research, Monitoring, and Evaluation (RME) Program as required by ESA Columbia River Biological Opinions (BiOps) and a Columbia River Federal Salmon Recovery Strategy MOU, and
- Comprehensive, monitoring efforts within the states of Oregon, Washington and Idaho.

Currently there are several processes that are trying to address these monitoring differences. A Collaborative System-wide Monitoring and Evaluation Project (CSMEP) led by the Columbia Basin Fish and Wildlife Authority (CBFWA) is focusing on a system-wide monitoring and evaluation of fish status, addressing requirements of NMFS and USFWS biological opinions and recovery plans as well as the Council's Fish and Wildlife Program. There is also the Pacific Northwest Aquatic Monitoring Partnership (PNAMP), which is intended to provide a forum for coordination at the policy level among the federal, state and Tribal interests involved in aquatic ecosystem monitoring activities that includes interested parties outside of CBFWA. Its purpose is to provide information in a coordinated manner at the appropriate scales to inform public policy and resource management decisions through implementation of standard data collection and management protocols.

In light of the various ongoing efforts to develop a regional monitoring plan, the IMP planners have chosen to develop a monitoring plan based on existing monitoring methods described in the scientific literature. Each subbasin has a chapter on RM&E included in this plan.

1.2.3.6 Feedback from Planning Participants on the Subbasin Planning Process

Subbasin Work Team members asked many questions during the course of the planning process. Many participants asked some of the same questions on multiple occasions, clearly indicating that these were difficult issues. A review of the Subbasin Work Team meeting notes highlighted these concerns (complete meeting notes are available on the

IMP subbasin planning website:
http://www.nwcouncil.org/fw/subbasinplanning/admin/level2/intermtn/default.htm

- How does the subbasin planning process fit with other, ongoing planning efforts in the area? In the IMP, subbasin planners tried to address this concern by including a broad range of agencies and the general public in the Subbasin Work Teams. Endangered species recovery plans and total maximum daily load projects were referenced, when appropriate, in the objectives. However, integration of planning processes continues to be a concern.
- How will the IMP address trans-boundary issues? Canadian representatives were invited to participate in the Subbasin Work Teams, but most were unable to attend meetings due to time and budget limitations. Better integration with Canadian concerns should be a goal of the next iteration of subbasin planning.
- Many questions were asked about the BPA, the Council, and their process for funding fish and wildlife projects. Involving both technical and non-technical persons in decision-making required extra time to educate participants in a wide range of topics, including the BPA and Council roles and responsibilities.
- Members of the general public were unfamiliar with the Council and the Fish and Wildlife Program.
- Many people were concerned that the subbasin planning process would lead to additional land use regulations. These concerns were expressed less often as people learned more about the planning process, but the concern has not disappeared.
- Should the plan only focus on problems directly related to the FCRPS, or should it be an overall fish and wildlife plan? Subbasin Work Team members struggled to understand the scope of the plan. Many questions were asked about the appropriate range of objectives that should be considered.
- There was frustration expressed at the tight timeline which required short turnaround times for review of materials.

Final IMP Provincial Wrap-up Meeting

Subbasin planners in the IMP established a timeline and process specifically designed to allow sufficient time for a final review of the IMP subbasin plans by all participants. On May 5th and 6th 2004, IMP subbasin planners convened a final review and wrap-up meeting. Although allowing sufficient time to incorporate this review cut down on the time available to make last-minute edits to the final document, and precluded the inclusion of late-arriving recommendations from the Council; IMP subbasin planners thought it provided an important additional level of public involvement and accountability to participants. Additionally, IMP subbasin planners agreed that the expense and effort devoted to development of subbasin plans warranted a thoughtful review and analysis of the process and products. Subbasin planners in the IMP also hoped through the wrap-up meeting to provide constructive recommendations for future planning efforts derived from the on-the-ground experience of those involved in planning efforts in the IMP.

The May 5th meeting was a full day province-wide meeting facilitated by the GEI outreach team and the IMP coordinator. The purpose of this meeting was to review the overall IMP subbasin plans as a provincial group, confirm the final contents of the six subbasin management plans, review the process and participation in the IMP, develop specific recommendations for the next iteration of subbasin planning in the IMP, and develop constructive comments about how to improve the overall process and product in the future. An additional important purpose of the meeting was to acknowledge the Subbasin Work Team members for their hard work and explain the next steps of the submission and review process. Invitations were extended to the entire IMP mailing list of just over 500 individuals. Participants included the Subbasin Work Team members from each subbasin, the OC, members of the ad-hoc Technical Coordination Group, Council staff, the GEI technical and outreach team, interested members of the public, and the IMP coordinator.

The purpose of the May 6th meeting was to allow the OC and GEI's technical team to review and assess the IMP subbasin plans in comparison to the Council's ISRP/ISAB/PRG review guidelines, the Council's adoptability guidelines, and to review key portions of the provincial level plan. The meeting was co-facilitated by GEI's outreach coordinator and the IMP coordinator.

May 5th Meeting

The GEI Team presented a summary overview of the entire completed IMP subbasin plans to the provincial group. Participants then spent the morning in subbasin breakout groups reviewing the final management plans and confirming that the finished plans accurately reflected the work product of each teams. Minor corrections were recorded and in two cases Subbasin Work Team members confirmed their requests to record dissenting opinions. Participants were also asked to post written suggestions or comments regarding the next iteration of subbasin planning on a wall with stations for each subbasin. Detailed notes from the full May 5th meeting are available on the IMP website http://www.nwcouncil.org/fw/subbasinplanning/admin/level2/intermtn/default.htm.

In the afternoon, the meeting participants split into breakout groups and in a round-robin format visited individual stations to discuss four recurrent themes that were articulated in work team meetings, OC meetings, and/or among the GEI consultant team. Those four themes and a summary of some of the major IMP provincial groups responses, discussion and recommendations follow:

1. Guidelines for Subbasin Planning / Task of Developing the Plan: Were there aspects of the subbasin planning process or direction/guidelines that were problematic for you? How would you improve the process and/or how could the Northwest Power and Conservation Council improve their guidelines and direction for subbasin planning?

   Summary of critique:
   - The lack of clear and consistent guidelines from the Council at the outset of planning was challenging. New guidelines were presented throughout the

planning process. No clear explanation for how and when subbasin plans will be implemented was provided. Subbasin planners were told at the outset that plans would be iterative, but there is no clear mechanism or commitment for this to occur.

- Related to the lack of initial guidelines, different subbasins, provinces and states are using different approaches to develop the technical and public involvement elements of the plans, it is not clear what method was "best". Subbasin planners had concerns about how the Council will compare these very different processes and products.
- The Council's expectations regarding stakeholder involvement were not clear. The Council never clearly articulated why subbasin planning should be done and why stakeholder involvement was needed when the obligations are already set in the Power Act. Participants in the IMP process would have liked to see more active participation by Council staff in the subbasin planning process. There was inadequate initial public education about who the Council is, who BPA is, and what the Fish and Wildlife Program is and is not. It was a challenge for new participants, especially non-fish and wildlife managers, to catch-up and get up to speed on background related information (e.g., subbasin summaries).
- The subbasin guidance and tools the Council provided to planners (e.g. EDT, the Technical Guide for Subbasin Planners) were very anadromous fish oriented and were in many cases difficult to adapt to blocked area conditions (e.g. resident fish and wildlife).

Summary of recommendations:

- The 2004 subbasin plans need to be living documents that can be and will be adapted in the future.
- Council should establish full and complete guidelines before the next iteration of subbasin planning process begins. At the outset, these guidelines should 1) describe how the final plans will be reviewed and provide a clear template with evaluation criteria, 2) facilitate development of succinct and simple subbasin plans, and 3) use the information gathered from this first iteration of subbasin planning to improve future subbasin planning guidance.
- The Council should consult with the local fish and wildlife managers when developing or redefining subbasin boundaries.
- Council should be more actively involved in the subbasin planning process at the subbasin level, clarify relationship of Power Act requirements in relationship to stakeholder involvement and related expectations from all parties.

2. Development of a Science-Based Management Plan: Did you feel it was challenging 1) for lay people involved in the process to be tasked with developing a science-based management plan, 2) for scientist involved in the process to be tasked with developing a plan, and/or 3) to be tasked with achieving "best-available science" in light of various opinions? Are there other challenges you

experienced relating to the development of a science-based management plan? What recommendations or suggestions do you have regarding these challenges?

Summary of critique:

- The process was not layperson friendly based on daylong meetings on workdays, time requirements, and lack of time to educate lay people.
- In the layperson's mind, science is often viewed as controversial and as "opinions" that often don't address or regard potential social, economic and local impacts. Scientists view lay people as having opinions, biases, and values that are not always founded in truth supported by science. Scientists sometimes appeared to struggle with the concept of doing planning and not the technical work they are trained to do. Bridging these disparities between lay people and scientist in the work groups was challenging. Relationships between scientists and lay people improved at the IMP subbasin work team table.
- Given the short timeframe, the science used in the IMP subbasin planning process may not be as solid as the scientific participants would have liked and important scientifically justifiable strategies may have been missed which may result in important science-based strategies and projects not get funding. In addition, some participants felt that good science may have been subsumed by the desire to ensure "fundable" strategies in some cases.
- Doing the best real time management actions within the established science-based framework is challenging and requires that scientists need to ask how they can inform public policy.

Summary of recommendations:

- Lay people need to be informed and educated before the process begins to help them get up to speed, and adequate time needs to be allocated for this up-front education. Lengthen the timeframe and allow the work teams to help develop the agendas based on what information they need next.
- Allow adequate time to develop assessment first and still have enough time to develop the management plan.
- Explore how priorities and projects can be better designed and funded based on the involvement of private lands and private landowners.

3. Participation in the Process: Was the IMP Plan development done in an open and inclusive public process? Who was not involved, or didn't stay involved, that would have added value to the process and final plan? How can they be encouraged to participate in the future?

   Summary of critique:

   - The IMP Plan was developed in an open and inclusive process. The Tribal and private landowners were better represented than in other projects. The Intermountain Province got great representation compared to other provinces, and effectively used the web site and produced periodic newsletters. The GEI

Team, the OC, and others should be commended facilitating this excellent grassroots effort.

- The group would have liked to have seen more press releases targeted to landowners, and an opportunity for more comments from the general public early on. The process also needs to consider the public's time schedules – for example, all-day meetings may discourage some people.
- It was noted that numerous people/groups/organizations were invited and chose not to participate in the work teams for numerous reasons. Many responded that they preferred to get their information off the Intermountain Province web page. A variety of groups and organizations were identified that would have been nice to have had involved. And it was recognized that all of the groups identified were invited to participate in the IMP planning process other than non-industrial businesses.
- There is a perception by some members of the public that their issues, concerns, and comments were not taken as seriously as those made by the agencies and tribal representatives. This was further confounded by the nature of the Power Act requirements. Everyone's input needs to be fully considered – not just the agency/tribal input.

Summary of recommendations:

- Establish a more reasonable time frame to complete the process – more time needed, but a defined time frame is still needed so it doesn't drag out beyond what is appropriate.
- Make sure the process considers people's time and other commitments. People who are most directly affected by actions to benefit fish and wildlife need to be more involved.
- Identify why participants or potential participants quit coming or chose not to be involved. And, follow up with them to evaluate how to get them involved.
- Continue to use similar methods of information sharing – newsletter, meeting notes, meeting announcements, emails, web site, etc. Identify the "lay people" and draw them out more during the discussions at meetings.

4. IMP Plan Product: Do you feel that the IMP Subbasin Plan is a useful document that will 1) help achieve the subbasin vision, and 2) help you, your organization, and/or community? What improvements to the management plan could be made in future updates? What elements of the plan are the best and will be most useful? What elements of the plan are the least useful? What additional elements/topics should be considered in future subbasin plans?

   Summary of critique:

   - Challenges that affected quality and content of final document included the Federal Columbia River Power System (FCRPS) broader focus, lack of clarity as to what the scope of the project was (e.g. FCRPS versus non-FCRPS), involvement of both scientists and lay people, disagreements over how specific to be in the objectives and strategies, need for better clarification on

aquatic side between anadromous fish substitution objectives and resident fish activities in general.

- The IMP Plan inventory is the least useful part of the plan and is not linked as well as it could be to the other parts. It is difficult to get project managers to critique their own projects, and adequate time and effort was not available to do a thorough analysis of the inventory. We did not ask ourselves the right questions when initially developing the inventory and then ran out of time. This could be one of the stronger elements of the document in a future iteration.
- Broader discussion of Columbia River operations is missing from the IMP Plan. There was not adequate discussion of the role of Grand Coulee and its effects, and more discussion of hydro operations was needed. Members of the Implementation Team should be involved in subbasin planning efforts
- The IMP planning process did not include discussion of economic impacts of fish and wildlife actions on local communities or the costs associated with implementing various actions. Although such an analysis was discussed at the outset of planning, economics got pushed out of the agenda because there just was not enough time to get everything done in the Subbasin Work Team meetings.

Summary of recommendations:

- Need to have a commitment from the Council that the subbasin management plan will be a living document that supports a subbasin management system that builds on work that has been done so far. Subbasin plans won't accomplish the subbasin vision without funding, a commitment to follow-through and opportunities for long-term reviews and revisions are needed.
- Plan needs to more clearly define the funding responsibilities of other agencies (e.g. what is BPA responsible for funding, what are state agencies responsible for funding, what are other federal agencies responsible for funding, etc.)
- Adequate time and resources need to be identified in next iteration so that strategies also address socio-economic issues, risks, political issues, as well as best available science.
- Subbasin plans need to go to the next level to identify actions, include estimates of the costs of various options, and include a budget page with the total necessary budget for subbasins and province.

More complete notes detailing participant comments from these four workstations are posted on the IMP website at http://www.nwcouncil.org/fw/subbasinplanning/admin/level2/intermtn/default.htm.

Meeting participants provided a variety of written ideas and suggestions that should be considered during the next iteration of subbasin planning for each of the six subbasins. These suggestions and comments fell into the following categories (the full set of comments is provided in the complete meeting summary which is posted on the project web page):

- Improvements for the aquatic assessment, clarifications to the inventory, concerns and suggestions relating to the prioritization, improvements to the objectives and strategies, how to improve participation in the process, project funding, improvements to the planning process, long-term monitoring, consistency with legal obligations, resolving controversial issues, expressing varying viewpoints in the final document, matching subbasin boundaries to hydrologic systems, building and strengthening weak links, adding more focus on species with little data, improvements to mapping, continued use of professional meeting facilitation, use of incentive-based management strategies, making clearer connections with operational issues, addressing data gaps, etc.

May 6th Meeting

At the May 6th meeting the OC and GEI's technical team reviewed the ISRP/ISAB/PRG guidelines and the Council's adoptability guidelines. During a daylong meeting the group reviewed and discussed their self-analysis of the IMP product in comparison to both of these sets of guidelines. A summary of this response will be included in a letter to the Council and the ISRP that will be submitted with this subbasin plan. In addition, these comments will be posted on the subbasin website.

1.3 General Description of the Natural Environment of the Intermountain Province

The IMP is characterized by a diverse landscape ranging from 1,000 feet above mean sea level near the tailwaters of Chief Joseph Dam to 7,690 feet above mean sea level at Illinois Peak in the headwaters of the St. Joe River (National Geographic Maps 2000). The northern and eastern boundaries lie within the Northern Rocky Mountains. These areas are generally characterized as alpine and subalpine forests with a decaying granitic geology (Alt and Hyndman 1994). In the eastern portion of the province, in both the Coeur d' Alene and Pend Oreille Subbasins, the Precambium Belt Supergroup is the predominant bedrock. Belt rocks are a thick layer of sedimentary sandstones and mudstones, approximately one billion years old (Alt 2001).

Much of the southwestern portion of the IMP is within an area known as the Palouse Hills. The Palouse Hills is a softly rounded landscape with rich, fertile, silty soils. Set within this farmland are areas known as scablands, with outcrops of black basalt, broad expanses of raw gravel, and dry stream channels (coulees) (Alt 2001). This landscape was carved during the most recent ice age. About 15,000 years ago, the southern fringe of the glaciers encroached upon the mountain valleys of northern Washington and Idaho. Glaciers dammed the Clark Fork River creating Glacial Lake Missoula. The dam broke and the lake drained catastrophically causing a torrential flood. This happened several dozen times resulting in the landscape seen today (Alt 2001).

1.4 Background of Existing Problems

Several over-riding issues are of critical importance in the IMP: the loss of anadromous fish, the historic lack of funding provided to the province for fish and wildlife mitigation, the lack of information about fish and wildlife in the IMP (a problem related to the lack of funding), and water management of mainstem dams.

The complete loss of the anadromous life history has had a wide array of impacts within the province and is a major focus of this plan. This topic will be discussed in depth in the assessment portions of this plan, and it is also addressed in objectives and strategies outlined in the management plan.

The lack of funding for fish and wildlife in the IMP is, in part, a direct consequence of the loss of anadromous fish. The BPA currently allocates approximately $139 million annually to protect, mitigate, and enhance fish and wildlife in the Columbia River Basin (CBFWA 2004[5]). The 2000 Fish and Wildlife Program calls for 70 percent of fish and wildlife mitigation funding to go to anadromous fish. Historically, the IMP has not received funding for anadromous fish mitigation because anadromous fish have been lost due to the construction of Chief Joseph and Grand Coulee dams without upstream fish passage facilities. The IMP has received between $6 and $11.5 million per year for fish and wildlife between 2001 and 2003, or between 5 and 8 percent of the total mitigation funds available (CBFWA 2004). This level of funding is not proportionate to the magnitude of the impacts experienced by the IMP, which total approximately 40 percent of the wildlife habitat and anadromous fish losses documented to date.

The lack of data is reflected in the assessment and management plan portions of this plan. For example, several of the aquatic focal species, such as white sturgeon and burbot, are addressed only briefly in the assessment because very little is known about them. In addition, in many cases objectives are, of necessity, broad and general. It was not possible to include numeric targets in most of the management objectives because of a lack of quantitative information.

Water management in the mainstem rivers has a profound effect on fish and wildlife in the IMP. Water levels in all the mainstem reservoirs in the IMP, including Lake Pend Oreille, Coeur d' Alene Lake, Lake Roosevelt, and Lake Rufus Woods are controlled by the hydropower system. Decisions about water management affect people throughout the Columbia River Basin and beyond. Therefore, decisions about water management are made on a system-wide basis.

In the IMP Subbasin Plan, the management planning work focused on issues that were conceivably within the control of the local Subbasin Work Teams and fish and wildlife managers. Therefore, although water management in the mainstem is an extremely important issue to the province, this plan largely does not address the topic. Nevertheless, the timing and extent of fill and drawdown has a profound effect on the ability of the reservoirs in the IMP to sustain fish and also affects many wildlife species. Many of the artificial production objectives and strategies described in the management plan are necessary because of operations of the reservoirs.

[5] available at: http://www.cbfwa.org/cfsite/ResultTopics.cfm?TopicID=24

1.4.1 Fisheries

At the turn of the twentieth century, anadromous fish runs in the Columbia River Basin ranged from an estimated 10 to 16 million fish annually (Council 1996), more than any other river system in the world. Spring Chinook and steelhead were relatively abundant in upper Columbia River tributary streams prior to the extensive resource exploitation in the 1860s. By the 1880s, the expanding salmon canning industry and the rapid growth of the commercial fisheries in the lower Columbia River had heavily depleted the mid- and upper Columbia River spring and summer Chinook runs (McDonald 1895), and eventually, steelhead (Mullan et al. 1992). Many factors, including construction of impassable mill and power dams, un-screened irrigation intakes, poor logging and mining practices, overgrazing, and private development of the subbasins, in combination with intensive fishing, all contributed to the decline in abundance of upper Columbia basin salmonids (Fish and Hanavan 1948; Chapman et al. 1982). However, in spite of these impacts, the anadromous fishery in the upper Columbia River was utilized until 1939.

Hydroelectric dam construction began in the basin in the late 1800s and continued through the mid-1980s. Initial excavation for Grand Coulee Dam began in 1933. The full extent of losses in upper Columbia River salmonid runs is difficult to quantify because of limited historical records, but the runs were severely depleted by the 1930s (Craig and Suomela 1941). In a 1947 report on the Columbia Basin Project, the Bureau of Reclamation acknowledged, “many valuable [salmon] breeding areas have been totally eliminated by construction of dams wholly unprovided with fishways.” The report’s author further stated, “a large part of the spawning and rearing areas originally available has either been completely eliminated or so seriously reduced as to be useless” (U.S. Bureau of Reclamation 1947; Scholz et al. 1985). Although the exact amount of fish lost as a result of hydropower development is unknown, the development of both the FCRPS and other hydropower facilities clearly had a significant impact on anadromous fish abundance in the Columbia River (Dauble et al. 2003).

Today, current annual run size estimates average about 2.5 million fish (Dauble et al. 2003), although none of these fish are able to return to the upper Columbia River. In the IMP anadromous fish were eradicated upstream of River Mile (RM) 596.6 (River Kilometer (RK) 959.9) on the Columbia River when Grand Coulee Dam was constructed without fish passage facilities in 1939 (Center for Columbia River History website). Grand Coulee Dam blocked access of Columbia River anadromous salmonids to about 17 percent of their upstream production areas (Dauble et al. 2003). Subsequently, in 1958, Chief Joseph Dam was also built without fish passage facilities, blocking upstream anadromous migrations another 50 miles downstream (Figure 1.2). In all, roughly 37 percent of all anadromous fish losses in the Columbia River basin occurred in the areas blocked by Grand Coulee and Chief Joseph dams (Scholz et al. 1985).

Construction of Grand Coulee Dam without fish passage facilities led to a program that centered on trapping salmon and steelhead at Rock Island Dam to address the upcoming loss of access to over 1,100 miles of anadromous fish habitat (Fish and Hanavan 1948). The Grand Coulee Fish Maintenance Project (GCFMP) (1939-1943) called for: (1) constructing four fish hatcheries in the Okanogan, Wenatchee, Entiat, and Methow river

basins, (2) building a trapping facility to intercept fish bound for spawning sites above Grand Coulee at Rock Island Dam, (3) transferring these fish to hatcheries where they were held in captivity until eggs could be collected, and (4) raising the progeny at the hatcheries until they could be stocked into the Wenatchee, Entiat, Methow, and Okanogan drainages. However, the Okanogan River Hatchery was never built because of the outbreak of World War II.

In addition, kokanee production at the Ford Fish Hatchery in the Spokane Subbasin was developed as mitigation for the loss of anadromous fisheries on the upper Columbia River due to the construction of the Grand Coulee Dam in 1939. This hatchery was built by BPA in 1941.

The attempt to relocate the fish proved to be a failure relative to preserving the upper Columbia River genetics for Chinook and steelhead. Seven years after the relocation attempt, Fish and Hanavan (1948, cited in UCUT 1999) stated:

> At the very outset, there was ample reason for doubting of the process of relocation, involving as it did the trapping, hauling and impounding of adult salmon in large numbers, could be accomplished without at least a temporary decline in the production levels. As the program progressed, these doubts were increased by the substantial mortality of adult salmon … in the hatchery holding pens.

In May 1975, Donald Moos, Director of the Washington State Department of Fisheries testified before the Senate and House Joint Public Works Appropriation Committee that, "Unfortunately the hatcheries were plagued with numerous problems from the very beginning. The brood stock died before ripening, disease was rampant, … sufficient water of proper temperature was not available, and the hatcheries were never adequately funded. In short, these hatcheries never fulfilled their intended purpose, which was maintenance of the vast numbers of anadromous fish that had formerly spawned upstream of Grand Coulee Dam" (UCUT 1999). Mullan (1987) pointed out that survival to adult for fish released from these hatcheries was generally one percent or less. Regardless of the degree of success of the GCFMP, the current stocks of fish that spawn in the upper Columbia River basin are at least partially descended from the progeny of the program.

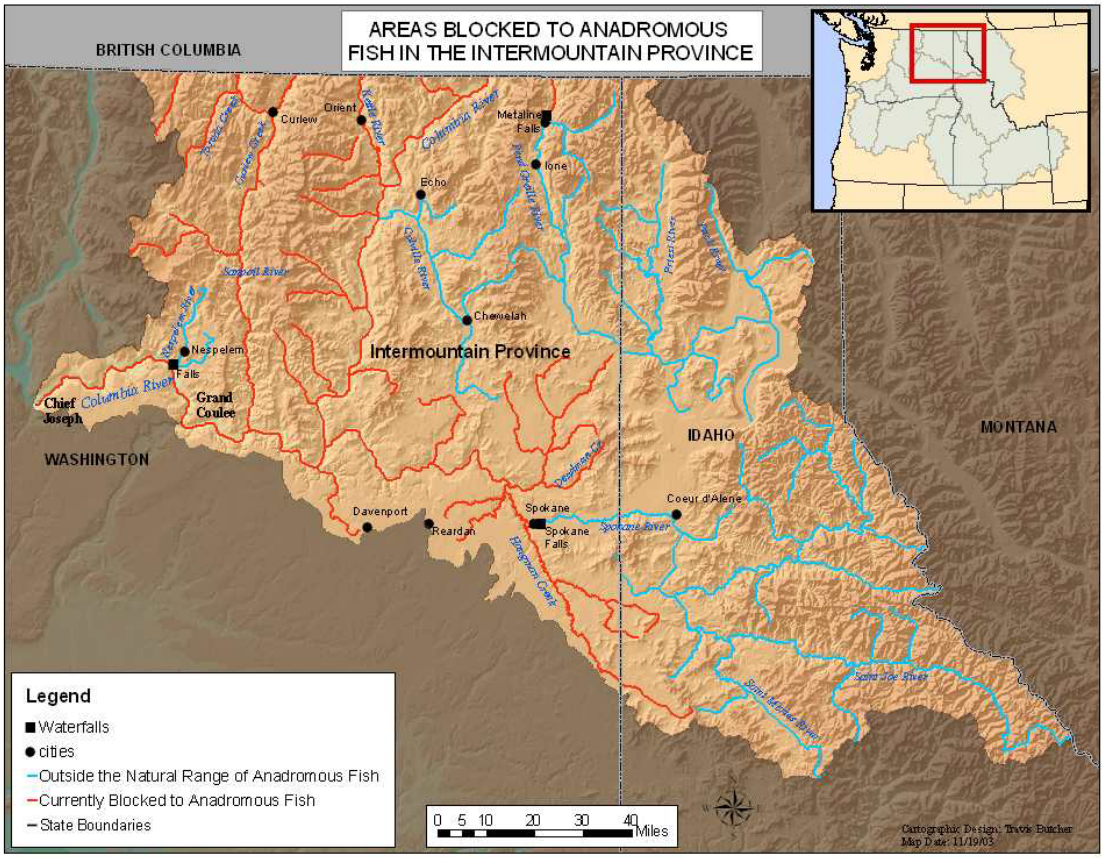

Figure 1.2. Map of the "blocked area" of the Columbia River Basin. The blocked area is that portion of the basin which historically had anadromous fish but no longer does because of the lack of fish passage at Chief Joseph and Grand Coulee dams.

The Colville Tribes reinitiated the question of the fourth Okanogan mitigation hatchery in the 1980s and in 2000, the U.S. Bureau of Reclamation agreed with the Colville Tribes that authorized mitigation for construction of Grand Coulee Dam was not complete.

In addition to the inadequacy and ineffectiveness of direct mitigation for construction of Grand Coulee Dam, the bulk of the Mitchell Act hatcheries built for federal salmon mitigation were constructed primarily in the lower Columbia River province to benefit lower river Tribes and commercial fisheries. The Council's 2003 draft artificial production review and evaluation basin-level report outlined the failure of these hatcheries to recover salmon and create a viable commercial fishery. The report recommends hatchery production be moved to locations in the upper Columbia and Snake rivers and utilize locally adapted brood stocks. Consistent with these recommendations, the Colville Tribes are currently seeking approval from the Council of a Step 1 conceptual design for a hatchery facility to be located at the base of Chief Joseph Dam. This hatchery facility would help support naturally spawning populations of Chinook salmon in the uppermost tributary of the Columbia River currently accessible to anadromous fish. Once constructed this facility would use the best science currently

available to improve stock genetics and harvest opportunities in the geographically closest location to impacted upper Columbia River Tribes and communities.

In addition to blocking fish passage, Grand Coulee Dam also inundated 135 miles of valuable habitat in the Columbia River mainstem from the dam to within 15 miles of the Canadian border (USGS 2004), 28 miles of the lower Spokane River, 12 miles of the San Poil River and 15 miles of the Kettle River. Other dams within the basin also converted significant sections of river into reservoirs. The creation of these impoundments has changed the once connected fluvial system into a series of slack water environments that are connected hydrologically, but quite isolated biologically. The low velocity impoundments often have non-stratified deep environments with fine sediments, elevated dissolved atmospheric gases, and unnatural flow regimes (CCT et al. 2000). Currently, the Hanford Reach RM 341 to 396 (RK 549 to 639), downstream of the IMP, remains the most significant lotic mainstem habitat within the United States upstream of Bonneville Dam (Dauble et al. 2003). The only other lotic mainstem habitat is a short reach (15 miles) found between the upstream end of Lake Roosevelt and the border with Canada.

In addition to the federal hydropower system, numerous private dams have been constructed in the province. These facilities also converted flowing rivers into slow moving reservoirs with higher temperatures and lower dissolved oxygen levels than found in flowing rivers. In addition, large storage dams built in Canada in the 1960s dramatically changed flow regimes in the upper Columbia River system.

The development of hydropower and the cheap electricity it generated helped promote rapid economic expansion within the Columbia River Basin, which resulted in secondary impacts to fisheries resources. The region's economy shifted from river- and salmon-based to agrarian-based and industrial-based. The economic shift resulted in increased extractive uses of the natural resources. Consumptive use of natural resources is closely associated with aquatic and terrestrial habitat degradation.

Also devastating to the native fish has been the introduction of no fewer than 21 exotic fish species that out-compete or directly prey on native species adding further harm to the native species. Additionally, the reservoirs benefit nonnative species, which further increase nonnative pressure on native species. At present only remnant populations of native resident salmonids remain, including Interior Columbia River redband trout, cutthroat trout, bull trout, and mountain whitefish.

Another impact of the loss of anadromous salmon has only recently been recognized, that is the consequences of the loss of nutrient transport from oceans to freshwater environments (Stockner and Ashley 2003). When migratory adult fish leave their ocean rearing grounds and migrate to lakes, rivers, and streams to spawn, they convey nutrients from one location to another. Since Pacific salmon die within a few days of spawning, the nutrients contained in their carcasses become available to the ecosystem, sometimes far inland from where the nutrients were derived. These salmon-transported nutrients are important for the maintenance of ecosystem biodiversity and fish production (Stockner and Ashley 2003).

Murota (2003) reviewed historic Pacific salmon escapement data for British Columbia and concluded that annual average nitrogen uploading was about 2,400 metric tons and average annual phosphorus loading was about 300 metric tons. No similar statistics are currently available for the IMP. However, Thomas et al. (2003) reviewed the role of marine-derived nutrients in Idaho streams and concluded that nutrient delivery by anadromous salmon may have been ecologically significant under historic spawning densities. It is clear that the loss of anadromous salmon must have resulted in very significant nutrient losses to both aquatic and terrestrial ecosystems in the IMP.

Biological changes created by dams are substantial and well documented (Allen 1995). Allen states, "that because of reduced and altered river flow, dams help to sever the river's historic connection with its floodplain, leading to reduced productivity in both habitats." The flood-pulse concept identifies that fish production is strongly dependent on regular inundation of the floodplain (Junk et al. 1989). The river exchanges material and nutrients between the terrestrial environment and aquatic environment creating a symbiotic effect. The river needs to purge itself of fine sediments and detritus and recruit new materials like large woody debris. The process of purge and recruit helps promote a healthy and diverse ecosystem.

Other processes such as hydrological interconnection with ground water are also reduced by dam operations, loss of floodplain connectivity, and irrigation withdrawals that are common in the IMP. Hydrologic function is also impacted by timber harvest, roads, and human development in terrestrial environments. The rate and duration of water entering stream channels is altered and this modifies stream morphology, channel structure, and sediment loads. Changes in vegetation and ground cover can impact hydrological and climatic conditions on a localized basis. All of these activities are associated with the development of the FCRPS and the landscape-wide changes that have occurred as a result. The regulation of free-flowing rivers clearly brings about fundamental change in the structure and function of ecosystems and the fish and wildlife resources that rely on them.

In creating subbasin plans, and to properly manage and rehabilitate damages to the ecosystem that have occurred in the Columbia River basin, the concept of fish and wildlife and ecological function must be merged into one thought. This approach will be used to address synergies between fish and wildlife activities by addressing habitat needs. However, the extent of the impacts such as increasing human demands, a history of established processes, and legal issues make this type of planning difficult. The altered environments in the IMP will exist long into the future as will the need to mitigate for the historic, current and future impacts created by the FCRPS. The subbasin plans are intended to simply guide efforts in a manner that will progress toward future ecosystem improvements.

1.4.2 Terrestrial Resources

Development and operation of the federal hydrosystem resulted in direct effects on wildlife populations and habitats through construction of facilities and reservoir

inundation. Wildlife continue to be affected via operational and secondary, or indirect, effects. Population growth and the combined effects of industrial, agricultural, and residential development also have had widespread effects on wildlife and their habitats in the IMP. Much of the province has been converted to developed and agricultural land uses, the majority of forest stands are managed for timber production, naturally-occurring fires have been suppressed, and human presence provides a source of disturbance to native wildlife. Habitat conversion and degradation are the two primary limiting factors to native focal wildlife species in the province. Although some of the direct effects can clearly be linked to the FCRPS, secondary effects of the hydrosystem are tightly intermingled with the effects of other land uses in the province.

Comparison of current to historic habitat conditions in the IMP shows that habitats have been greatly modified through direct and secondary effects of the FCRPS and through other land uses and development. Habitat conversion is most evident in the lands currently mapped as urban (about 1 percent of the province) and those mapped as agriculture/pasture/mixed development (about 12 percent of the province).

Chief Joseph and Grand Coulee dams inundated over 200 miles of the Columbia River and portions of many confluent tributary streams and rivers. Riparian habitat, wetlands, alluvial habitat, and estuaries were inundated along the downstream reaches of these rivers and streams. Loss of riparian and wetland habitat also occurred at Albeni Falls, where the reservoir inundated several miles of the Pend Oreille and Clark Fork rivers and shoreline along Lake Pend Oreille. Numerous other non-FCRPS projects located in the IMP contributed to province-wide reductions in riparian habitat. The riverine, riparian, and wetland habitats that were inundated by construction of the hydropower system are habitats with unusually high value to wildlife.

The function of remaining riparian and wetland habitats is in many cases lower than the historic condition. Timber harvest and grazing have caused changes in the soil structure and vegetation cover of riparian zones; loss of mature trees and reduction in large-diameter standing dead and downed trees are examples of changes to the habitat elements in riparian zones. Roads, agriculture, and other human developments are often located within riparian zones because of topography or proximity to water. Reduced riparian zone flooding and fluctuating water levels from reservoir flood control operations are also having continuing impacts on riparian gallery forests and backwater sloughs.

Grasslands in the IMP are estimated to have decreased in area by 19 percent from the historic condition. Grasslands have been modified through dryland and irrigated agriculture, grazing, urbanization, construction of dams for hydroelectric power, irrigation, and flood control.

Shrub-steppe habitats have decreased in area 22 percent from the historic condition, primarily due to agriculture and grazing, and to a lesser extent due to inundation by impoundments. Both the Chief Joseph and Grand Coulee projects resulted in inundation of steppe habitat.

Forested habitats in the IMP have been altered by conversion to non-vegetated habitats and by modification of the vegetative cover. Eastside mixed conifer forest shows a gain of 38 percent from the historic condition, due primarily to forest management and fire suppression which promote shade-tolerant species and reduce the occurrence of shade-intolerant species. All three of the federal hydrosystem projects in the IMP inundated eastside mixed conifer forests. Lower elevation ponderosa pine habitats show a decrease of 66 percent from the historic period. These habitats have been reduced in area by urbanization, grazing, agriculture, timber harvest, and development of hydroelectric, irrigation, and flood control projects. Both the Chief Joseph and Grand Coulee projects inundated significant areas of ponderosa pine.

Western juniper and mountain mahogany woodlands are absent in the current condition mapping, a complete loss of the habitat type. In the IMP, this habitat was located primarily in the Lake Rufus Woods and Upper Columbia subbasins in areas affected by hydroelectric project development, grazing, and agriculture. Higher elevation forested habitat types such as upland aspen and lodgepole pine forest were unlikely to have been inundated by hydroelectric project construction, but secondary impacts of the hydrosystem may affect the current distribution of these habitat types.

The Northwest Power Act of 1980 requires that measures be implemented to protect, mitigate, and enhance wildlife affected by the development and operation of hydropower projects on the Columbia River System. The Council's Fish and Wildlife Program has included measures and implemented projects to obtain and protect habitat units in mitigation for these calculated construction and inundation losses. Operational and secondary losses have not been estimated or addressed. However, the Fish and Wildlife Program includes a commitment to mitigate for these losses.

Habitat loss assessments were conducted to evaluate the effects of federal hydrosystem project construction and reservoir inundation on wildlife. The loss assessments are available in standard references known as "Brown Books" (Kuehn and Berger 1992; Creveling and Renfrow 1986; Martin et al. 1988). Each assessment reported the number of acres of habitat types that were affected (refer to Table 4.16). In addition, the Habitat Evaluation Procedures (HEP) methodology developed by the USFWS was used to evaluate the quantity and quality of wildlife habitats affected. The HEP models provided an estimate of the value of the lost habitats to various indicator species of wildlife. HEP models provide results in terms of Habitat Units, which are units of value based on both quality and quantity of habitat. Progress made to date toward implementing the recommended mitigation strategies for the direct construction losses is summarized below in terms of Habitat Units by species by hydropower project (Table 1.1).

Table 1.1. Status of mitigation for construction and inundation wildlife-habitat losses: HEP Habitat Units (HUs)

Project	Species	HUs lost	HUs acquired	Percent complete
Chief Joseph[1]				
	Total all species	8,833	1,433	16.2%

Project	Species	HUs lost	HUs acquired	Percent complete
Grand Coulee[2]				
	Total all species	111,785	56,680	50.7%
Albeni Falls[3]				
	Total all species	28,658	4,822	16.7%

[1] BPA 2002
[2] WDFW 2004
[3] KT 2004

Completion of the construction loss mitigation is the highest priority for the IMP. The riverine, riparian, and wetland habitats affected are habitats with unusually high value to fish and wildlife. Other habitats, such as shrub-steppe, are in relatively low quantity and/or quality in the province. The projects were constructed between 1938 (Grand Coulee), 1952 (Albeni Falls) and 1955 (Chief Joseph). Wildlife-habitat losses remained unmitigated until after implementation of the Northwest Power Act and completion of the loss assessment studies. At this time, mitigation for the Albeni Falls Project is approximately 17 percent complete, Grand Coulee is 51 percent complete, and Chief Joseph is 16 percent complete. Losses have affected wildlife each year since the projects were constructed, and will continue to affect wildlife each year that they remain unmitigated.

Operational impact assessments have not been conducted for any of the three FCRPS hydroelectric projects. This Subbasin Plan identifies the types of operational effects that may occur, and proposes a schedule for performance of assessments, development of mitigation plans, and implementation of mitigative actions for each of the three federal projects.

Assessments of secondary effects of hydroelectric development for the three IMP federal hydroelectric projects have not been prepared. Secondary effects of FCRPS development in the IMP are wide-reaching and are intermingled with effects of other land use developments. This Subbasin Plan identifies the types of secondary habitat and wildlife species effects that have occurred as a result of federal hydrosystem development and other human uses in the province, and describes subbasin objectives for wildlife and wildlife-habitat protection, restoration, and mitigation based on consideration of current conditions of wildlife populations and habitat.

1.5 Out-of-Basin Effects

The San Poil and Coeur d' Alene subbasins are headwaters subbasins and so are not subject to impacts from other upstream subbasins. The other four subbasins in the IMP are all downstream of other Columbia River subbasins that have the potential to affect water quality, quantity, and migratory fish and wildlife. The Pend Oreille Subbasin is downstream of the Clark Fork River in Montana. The Upper Columbia Subbasin is downstream of the Columbia and Kootenai rivers in British Columbia and Montana. The Lake Rufus Woods Subbasin is downstream of all subbasins in the IMP but includes the Nespelem River watershed that is a headwater watershed.

1.5.1 Upstream Pollutant Sources

Teck Cominco Ltd. owns the smelter at Trail, British Columbia which released approximately 360 metric tons per day of smelter slag into the Columbia River from 1900 to 1998 (USGS 2004). Contamination has been found downstream in the U.S. portions of Lake Roosevelt. A study by the USGS reported that Lake Roosevelt bed sediments were contaminated with arsenic, lead, and other metals based upon high concentrations, impaired benthic invertebrate communities, and laboratory sediment bioassays (USGS 2004). The impacts of the contaminants on aquatic life have not been well documented.

In 1999, the Colville Tribes petitioned the Environmental Protection Agency (EPA) to conduct an assessment at the Upper Columbia River. The petition expressed concerns about risks to human health and to the health of the environment from contamination in the river. In December 2000, EPA completed a preliminary assessment of the Upper Columbia River and determined that a sampling investigation was necessary. In mid-2001, EPA collected samples from the Upper Columbia River to learn more about the types and amounts of pollution in the sediments. The results of the sampling were released in November 2002 in a draft Site Inspection Report. Sampling results suggest that further investigation of contamination in the Upper Columbia River is warranted.

Negotiations about cleanup measures are ongoing. In December 2002, the U.S. Environmental Protection Agency asked Teck Cominco to pay for a study of the contamination. However, jurisdictional issues remain and, as of this writing (February 2004), no agreement on studies or cleanup has been reached. In 2004, EPA is contracting a six-part study of existing information on the river. Also, the USGS is continuing to study the effects of airborne contaminants.

1.5.2 Upstream Dams

Several large dams are upstream of the IMP, including Hungry Horse, Libby, Mica, Keenleyside, and Revelstoke dams. These dams have modified flow regimes in the Pend Oreille, Kootenai, and Columbia rivers in the IMP. The exact effect of these modified flow regimes on fish and wildlife has not been quantified. However, in general it is known that the timing, duration, and magnitude of normal high and low flow periods have changed. Rapidly shifting intra-daily fluctuations dramatically alter the historic hydrograph of all river systems where hydroelectric generation occurs. These changes have resulted in changes in the abundance and species composition of fisheries in downstream areas.

These dams also affect water quality. For example, elevated water temperatures in the winter have impacted spawning habitat for burbot in the Kootenai River below Libby Dam (Paragamian 1993). Spill over the dam results in increases in total dissolved gases (TDG) to levels in excess of saturation. High levels of TDG can cause gas bubble disease (GBD), which can injure or kill fish. Water quality studies have found that TDG levels in the Columbia River exceed the water quality standards established by Washington, Oregon, the Colville Tribes, and the Spokane Tribe of Indians. Work is currently underway to establish a Total Maximum Daily Load (TMDL) for TDG and other pollutants in the Columbia River.

1.5.3 Climatic Events

Changes in climate can have major impacts on fish, wildlife, and plant species. Data suggests that the precipitation that has fallen in the Washington Cascades has shifted from mainly snowfall to more rain over the last 20 years. The change in precipitation form has major impacts to the way dams are operated and runoff patterns. Smaller spring runoff influences: reservoir fill-rates, channel geomorphology, and flood frequency altering ecosystem structure and function. Drought conditions become more frequent making water less available to fish and wildlife thus limiting habitat quantity. Global warming even at a small increase in temperature could have a major impact on coldwater fish that inhabit desert or arid environments where high summer water temperatures currently and historically are stressful to fish. Although such factors are impossible to address at the subbasin or even provincial scales, their influence on ecosystems has the potential to overshadow the results of efforts outlined in this plan.

1.5.4 International Issues

Two of the subbasins in the IMP, the Pend Oreille and the Upper Columbia, include portions of Canada, complicating coordination of fish and wildlife management. Canadian representatives were invited to participate in the Subbasin Work Teams, but most were unable to because of time and budget constraints. However, there are some objectives in the Pend Oreille Subbasin Management Plan that address bull trout concerns in the Canadian portion of the subbasin. These objectives were initially suggested by Canadian representatives. In addition, a Canadian representative from Teck Cominco was a member of the Upper Columbia Subbasin Work Team.

1.6 Organization of this Document

The document begins with an executive summary summarizing the key elements of the planning process and features of this plan (Table 1.6-1). Section 1 provides an overview of the planning process and its participants, and a review of aquatic and terrestrial resources on the province scale. Section 1 also describes the methods used by the planning participants to develop the assessments, inventories, and management plans.

Section 2 contains the province level inventory and management plan for the IMP, including the province level vision, guiding principles, objectives, and strategies. The province level plan tiers to the Council's 2000 Fish and Wildlife Program vision, scientific principles, and objectives (refer to Appendix A); it also provides the framework within which each of the six IMP subbasin management plans were developed.

Section 3 includes the assessment of aquatic resources in the province, and Section 4 includes the assessment of terrestrial resources in the province. The specific methodologies and data sources used for the assessments are described in the respective sections.

Sections 5 through 52 are organized by subbasin, beginning with the Coeur d'Alene, Pend Oreille, and Spokane subbasins, and followed by the Upper Columbia, San Poil, and Lake Rufus Woods subbasins. These sections present the subbasin-specific

assessment information and inventories of current and historic programs for aquatic and terrestrial resources, respectively. The management plan follows, incorporating subbasin objectives and strategies for both aquatic and terrestrial resources. Sections 5 to 11 cover the Coeur d' Alene Subbasin; Sections 12 to 19 cover the Pend Oreille Subbasin; Sections 20 to 27 cover the Spokane Subbasin; Sections 28 to 35 cover the Upper Columbia Subbasin; Sections 36 to 43 cover the San Poil Subbasin; and Sections 44 to 52 cover the Lake Rufus Woods Subbasin. References are located in Section 53.

A variety of appendices have been prepared to provide additional useful information to the reader. Appendix A provides key elements of the Council's approach to Fish and Wildlife Subbasin Planning that emerged from their 2000 Fish and Wildlife Plan, including the vision, assumptions for planning, scientific principles, and biological objectives. Appendix B is a quick reference to the acronyms used in this document. Appendix C is a list of the province level focal wildlife species analyzed in Section 4. Appendix D shows the degree of association between focal wildlife species and specific habitats used for breeding. Appendix E shows the critical ecological functions provided by certain focal wildlife species. Appendix F includes a list of alternative funding sources (non-BPA) for future projects. Appendix G presents recent wildlife harvest data for key species in each of the subbasins. Appendix H is a summary of ongoing or recently completed projects in the IMP. Appendix I includes the references for the Research, Monitoring, and Evaluation Plan. Appendix J includes copies of the comment letters that were received on the third and fourth draft.

Table 1.6-1. Organization of this document

Section	Contents
Executive Summary	Summary of Key Elements of the Plan
1	Overview of IMP and Subbasin Planning
2	Province Level Management Plan and Inventory
3	Province Level Assessment of Aquatic Resources
4	Province Level Assessment of Terrestrial Resources
5 through 12	Coeur d' Alene Subbasin
13 through 20	Pend Oreille Subbasin
21 though 28	Spokane Subbasin
29 through 36	Upper Columbia Subbasin
37 through 44	San Poil Subbasin
45 through 52	Lake Rufus Woods Subbasin
53	References
Appendix A	2000 Fish and Wildlife Plan
Appendix B	Acronym Index
Appendix C	Province Level Focal Species
Appendix D	Association Between Focal Wildlife Species and Specific Habitats Used for Breeding
Appendix E	Critical Ecological Functions Provided by Certain Focal Wildlife Species
Appendix F	Alternative Funding Sources (Non-BPA) for Future Projects
Appendix G	Recent Wildlife Harvest Data
Appendix H	Summary of Ongoing or Recently Completed Projects in the IMP
Appendix I	References for Research, Monitoring, and Evaluation Plan
Appendix J	Comments Received on Third and Fourth Draft

SECTION 2 – Table of Contents

2 Province Management Plan and Inventory

The *Technical Guide for Subbasin Planners* states that the Subbasin Management Plan is the heart of the Subbasin Plan. The primary goal of the planning effort is to define the environmental and biological *vision, objectives, and strategies* specific to fish and wildlife within the Columbia River Basin. The management plan should take on a 10-15 year planning horizon. The Oversight Committee for the Intermountain Province (IMP) has decided on a ten-year planning horizon, although this does not preclude the development of objectives with a longer time frame.

In the IMP, a provincial approach was taken to subbasin planning. As a result, this section of the document presents a vision, objectives, and strategies that will apply to the entire IMP. In addition, there are subbasin-specific visions, objectives, and strategies for each of the six subbasins. The subbasin specific management plans are found in the subbasin-specific sections of this document.

This plan was developed in an open public process, which provided opportunities for participation by a wide range of state, federal, Tribal and local managers, experts, landowners, local governments, and stakeholders. The process used in the IMP to develop the management plan is described in more detail in Section 1.

2.1 Vision and Guiding Principles for the Intermountain Province

The *Technical Guide for Subbasin Planners* states that, "The Vision describes the desired future condition in terms of a common goal for the subbasin. The vision is qualitative and should reflect the policies, legal requirements and local conditions, values and priorities of the subbasin in a manner that is consistent with the vision described for the Columbia Basin in the Northwest Power and Conservation Council's (Council) program. The vision will provide the guidance and priority for implementing actions in the future, therefore driving the development of biological objectives and strategies for the subbasin."

In March 2003 the IMP Oversight Committee (OC) and interested stakeholders met to develop the province level vision and objectives for the IMP. The following is the vision statement for the IMP:

> ***"We envision the Intermountain Province being comprised of and supporting viable, diverse, fish and wildlife populations, and their habitats that contribute to the social, cultural, and economic wellbeing of the Pacific Northwest."***

The OC also developed the following guiding principles:

- The role of the IMP OC is to facilitate development of subbasin plans at the subbasin level.
- Public outreach is essential for successful plan development and implementation.
- Human interests can be balanced with fish and wildlife needs.
- All people are stewards for future generations.

- Integrated subbasin plans should consider ecological, not political, boundaries.
- Subbasin plans will address cultural and subsistence issues.
- Subbasin planning should be consistent with the Northwest Power Act, the Council's Fish and Wildlife Program and technical guidance for subbasin planning, while complementing existing plans, policies, and planning efforts.
- Wildlife species and habitat should be managed in perpetuity based on scientific, ecological, and biological principles.

The supporting objectives developed by the OC are:

- Manage the natural resources of the province for human use and healthy environment.
- Emphasize ecological principles and apply an inclusive approach to restore, enhance, and maintain fish and wildlife and their habitats and our quality of life.
- Include monitoring, research, and adaptive management to support achievement of the vision.
- Develop subbasin plans within the framework of the Northwest Power Act, the Council's Fish and Wildlife Program, and subbasin technical advice.

2.2 Intermountain Province Working Hypothesis and Limiting Factors

A working hypothesis summarizes a scientifically based understanding of the subbasin at the time the Management Plan was developed and begins to bridge the gap between the science and strategies (Council 2001). The working hypothesis is used to evaluate and derive biological objectives and strategies in relation to the subbasin vision.

The connection between the IMP working hypothesis, the limiting factors in the IMP, and the IMP objectives is displayed in Figure 2.1. The purpose of this figure is to visually display the linkage between the working hypothesis, limiting factors, and biological objectives. It is also designed to depict the connection to the Council's 2000 Fish and Wildlife Plan. In the IMP, the overarching working hypothesis for the province is that the major hydroelectric facilities in, and upstream of, the IMP are expected to remain in place for the life of the IMP Subbasin Plan. In Figure 2.1, the overarching working hypothesis is displayed in the blue box at the top of the first sheet. The corollaries to this hypothesis are:

(1) Anadromous fisheries will not be restored in the IMP during the 10-year planning period (with the possible exception of experimental actions).
(2) The reservoirs will continue to inundate fish and wildlife-habitats.
(3) Operational impacts of the hydroelectric projects will continue to occur to fish, wildlife, and their habitats.
(4) Secondary impacts of the hydroelectric projects will continue to affect fish, wildlife, and their habitats.

The working hypothesis is based on the expectation that the major hydroelectric facilities in the IMP, both FCRPS and FERC-licensed, are relatively permanent structures, and are

likely to remain in place for the foreseeable future. In addition, restoration of anadromy in the IMP is a complex issue that is not likely to be resolved in the first 10-year planning period of the subbasin plan. While experimental fish passage facilities could be installed and tested within the next ten years, it is unlikely that significant restoration of anadromous fish runs will occur in this time frame. Thus, four major types of effects are expected to continue to influence fish and wildlife of the IMP: loss of anadromous fish, inundation of fish and wildlife-habitats, operational effects of the projects, and secondary effects of the projects. The four major types of effects of the dams are displayed on sheet 1 of Figure 2.1 with the resulting impacts depicted in subsequent pages.

The continued loss of anadromous fish results in (sheet 2 of Figure 2.1):

- Continued loss of marine-derived nutrients to the aquatic and terrestrial resource. This leads to:
    - Continued reduction of fish and wildlife abundance and diversity
- Subsistence salmon fishing loss continues. This leads to:
    - Tribal loss of traditions and values
    - Tribal loss of culture and ceremony
    - Tribal loss of gatherings and ways of life
    - Tribal loss of a healthy food resource
    - Increased Tribal harvest of wildlife and resident fish
    - Increased pressure on game species of wildlife
    - Continued reduction of fish and wildlife abundance and diversity
- Fishing continues to be limited to resident fish species. This leads to:
    - Continued decrease in fishing opportunities
    - Increased fishing pressure on resident fish

The operational impacts of the dams and reservoirs include, but are not limited to (sheet 4 of Figure 2.1):

- Loss of spawning habitat.
- Continuing shoreline erosion
- Continued loss of riparian and littoral habitats
- Modified hydrographs impact riparian/wetland areas, fish habitat, and fluvial processes
- Disruption of hydrologic connectivity between river and floodplains
- Change in pioneering species recruitment
- Altered aquatic/terrestrial primary and secondary production
- Continued fish entrainment
- Elevated total dissolved gas
- Changes in flood frequency
- Creation of fish passage barriers

The reservoirs affect fish and wildlife through (sheet 3 of Figure 2.1):

- Declining water quality
- Loss of terrestrial habitats, including wetlands, riparian areas, and uplands
- Loss of cold aquatic riverine habitats which continue to be replaced by warmer water reservoir habitats supporting nonnative fishes

- Connectivity of native fish and wildlife-habitats continues to be disrupted by reservoirs
- Nutrient sinks
- Loss of habitat diversity

The secondary impacts of the hydrosystem include (sheet 5 of Figure 2.1):

- Flood Control
    - Past flooded areas available for development
        - Aesthetics of river and open water
        - Agricultural conversions of highly fertile floodplain/wetlands
        - Increased access to river
- Low cost electricity continues to provide economic growth incentive in IMP. This leads to:
    - More people live and work in the IMP. This leads to:
        - Hunting, fishing, and recreation pressure continues to increase.
        - Increased human demands for water resulting in loss of aquatic habitat and hydrologic function.
        - Increased pollution
        - Changes in plant community and diversity
        - Increased road densities
        - Increased human development of fish and wildlife-habitats
        - Increased conflicts between fish, wildlife, and humans
        - Increased need for regulation, management, habitat protection, habitat restoration, and use of hatcheries

The impact of all this is that fish and wildlife-habitat continues to decrease and the abundance of fish and wildlife declines as a result of hydroelectric development in the IMP. The loss of anadromous fish has forced local fisheries managers to substitute resident fish for anadromous fish, an approach that has been recognized and supported in the Council's Fish and Wildlife Program. In addition, habitat degradation has, in some situations, forced fisheries managers to manage for nonnative fishes rather than native fishes. The selection of focal fish species in the IMP reflects both the desire to re-establish anadromous fish and to manage for native resident fish, and the realistic necessity of managing for nonnative fish.

The objectives developed for the IMP help to address the above impacts from the development, operations, and indirect influences of the FCRPS are designed to address known limiting factors for fish and wildlife. The objectives also attempt to balance the human uses with environmental requirements for fish and wildlife by using an inclusive process involving all stakeholders.

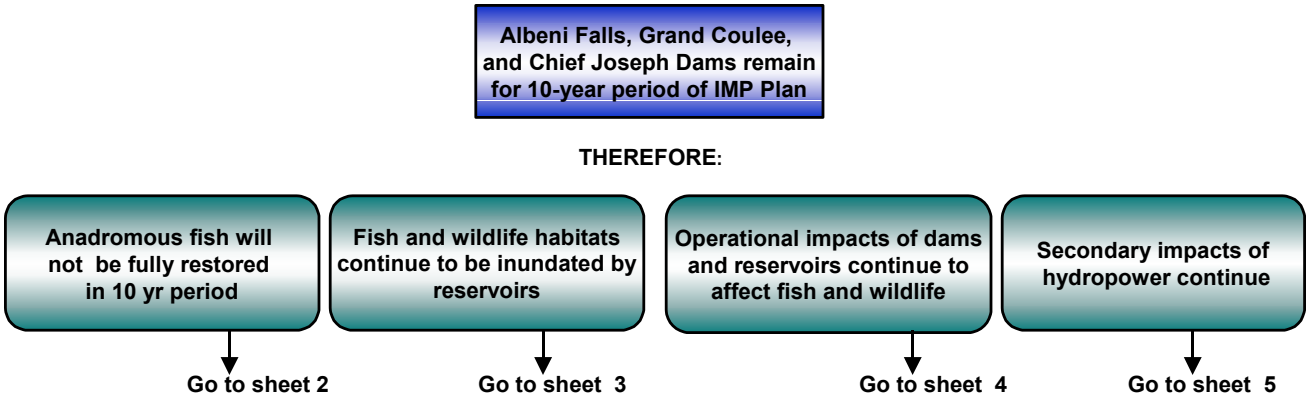

Figure 2.1, Sheet 1. IMP working hypothesis. Plan hypothesis is that the hydroelectric facilities will remain in place for the life of the plan. This will lead to limiting factors which are addressed by objectives in the IMP Management Plan.

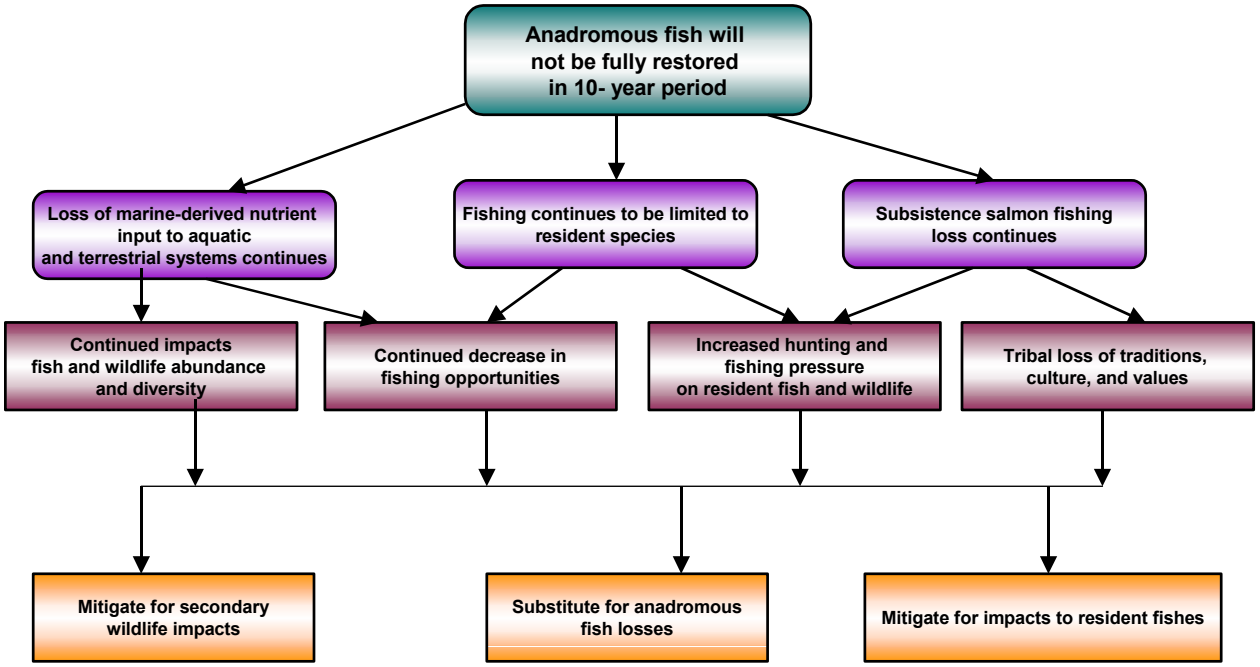

Figure 2.1, Sheet 2. IMP working hypothesis. Loss of the anadromous life history leads to limiting factors which are addressed by objectives in the IMP Management Plan.

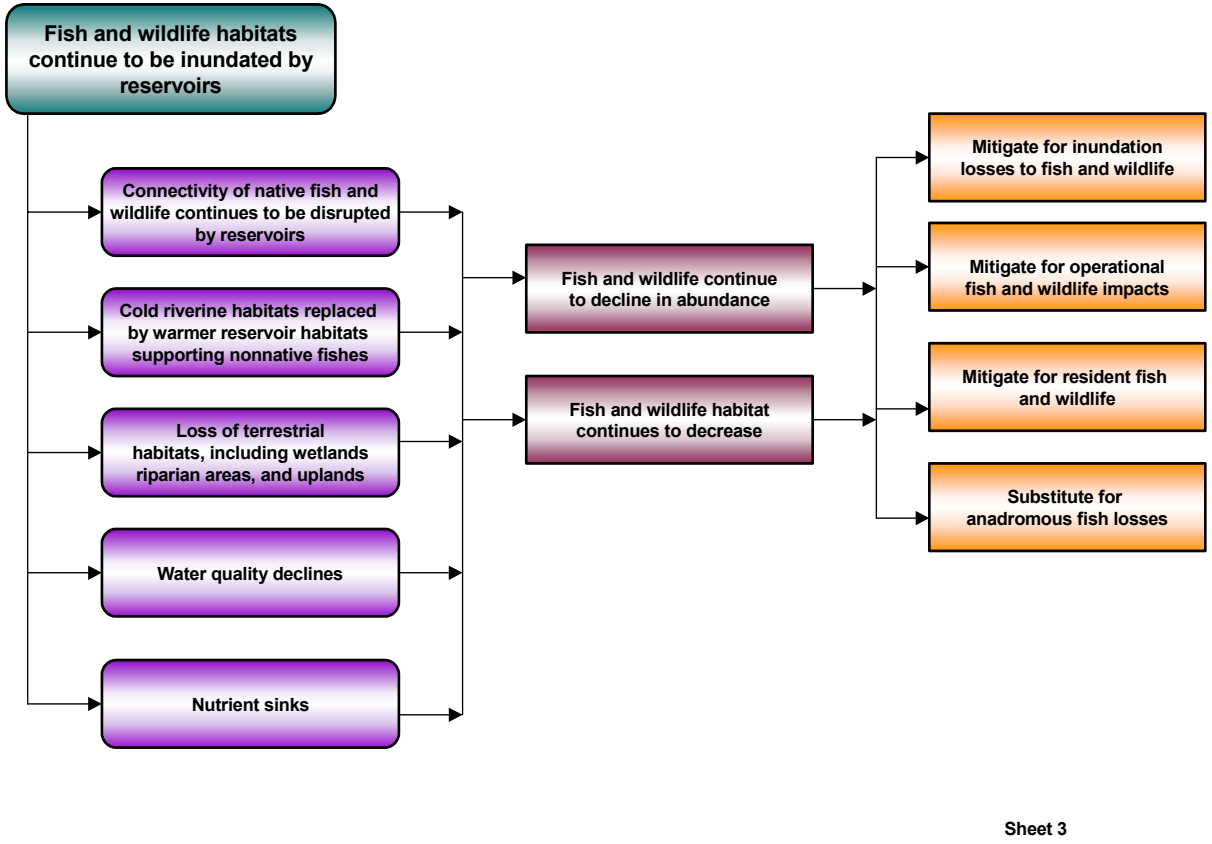

Figure 2.1, Sheet 3. IMP working hypothesis. Construction of the dams inundates land and rivers and leads to limiting factors which are addressed by objectives in the IMP Management Plan.

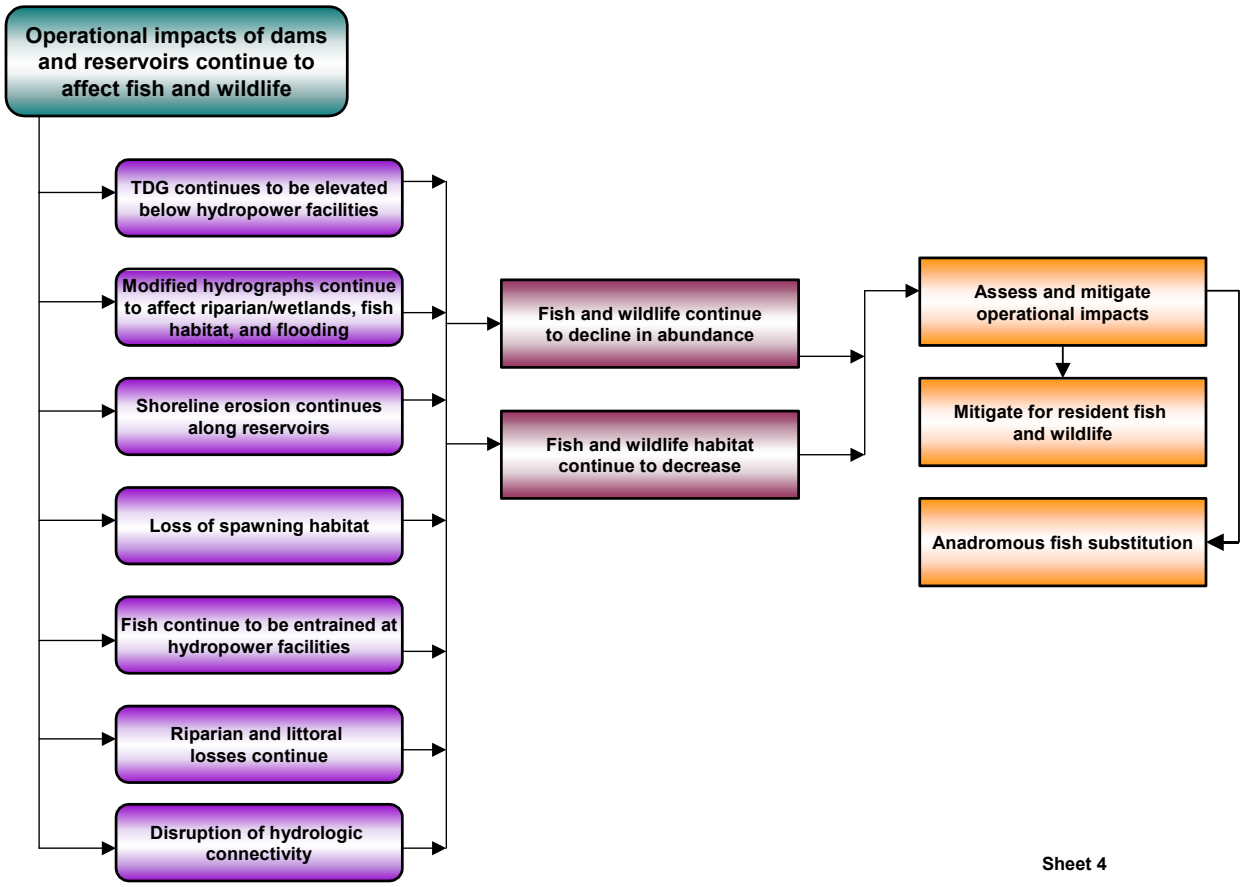

Figure 2.1, Sheet 4. IMP working hypothesis. Operational impacts of the hydropower system lead to limiting factors which are addressed by objectives in the IMP Management Plan.

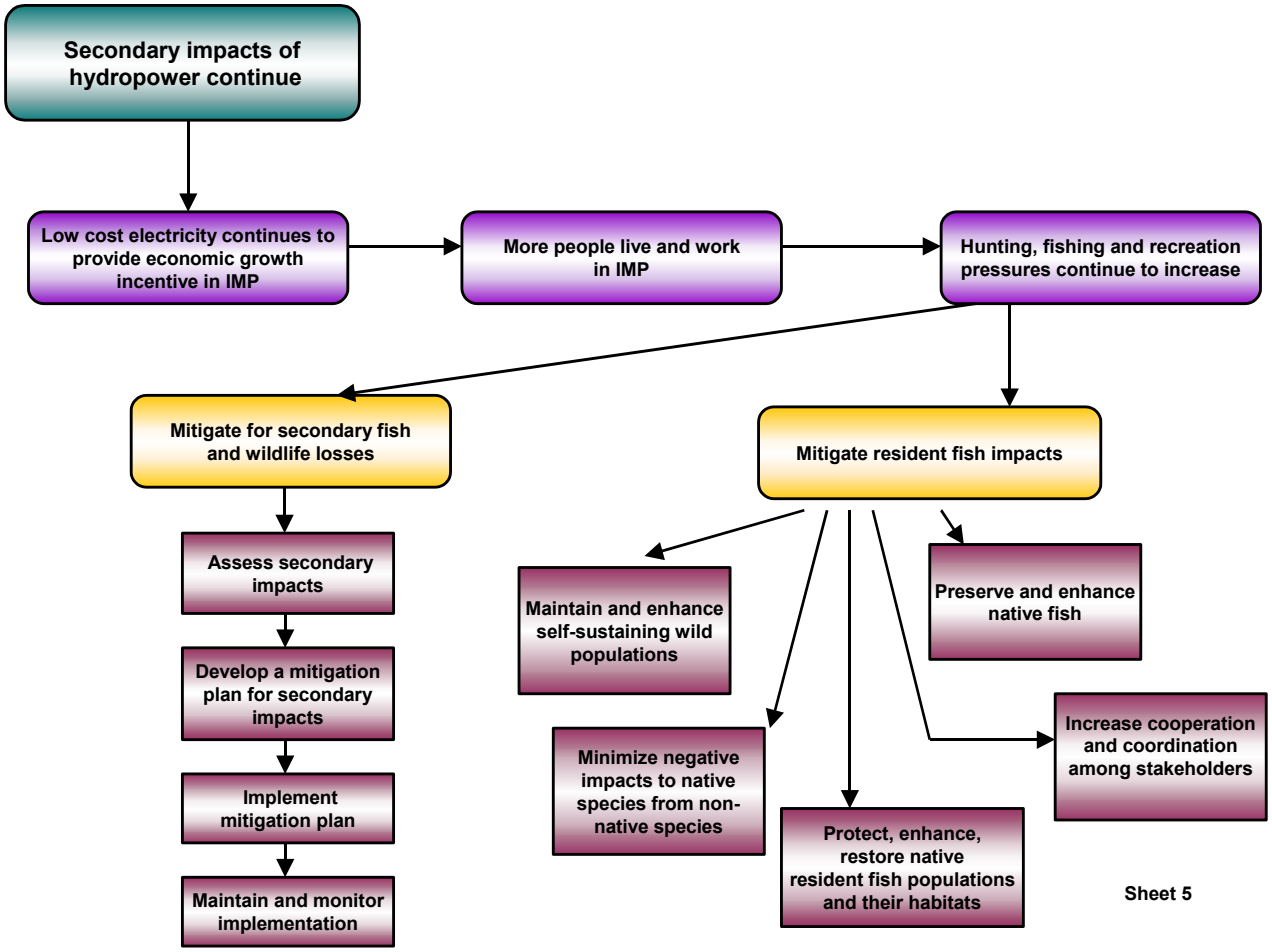

Figure 2.1, Sheet 5. IMP working hypothesis. Secondary impacts of the hydropower system lead to limiting factors which are addressed by objectives in the IMP Management Plan.

2.3 Objectives for the Intermountain Province

The *Technical Guide for Subbasin Planners* states that, "The initial assessments along with the vision will guide the focus of the biological objectives. Biological objectives should clearly describe physical and biological changes needed to achieve the vision in a quantifiable fashion."

The *Technical Guide for Subbasin Planners* further states that, "Strategies are developed to achieve biological objectives. Implementing strategies should be aimed at addressing the limiting factors that will accomplish the biological objectives. Strategies identified within the subbasin plans will be used as a basis for Council recommendations to the Bonneville Power Administration regarding project funding. There may be several different strategies with a subbasin that are selected to meet the biological objectives that will vary depending on the condition of the populations and habitat."

In the IMP, biological objectives were developed for the province that describe intended accomplishments for fish and wildlife and their habitats. The strategies are tools to be used to meet the objectives. That is, the objectives list what is wanted and the strategies list how to get there.

Biological objectives for the IMP were developed using a tiered approach, with subbasin level biological objectives grouped under province level objectives, which are in turn grouped under Columbia River Basin biological objectives (Figure 2.3-1). The basin level objectives were identified through review of the Council's 2000 Fish and Wildlife Program. Province level biological objectives are grouped based on the basin level objectives. By tiering the objectives into subbasin, province and basin levels, objectives were being developed that were consistent with the Council's Fish and Wildlife program. In addition, the linkage between the Council's objectives and the IMP objectives is clearly displayed.

The purpose of Figure 2.3-1 is to depict how the Council's 2000 Fish and Wildlife Program were based on eight scientific principles. The objectives in the Fish and Wildlife Program are referred to in this plan as the Columbia River Basin Goals. The province level objectives were developed by the OC to cover the entire IMP. These objectives are described in the plan in sections 2.3.1 and 2.3.2. The subbasin objectives are prioritized and they tier to the provincial objectives. They are summarized in tables for each subbasin as listed on Figure 2.3-1. Strategies were developed at the subbasin level. They are also prioritized and are described in the subbasin management plans, as listed on Figure 2.3-1.

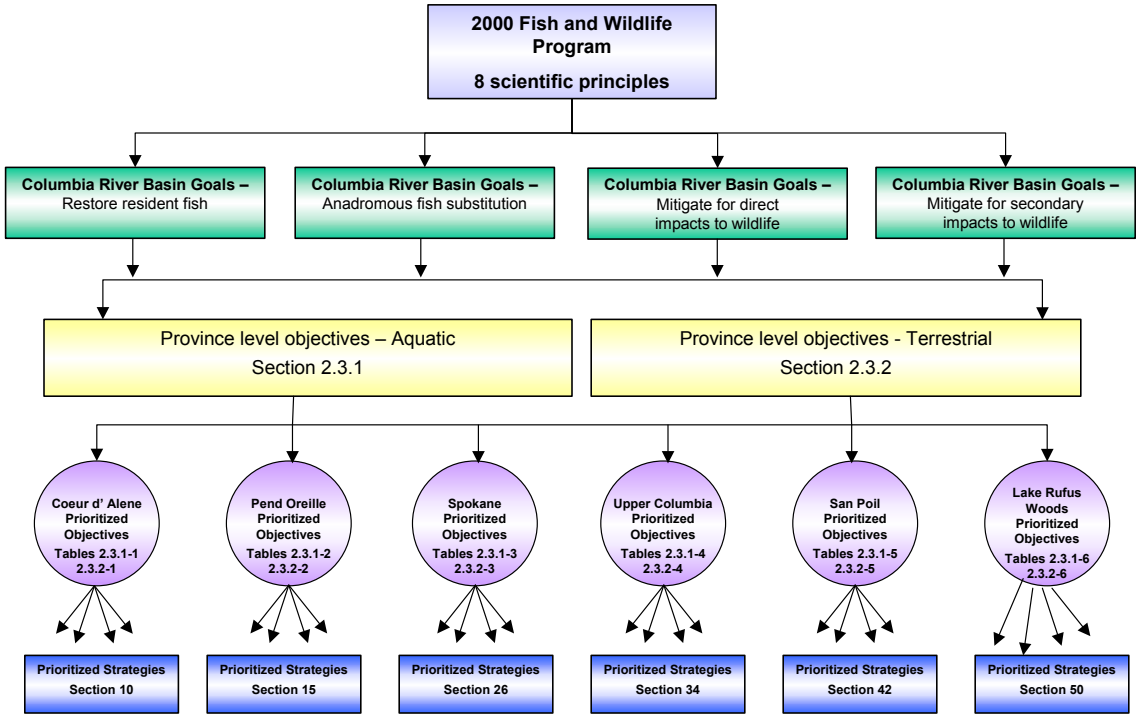

Figure 2.3-1. IMP objectives and strategies tiered from the Council's Fish and Wildlife Program

2.3.1 Province Level Aquatic Objectives

Columbia River Basin level aquatic resource objectives were developed by the Council in their 2000 Fish and Wildlife Program. The IMP has developed province level aquatic resource objectives that are tiered to the Columbia River Basin level goals. In addition, the six subbasins in the IMP developed subbasin specific objectives and strategies, which are tiered to both the Columbia River Basin and IMP goals.

These objectives are not prioritized. Objectives in Category 2 are equally as important as objectives in Category 1.

Columbia River Basin Level Category 1: Mitigate for resident fish losses.

Columbia River Basin Level Goal 1A:
Complete assessments of resident fish losses throughout the Columbia River Basin resulting from the federal and federally-licensed hydrosystem, expressed in terms of the various critical population characteristics of key resident fish species.

Province Level Objective 1A:
Fully mitigate[1] fish losses related to construction and operation of federally-licensed and federally operated hydropower projects.

Columbia River Basin Level Goal 1B:
Maintain and restore healthy ecosystems and watersheds, which preserve functional links among ecosystem elements to ensure the continued persistence, health and diversity of all species including game fish species, non-game fish species, and other organisms. Protect and expand habitat and ecosystem functions as the means to significantly increase the abundance, productivity, and life history diversity of resident fish at least to the extent that they have been affected by the development and operation of the federal and federally-licensed hydrosystem.

Province Level Objective 1B:
Protect and restore in-stream and riparian habitat to maintain functional ecosystems for resident fish, including addressing the chemical, biological, and physical factors influencing aquatic productivity.

Columbia River Basin Level Goal 1C:
Restore resident fish species (subspecies, stocks and populations) to near historic abundance throughout their historic ranges where suitable habitat conditions exist and/or where habitats can be restored

Province Level Objective 1C1:
Protect, enhance, restore, and increase distribution of native resident fish populations and their habitats in the IMP with primary emphasis on sensitive, native salmonid stocks.

Province Level Objective 1C2:
Maintain and enhance self-sustaining, wild populations of native game fish and subsistence species to provide for harvestable surplus.

Province Level Objective 1C3:
Minimize negative impacts (for example, competition, predation, introgression) to native species from nonnative species and stocks.

Province Level Objective 1C4:
Increase cooperation and coordination among stakeholders throughout the province.

Province Level Objective 1C5:
Meet and exceed the recovery plan goals for federally-listed threatened and endangered fish species[2].

Province Level Objective 1C6:

[1] The definition of full mitigation is provided in Section 2.3.1.3.

[2] The Draft Bull Trout Recovery Plan can be viewed at: http://pacific.fws.gov/bulltrout/

Restore resident fish **s**pecies (subspecies, stocks and populations) to near historic abundance throughout their historic ranges where suitable habitat conditions exist and/or where habitats can be restored

Columbia River Basin Level Category 2: Substitute for anadromous fish losses.

Columbia River Basin Level Goal 2A:
Restore resident fish species (subspecies, stocks and populations) to near historic abundance throughout their historic ranges where suitable habitat conditions exist and/or where habitats can be feasibly restored.

Province Level Objective 2A1:
Protect, enhance, restore, and increase distribution of native resident fish populations and their habitats in the IMP with primary emphasis on sensitive, native salmonid stocks.

Province Level Objective 2A2:
Maintain and enhance self-sustaining, wild populations of native game fish and subsistence species to provide for harvestable surplus.

Province Level Objective 2A3:
Minimize negative impacts (for example, competition, predation, introgression) to native species from nonnative species and stocks.

Province Level Objective 2A4:
Increase cooperation and coordination among stakeholders throughout the province.

Columbia River Basin Level Goal 2B:
Provide sufficient populations of fish and wildlife for abundant opportunities for Tribal trust and treaty right harvest and for non-Tribal harvest.

Province Level Objective 2B:
Focus restoration efforts on habitats and ecosystem conditions and functions that will allow for expanding and maintaining diversity within, and among, species in order to sustain a system of robust populations in the face of environmental variation.

Columbia River Basin Level Goal 2C:
Administer and increase opportunities for consumptive and non-consumptive resident fisheries for native, introduced, wild, and hatchery-reared stocks that are compatible with the continued persistence of native resident fish species and their restoration to near historic abundance (includes intensive fisheries within closed or isolated systems).

Province Level Objective 2C1:
Artificially produce sufficient salmonids to supplement consistent harvest to meet management objectives.

Province Level Objective 2C2:
Provide both short- and long-term harvest opportunities that support both subsistence activities and sport-angler harvest.

Columbia River Basin Level Goal 2D:
Reintroduce anadromous fish into blocked areas where feasible[3].

Province Level Objective 2D1:
Develop an anadromous fish reintroduction feasibility analysis by 2006 for Chief Joseph and by 2015 for Grand Coulee[4].

Province Level Objective 2D2:
Develop an implementation plan within five years of feasibility determination for each facility.

The USFWS noted that, from their perspective, both objectives 1C1 and 2A1 (and corresponding subbasin objectives) address bull trout recovery (J. Flory, USFWS, personal communication, May 6, 2004). The distinction between Category 1 (resident fish mitigation) and Category 2 (substitution for anadromous fish) and subsequent differences in subbasin prioritization of objectives, do not necessarily align with the USFWS priorities for bull trout recovery.

2.3.1.1 Discussion of Provincial Aquatic Objectives

The provincial aquatic objectives are designed to respond to the limiting factors identified for the IMP. Strategies and RM&E plans were developed at the subbasin level to correspond to the provincial and subbasin objectives. Figure 2.3-2 (sheets 1 to 7) shows an example of each of the aquatic provincial objectives, with examples of the strategies and RM&E that have been proposed to respond to that objective. This is not meant to be a comprehensive list of all the limiting factors, strategies, or RM&E proposals. Rather this figure is intended to illustrate the connection between the assessment and the management plan. (Refer to the subbasin specific management plan sections for the full list of objectives and strategies for each subbasin.)

[3] OC notes that "where feasible" is actual language from Council's Program.

[4] At this time the WDFW has no formal agency position, pro or con, on possible reintroduction and/or establishment of anadromous Chinook or steelhead above Grand Coulee Dam. Consideration for re-establishment of anadromous salmonid stocks above Grand Coulee Dam should be carefully evaluated in light of local subbasin habitat conditions, and potential impacts upon existing resident fish substitution programs currently in place to partially mitigate for the loss of historic anadromous fish resources.

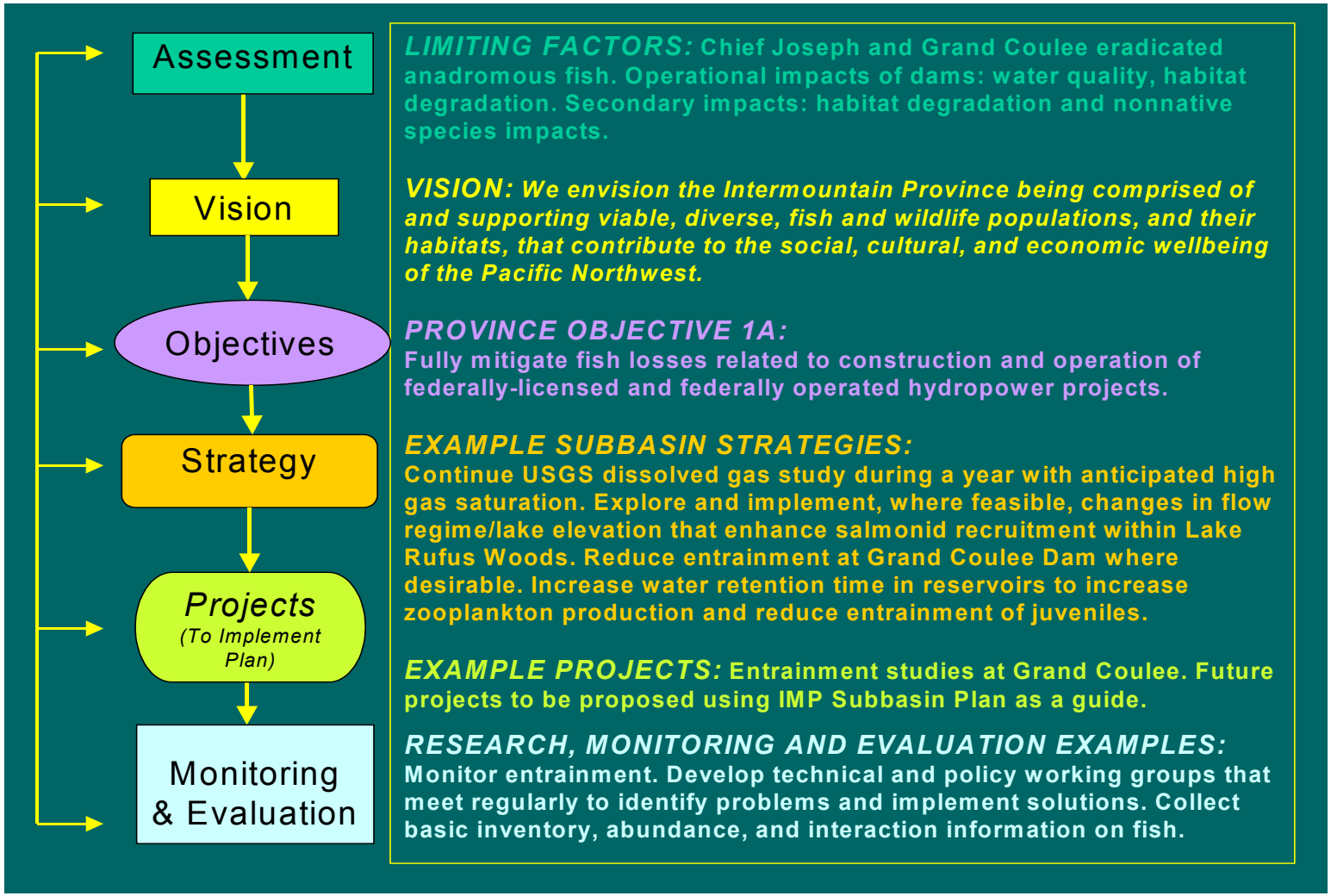

Figure 2.3-2, Sheet 1. Connection between the limiting factors for aquatic life and Province Objective 1A and the subbasin strategies and RM&E

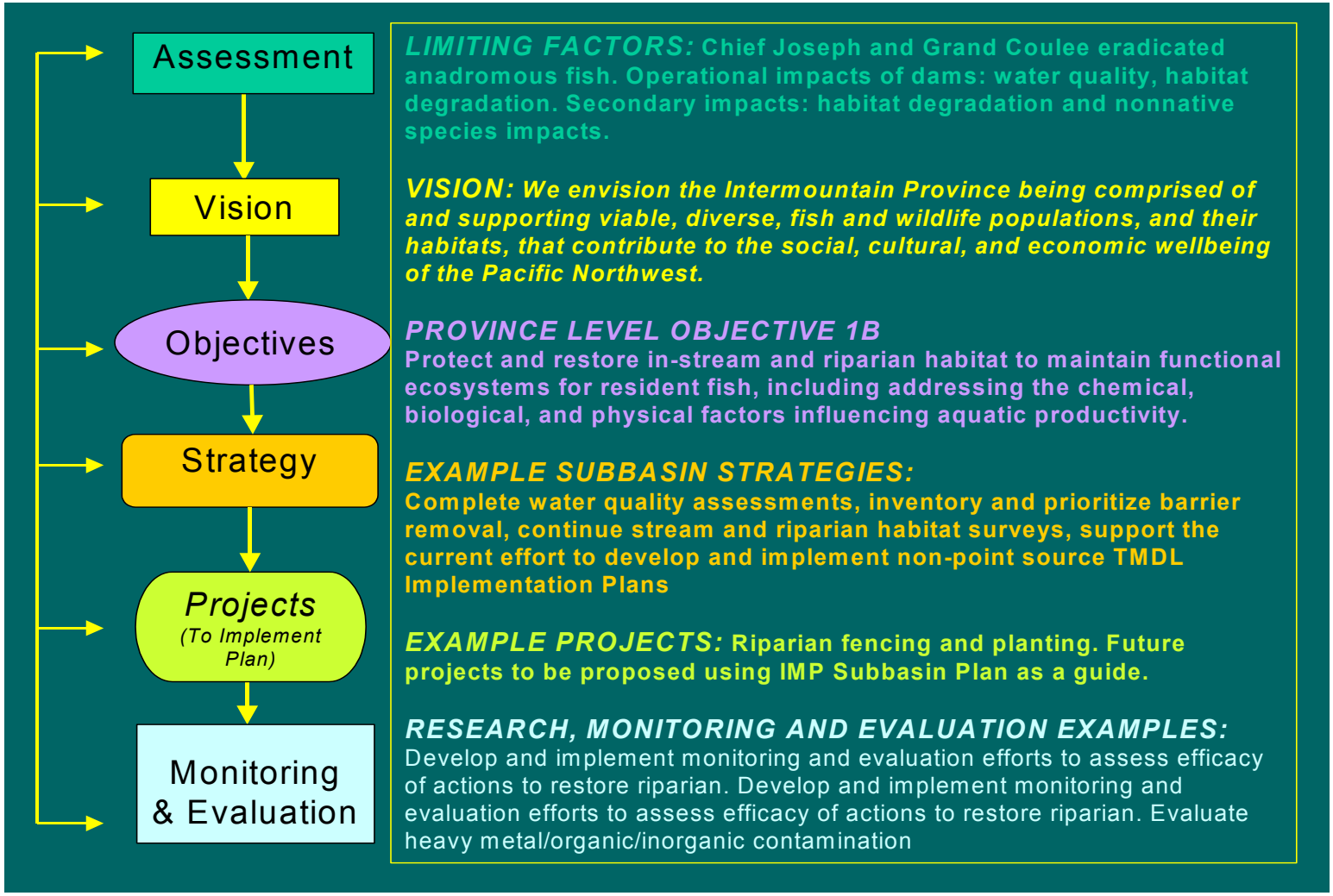

Figure 2.3-2, Sheet 2. Connection between the limiting factors for aquatic life and Province Objective 1B and the subbasin strategies and RM&E

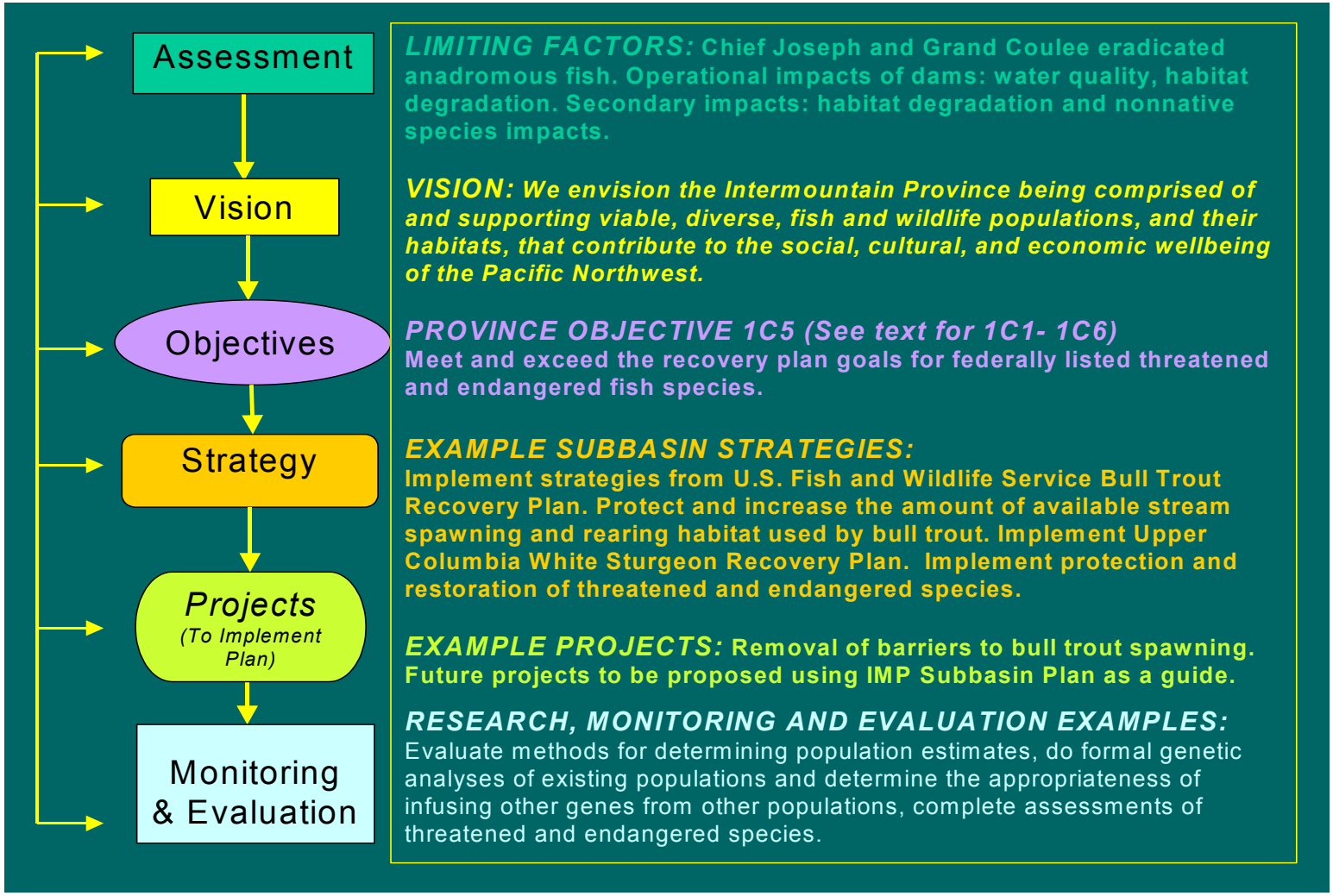

Figure 2.3-2, Sheet 3. Connection between the limiting factors for aquatic life and Province Objective 1C5 and the subbasin strategies and RM&E

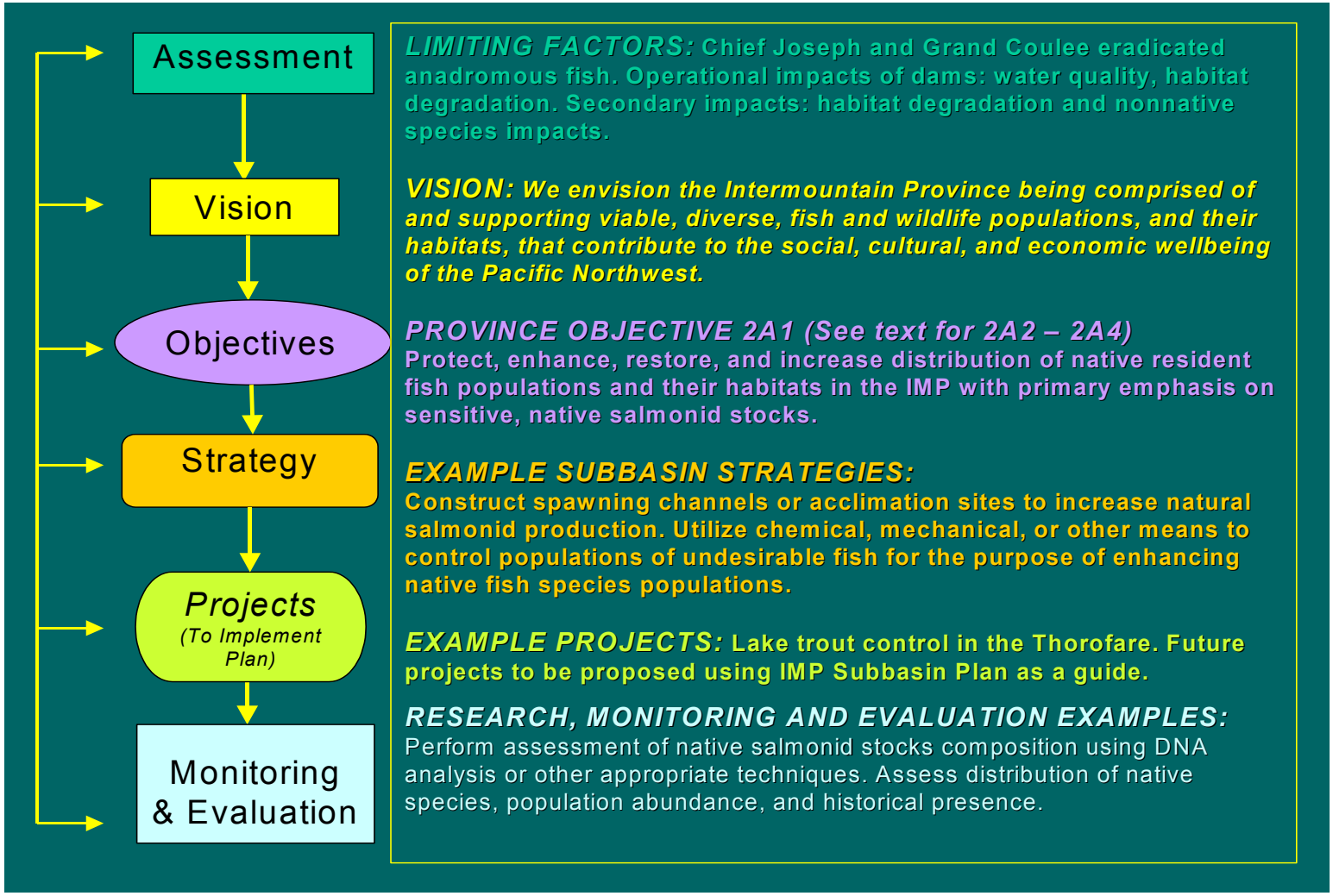

Figure 2.3-2, Sheet 4. Connection between the limiting factors for aquatic life and Province Objective 2A1and the subbasin strategies and RM&E

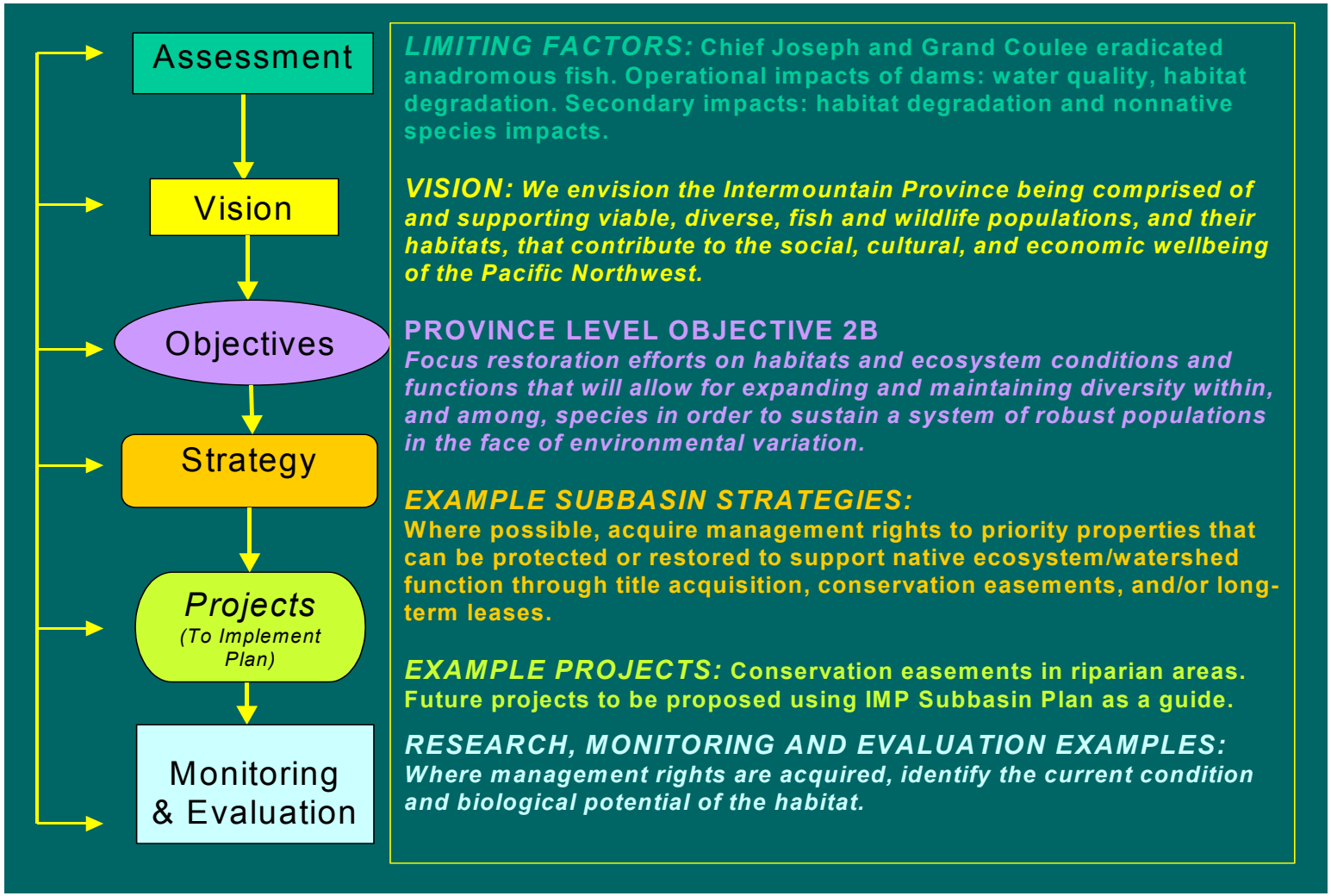

Figure 2.3-2, Sheet 5. Connection between the limiting factors for aquatic life and Province Objective 2B and the subbasin strategies and RM&E

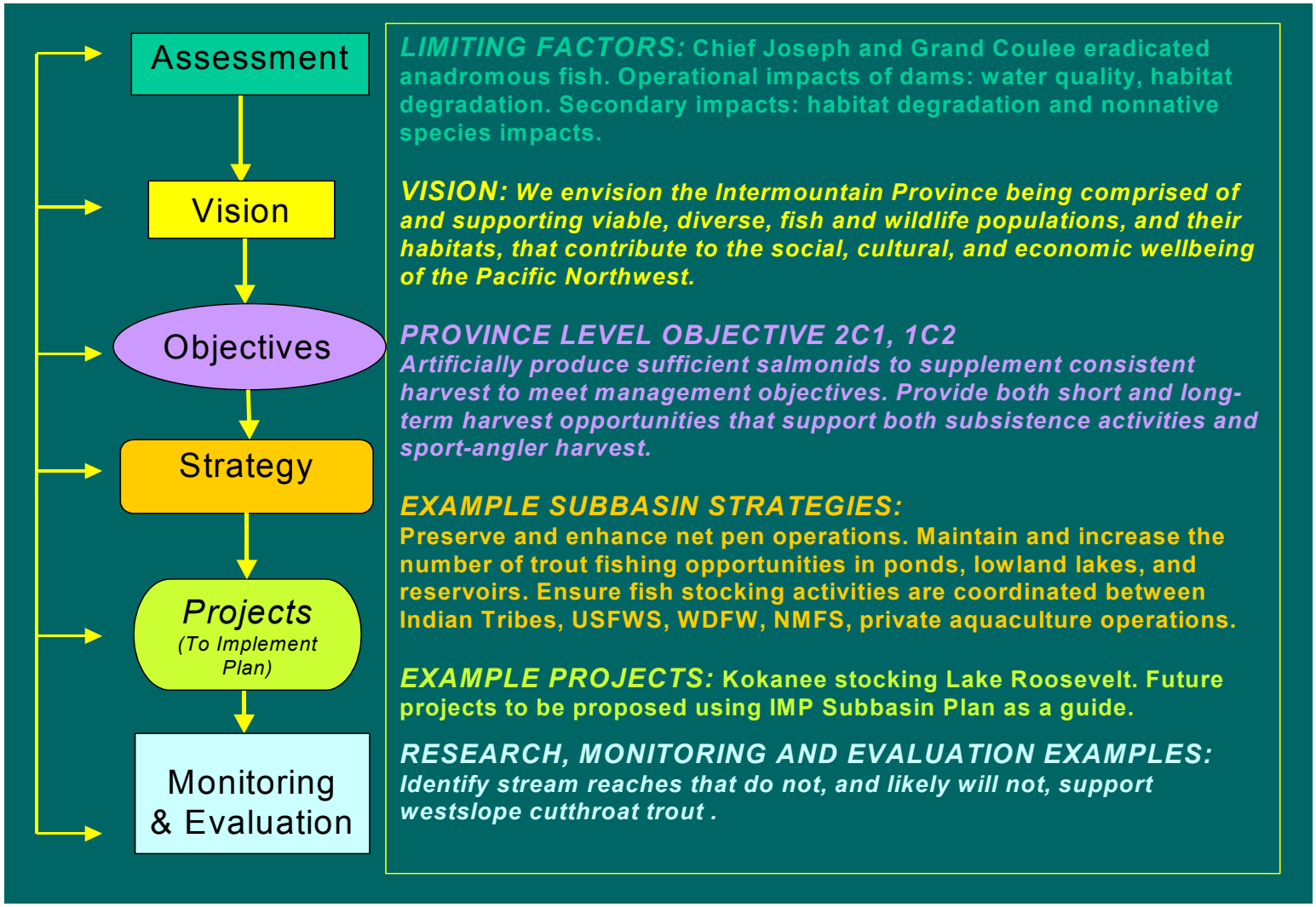

Figure 2.3-2, Sheet 6. Connection between the limiting factors for aquatic life and Province Objectives 2C1 and 2C2 and the subbasin strategies and RM&E

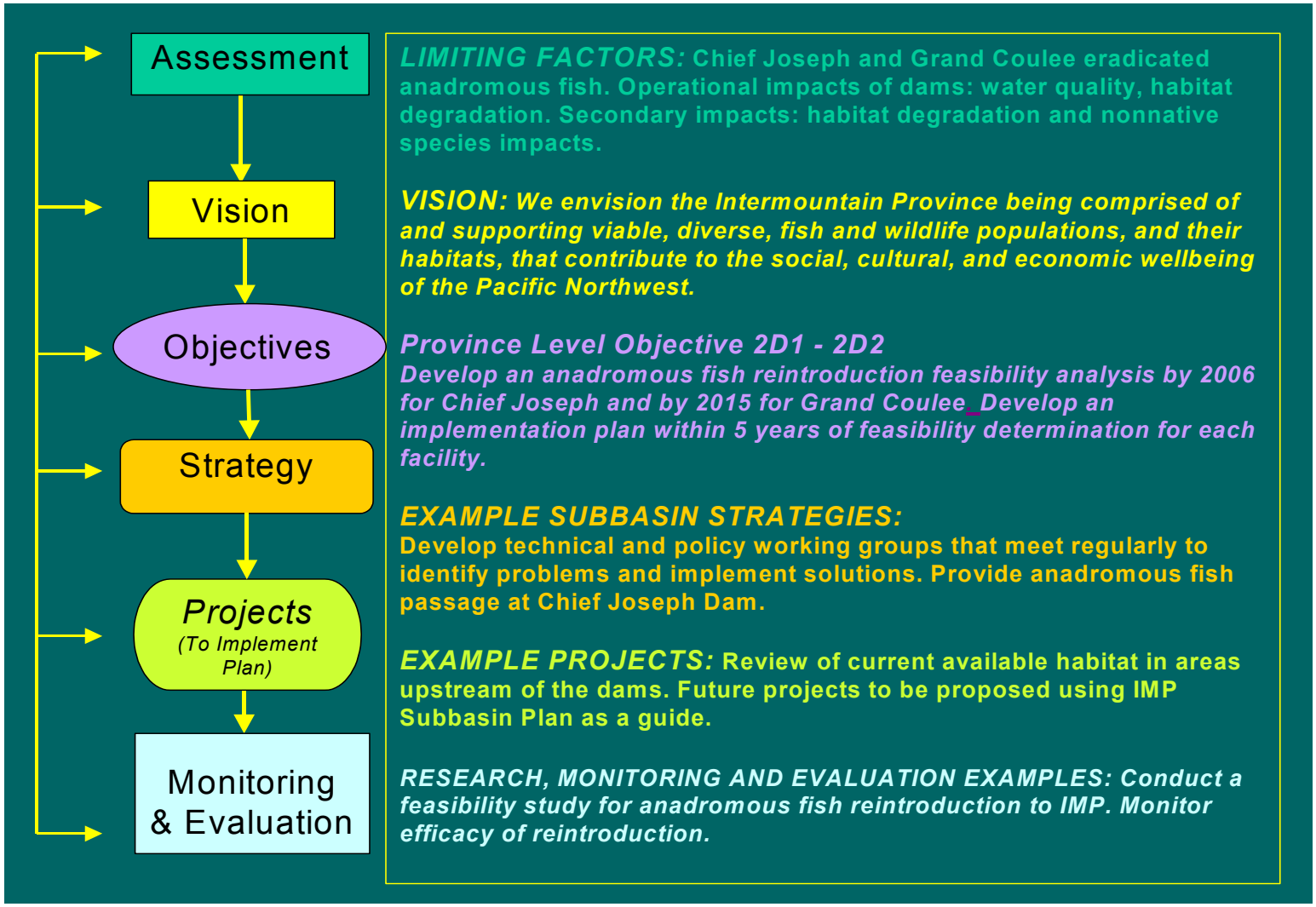

Figure 2.3-2, Sheet 7. Connection between the limiting factors for aquatic life and Province objectives 2D1, 2D2 and the subbasin strategies and RM&E

2.3.1.2 Summary of Subbasin Aquatic Objectives

Each subbasin developed objectives that are subbasin specific and are tiered to the province level objectives (see the subbasin specific management plan sections for more information). The subbasin objectives were prioritized by the Subbasin Work Teams. The following tables list the subbasin objectives in priority order, with the limiting factors that the objectives were designed to address (tables 2.3.1-1 to 2.3.1-6). Each subbasin also developed strategies to implement the objectives. The strategies are described in the subbasin specific management plan sections.

Table 2.3.1-1. Ranked Aquatic Resources Objectives for the Coeur d' Alene Subbasin, with the limiting factor(s) that each objective was designed to address.

Objectives in Priority Order	Limiting Factor(s) Addressed
(1) By 2015, protect and restore remaining stocks of native resident westslope cutthroat trout to ensure their continued existence in the basin and to provide catch rates of over 1.0 fish per hour in the St. Joe, Coeur d' Alene, and St. Maries rivers; an annual catch of over 1,000 fish in Coeur d' Alene Lake; and harvestable surpluses of naturally reproducing adfluvial adult fish from Lake, Benewah, Evans, and Alder creeks and other populations well-distributed in tributaries throughout the basin. **Objective 2A2**	Loss of native westslope cutthroat trout, habitat degradation.
(2) Establish put-and-take fisheries for westslope cutthroat trout in waters that currently do not, or likely will not, support native cutthroat trout populations by 2010. **Objective 2C1**	Loss of native westslope cutthroat trout, habitat degradation.
(3) Protect and restore native, locally adapted, naturally reproducing bull trout to a level that will support annual harvest in the Coeur d' Alene Subbasin by 2020. **Objective 2A1**	Loss of native bull trout, habitat degradation.
(4) Reduce pressure on native resident fish populations by maintaining fisheries for introduced species at an annual harvest of greater than 500,000 kokanee, greater than 5,000 Chinook salmon, greater than 20,000 rainbow trout in Tribal catch-out ponds, and average catch rates of greater than 0.5 fish/hour for largemouth bass. **Objective 2C2**	Loss of fishing opportunities, habitat degradation.
(5) Protect, restore, and enhance existing aquatic and terrestrial resources in order to meet the increased demands (cultural, subsistence, and recreation) on these resources associated with the extirpation of anadromous fisheries. **Objective 2B1**	Loss of anadromous life history.
(6) **Objective 1A1:** Fully quantify lost fish resources and opportunities historically used by the Coeur d' Alene Tribe associated with the construction, inundation and operation of the FCRPS outside the Coeur d' Alene Subbasin by 2015. **Objective 1A2**: Mitigate impacts of Albeni Falls Dam on resident fish by off-site/in-kind opportunities in the Coeur d' Alene Subbasin. **Objective 1B1:** Identify, restore, protect, and mitigate impacts of Albeni Falls Dam on resident fish in areas historically used by the CDA Tribe by off-site and in-kind opportunities in the Coeur d' Alene Subbasin. **Objective 1B2*:** Complete TMDL Subbasin Assessments, pollutant reduction allocations, and Implementation Plans for impaired waterbodies by 2010 and carry out actions identified in TMDL Implementation Plans within 10 years of adoption to mitigate off-site, in-kind for native resident fish losses. **Objective 1C1**: Pursue the objectives in the U.S Fish and Wildlife Service Bull Trout Recovery Plan. 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**.** If these objectives should change in the future, the subbasin plan should be adjusted accordingly. **Objective 1C2**: Protect and restore native, locally adapted, reproducing	Lack of information, habitat degradation, water quality, bull trout recovery, lack of fishing opportunity

Objectives in Priority Order	Limiting Factor(s) Addressed
bull trout that will support an annual harvestable surplus of bull trout in the Coeur d' Alene Subbasin by 2020.	
(7) Reintroduce anadromous fish into blocked areas where feasible. **Objective 2D**	Loss of anadromous life history, pertinent to Coeur d' Alene Tribe in traditional use areas outside subbasin

Table 2.3.1-2. Ranked Aquatic Resources Objectives for the Pend Oreille Subbasin, with the limiting factor(s) that each objective was designed to address. Category 1 objectives are ranked separately from Category 2 objectives. Both categories are of equal importance.

Objectives in Priority Order	Limiting Factor(s) Addressed
1st Priority*	
Category 1 **Province Level Objective 1A:** Fully mitigate fish losses related to construction and operation of federally-licensed and federally operated hydropower projects.	
(1) 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.	Lack of information, hydropower construction and operation impacts to aquatic habitat
(2) Subbasin Objective 1A2: Develop, prioritize, and implement projects on- and off-site to fully mitigate these effects by year 2020.	Hydropower construction and operation impacts to aquatic habitat
2nd Priority*	
Category 1 **Province Level Objective 1B:** Protect and restore in-stream and riparian habitat to maintain functional ecosystems for resident fish, including addressing the chemical, biological, and physical factors influencing aquatic productivity. **Province Level Objective 1C1 – 1C5:** Protect, enhance, restore, and increase distribution of native resident fish populations and their habitats in the IMP with primary emphasis on sensitive, native salmonid stocks. Maintain and enhance self-sustaining, wild populations of native game fish and subsistence species to provide for harvestable surplus. Minimize negative impacts (e.g., competition, predation, introgression) to native species from nonnative species and stocks. Increase cooperation and coordination among stakeholders throughout the province. Meet and exceed the recovery plan goals for federally-listed threatened and endangered fish species	
(1) 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. **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. **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. **Subbasin Objective 1B8**: Enhance, conserve and protect riparian habitats to the extent that they are intact and functional. **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.	Habitat degradation, loss of opportunities for fishing, riparian habitat degradation, loss of native bull trout populations.
(2) Subbasin Objective 1B2: Improve water quality to meet or exceed applicable water quality standards in the Pend Oreille	Water quality, sediment, nonnative invasive plants, loss of fishing

Objectives in Priority Order	Limiting Factor(s) Addressed
Subbasin. **Subbasin Objective 1B4:** Develop, prioritize, and implement projects to remove or reduce sediment sources negatively influencing fish habitat, using a coordinated watershed approach with a broad coalition of partners. **Subbasin Objective 1B6**: Control the spread (allow 0 acres) of Eurasian Watermilfoil in the Subbasin. **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.	opportunities
(3) Subbasin Objective 1B3*: Conduct watershed assessments in drainages where sediment transport/bedload issues are negatively impacting resident fish habitat by 2008. **Subbasin Objective 1C4:** Remove 90% or more of the lake trout from Upper Priest Lake and prevent re-establishment through the Thorofare.	Lack of information, sediment, stream instability, nonnative fishes
(4) 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.	Nonnative fish impacts
(5) 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.	Nonnative fish impacts
3rd Priority*	
Category 1 **Province Level Objective 1C6:** Restore resident fish species (subspecies, stocks and populations) to near historic abundance throughout their historic ranges where suitable habitat conditions exist and/or where habitats can be restored.	
(1) Subbasin Objective 1C7: By 2020 restore kokanee populations in Lake Pend Oreille to allow sustainable harvest of 750,000 fish/year, as long as this activity does not adversely impact native fish. **Subbasin Objective 1C9:** Improve the stocking program for kokanee in Lake Pend Oreille so that it contributes 375,000 kokanee to the harvest annually.	Loss of fishing opportunity
(2) Subbasin Objective 1C11*: By 2010, gain a better understanding of the kokanee food habits, potential competition with Mysis shrimp, and the ecological role of lake whitefish in reducing shrimp abundance.	Loss of fishing opportunity
(3) Subbasin Objective 1C8: By 2010 balance predator (lake trout, rainbow trout, bull trout)/prey (kokanee) populations in Lake Pend Oreille (1:10 biomass ratio).	Loss of fishing opportunity, nonnative species impacts
(4) Subbasin Objective 1C10: As prey base improves in Lake Pend Oreille, restore the rainbow trout fishery to a sustainable harvest of >4,000 fish/year.	Loss of fishing opportunity
(5) Subbasin Objective 1C6: Improve the genetic purity of Gerrard rainbow trout in Lake Pend Oreille by infusing pure strain fish from Kootenai Lake, B.C. into the gene pool.	Loss of fishing opportunity
Priority unknown. Subbasin Objective 1C12: Improve bass fishery above Albeni Falls Dam.	Loss of fishing opportunity
1st Priority*	

Objectives in Priority Order	Limiting Factor(s) Addressed
Category 2 **Province Level Objective 2A1 – 2A4:** Protect, enhance, restore, and increase distribution of native resident fish populations and their habitats in the IMP with primary emphasis on sensitive, native salmonid stocks. Maintain and enhance self-sustaining, wild populations of native game fish, and subsistence species, to provide for harvestable surplus. Minimize negative impacts (e.g., competition, predation, introgression) to native species from nonnative species and stocks. Increase cooperation and coordination among stakeholders throughout the province.	
(1) Subbasin Objective 2A1: Protect, enhance, or restore stable, viable native fish populations. **Subbasin Objective 2B1:** Where opportunity exists, implement habitat restoration, protection, and enhancement projects that benefit multiple resources on a watershed basis to improve habitats and populations benefiting both Tribal and non-Tribal utilization.	Loss of fishing opportunity, habitat degradation
Subbasin Objective 2A2: Manage nonnative species, including brook trout, in a way that minimizes negative impacts to native species.	Nonnative species impacts
Priority 3 Subbasin Objective 2A3: Enhance the native westslope cutthroat trout population so that it can sustain a sport fishery in the Pend Oreille River and its tributaries by 2020.	Loss of fishing opportunity
2nd Priority*	
Category 2 **Province Level Objective 2C1:** Artificially produce sufficient salmonids to supplement consistent harvest to meet management objectives. **Province Level Objective 2C2:** Provide both short- and long-term harvest opportunities that support both subsistence activities and sport-angler harvest.	
(1) 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.	Loss of fishing opportunity
3rd Priority*	
Category 2 **Province Level Objective 2D1:** Develop an anadromous fish reintroduction feasibility analysis by 2006 for Chief Joseph and by 2015 for Grand Coulee **Province Level Objective 2D2:** Develop an implementation plan within 5 years of feasibility determination for each facility.	
(1) Subbasin Objective 2D1: Most of the Pend Oreille subbasin is upstream of the natural upper limit of anadromous salmon, therefore this objective will have limited impact on the waters of the Pend Oreille Subbasin.	Loss of anadromous life history
4th Priority*	
Category 2 **Province Level Objective 2B:** Focus restoration efforts on habitats and ecosystem conditions and functions that will allow for expanding and maintaining diversity within, and among, species in order to sustain a system of robust populations in the face of environmental variation.	
(1) Subbasin Objective 2B1: Where opportunity exists, implement habitat restoration, protection, and enhancement projects that benefit multiple resources on a watershed basis to improve habitats and populations benefiting both Tribal and non-Tribal utilization.	Loss of fishing opportunity, loss of anadromous life history

* = Note that Category 1 and Category 2 were considered of equal priority and were not ranked relative to each other. Within each category, the Work Team considered all objectives to be high priority, but provided relative rankings of 1st, 2nd, 3rd, and 4th priority. Refer to meeting notes of Work Team Meeting 6, March 16, 2004, for further details on prioritization.

Table 2.3.1-3. Ranked Aquatic Objectives for the Spokane Subbasin, with the limiting factor(s) that each objective was designed to address.

Objectives in Priority Order	Limiting Factor(s) Addressed
Priority 1	
Subbasin Objective 1A1*: Complete assessments of resident fish losses throughout the Spokane Subbasin resulting from the FCRPS construction and operation, expressed in terms of the various critical population characteristics of key resident fish species, through the evaluation of altered habitat, carrying capacity, and competition by year 2020.	Lack of information, habitat degradation
Subbasin Objective 1B2: Develop and implement projects directed at protecting, restoring, and enhancing fish habitat for both native and nonnative resident fish, through improvements in riparian conditions, fish passage, and aquatic conditions.	Degraded riparian conditions, fish passage barriers, and degraded aquatic habitat.
Subbasin Objective 1C3: Maintain and implement restoration activities consistent with Upper Columbia White Sturgeon Recovery Plan by 2005.	Loss of anadromous life history, fish passage barriers, modified flow regimes
Subbasin Objective 1C4: Develop and meet recovery plan goals for sensitive native resident fish species.	Lack of information, habitat degradation
Subbasin Objective 2A1*: Conduct baseline investigations to determine native resident and resident fish stock composition, distribution, and relative abundance in the subbasin by year 2010.	Lack of information, nonnative species impacts
Subbasin Objective 2B1: Protect, restore, and enhance existing terrestrial and aquatic resources in order to meet the increased demands (i.e., cultural, subsistence, and recreational) on these resources associated with the extirpation of anadromous fisheries.	Loss of fishing opportunity, loss of anadromous life history
Subbasin Objective 2C1: Use artificial production to provide recreational and subsistence fisheries of white sturgeon, rainbow trout, kokanee salmon, and or other species consistent with the NPCC Resident Fish Substitution Policy.	Loss of anadromous life history, lack of spawning habitat, habitat degradation
Subbasin Objective 2C2*: Assess need for conservation aquaculture facilities to assist with enhancing or re-establishing healthy, self-sustaining native fish populations for reproduction, recreation, and subsistence by year 2012.	Loss of fishing opportunity, loss of anadromous life history, habitat degradation
Subbasin Objective 2C3: Supplement non-self-sustaining fish species to provide a recreational and subsistence fishery.	Loss of fishing opportunity, loss of anadromous life history, habitat degradation
Subbasin Objective 2D1*: In the event anadromous fish return to the Spokane arm of Lake Roosevelt, the appropriate Tribes, agencies, and stakeholders will assess the feasibility of restoration of access and habitat throughout the remainder of the Spokane River Subbasin.	Loss of anadromous life history
Priority 2	
Subbasin Objective 1A2: Fully mitigate and compensate for resident fish losses related to construction and operation of FCRPS by the year 2050.	Habitat degradation as a result of FCRPS construction and operation
Subbasin Objective 1B1*: Evaluate in-stream and riparian habitat quality and quantity (at least 50 miles per year) for resident fish with primary emphasis on native salmonid habitats by year 2010.	Degraded riparian habitat and in-stream flows
Subbasin Objective 1C1*: Assess the distribution and relative abundance of threatened or endangered species within the Spokane River Subbasin by year 2010.	Lack of information
Subbasin Objective 1C2: Within five years of identification of threatened and endangered species, implement activities for protection and restoration.	Habitat degradation, loss of fishing opportunity

Objectives in Priority Order	Limiting Factor(s) Addressed
Subbasin Objective 2A3: Double the number of miles of stream within the Spokane Subbasin that support native game fish, including redband trout and native mountain whitefish and subsistence species by 2020 through strategies addressing habitat and management of game species.	Habitat degradation, loss of fishing opportunity
Priority 3	
Subbasin Objective 1B4: Determine a range of flows suitable for protection and enhancement of native resident fish species in the subbasin.	In-stream flows
Subbasin Objective 2A2: Minimize negative impacts (e.g., competition, predation, introgression) to native species from nonnative species and stocks.	Nonnative species impacts
Priority 4	
Subbasin Objective 1B3: Meet or exceed applicable water quality standards by year 2015.	Water quality
Priority 5	
Subbasin Objective 1B7: Expand stable littoral zones along Lake Roosevelt by 10 percent of lake surface area.	Productivity, rearing habitat in Lake Roosevelt
Priority 6	
Subbasin Objective 1B6*: Evaluate heavy metal/organic/inorganic contamination as a limiting factor on native, culturally, and economically important species.	Water quality, sedimentation
Priority 7	
Subbasin Objective 1B5: Reduce persistent bioaccumulating toxin concentrations in the waters of the Spokane Subbasin to acceptable levels, as defined by the applicable regulatory authorities by year 2015.	Water quality, sedimentation

Table 2.3.1-4. Ranked Aquatic Objectives for the Upper Columbia Subbasin, with the limiting factor(s) that each objective was designed to address.

Objectives in Priority Order	Limiting Factor(s) Addressed
(1) Begin implementation of habitat strategies for addressing identified limiting factors for all focal species and native fishes by 2005. **Subbasin Objective 1B2**	Riparian habitat, water quality, nutrients, sediment
(2) Protect the genetic integrity of all focal and native fish species throughout the Subbasin. **Subbasin Objective 2A1**	Nonnative species, loss of anadromous life history
(3) Maintain, restore, and enhance wild populations of native fish and subsistence species to provide for harvestable surplus. **Subbasin Objective 2A2**	Loss of anadromous life history, loss of lotic habitat, habitat degradation
(4) Restore resident fish **s**pecies (subspecies, stocks and populations) using artificial production. **Subbasin Objective 1A5**	Loss of anadromous life history, loss of lotic habitat, habitat degradation
(5) The Upper Columbia Subbasin is within the Northeast Washington Bull Trout Recovery Unit, and is identified as a "Research Needs Area" (USFWS 2002). Surveys are needed to determine how or if the Subbasin can contribute to recovery. **Subbasin Objective 1C1**	Lack of information
(6) Artificially produce enough fish to supplement consistent harvest to meet state and Tribal management objectives. **Subbasin Objective 2C1**	Loss of anadromous life history, loss of lotic habitat, habitat degradation
(7) Continue to evaluate hydropower impacts to native and focal species. Implement strategies to reduce impacts. **Subbasin Objective 1A1 ***	Lack of information, loss of lotic habitat, water quality degradation
(8) Evaluate feasibility of anadromous fish reintroduction by 2015, and begin implementation. **Subbasin Objective 2D1***	Loss of anadromous life history
(9) Enhance, conserve, and protect riparian habitats to the extent that 80 percent of each stream's riparian areas remain intact and functional. **Subbasin Objective 1B6**	Riparian habitat degradation
(10) Restore connectivity of salmonid habitat as appropriate by 2015. **Subbasin Objective 1B1**	Fish passage barriers
(11) Improve or maintain streambed embeddedness between 20% and 30% in all streams with known salmonid populations. **Subbasin Objective 1B5**	Sedimentation
(12) Maintain and/or achieve stream temperatures below 18^{o}C for all streams that support salmonid populations. **Subbasin Objective 1B3**	Water temperature
(13) Expand stable littoral zones along Lake Roosevelt by 10% of lake surface area (at elevation 1,290 ft) **Subbasin Objective 1A2**	Productivity, rearing habitat in Lake Roosevelt
(14) Assess and implement nutrient enrichment program for Lake Roosevelt and tributaries. **Subbasin Objective 1A3**	Loss of anadromous life history, nutrients
(15) Protect, maintain, and enhance flows appropriate for all life stages of focal and native fish species in all intermittent, ephemeral, and perennial streams. **Subbasin Objective 1B8**	In-stream flows
(16) Attain total dissolved gases (TDG) below 110% saturation for the mainstem Columbia River. **Subbasin Objective 1A4**	Water quality degradation
(17) Evaluate heavy metal/organic/inorganic contamination as a limiting factor on native, culturally, and economically important species. **Subbasin Objective 1B4***	Water quality degradation, sedimentation
(18) Reduce width-to-depth ratios to < 10 for all streams within the subbasin, as appropriate. **Subbasin Objective 1B7**	Stream channel instability

Table 2.3.1-5. Ranked Aquatic Objectives for the San Poil Subbasin, with the limiting factor(s) that each objective was designed to address.

Objectives in Priority Order	Limiting Factor(s) Addressed
(1) Begin implementation of habitat strategies for addressing identified limiting factors for all focal species and native fishes by 2005. **Objective 1B2**	Riparian habitat, water quality, nutrients, sediment
(2) Protect and enhance redband trout and kokanee salmon populations and preserve their genetic integrity, while maintaining their subsistence and recreational fishery. **Objective 2A2**	Nonnative species, loss of anadromous life history
(3) Enhance, conserve, and protect riparian habitats to the extent that 80% of each stream's riparian areas remain intact and functional. **Objective 1B3**	Riparian habitat
(4) Manage adfluvial rainbow trout populations to support recreational, cultural and subsistence fisheries with a catch per unit effort of > 1 fish per hour. **Objective 2A1**	Loss of anadromous life history, loss of lotic habitat, habitat degradation
(5) Protect and maintain flows adequate for all life stages of focal and native fish species in all intermittent, ephemeral, and perennial streams. **Objective 1B7**	In-stream flows
(6) Maintain and/or achieve stream temperatures below 18^{o} C for all streams that support salmonid fish populations **Objective 1B4**	Water temperature
(7) Inventory all barriers in San Poil Subbasin by 2005 and begin implementing necessary passage improvements associated with man-made barriers by 2006. **Objective 1B1***	Fish passage barriers
(8) Artificially produce enough native, genetically appropriate salmonids stocks to supplement consistent harvest to meet state and Tribal management objectives. **Objective 2C2**	Loss of anadromous life history, loss of lotic habitat, habitat degradation
(9) Enhance and maintain streambed embeddedness at between 20% and 30% on all streams with known salmonids populations. **Objective 1B5**	Sediment
(10) Expand stable littoral zones along the San Poil arm of Lake Roosevelt to contribute to the Upper Columbia Subbasin objective of stabilizing 10% of the reservoir surface area. **Objective 1A1**	Productivity, rearing habitat in Lake Roosevelt
(11) Reduce width-to-depth ratios to < 10 for all streams within the subbasin. **Objective 1B6**	Stream channel instability
(12) Assess and implement nutrient enrichment program for Lake Roosevelt and tributaries. **Objective 1A2***	Loss of anadromous life history, nutrients
(13) Provide for a diverse and sustainable recreational fishery at Curlew Lake. **Objective 2C1**	Water quality, habitat degradation
(14) Complete feasibility study of potential restoration of anadromous Chinook and steelhead by 2015. **Objective 2D1***	Loss of anadromous life history
(15) The San Poil Subbasin is within the Northeast Washington Bull Trout Recovery Unit and is identified as a "Research Needs Area". Determine if the San Poil Subbasin can contribute to Bull Trout recovery. **Objective 1C1**	Lack of information
(16) Maintain existing westslope cutthroat fishery at Long and Gold lakes. **Objective 2A3**	Loss of fishing opportunities as a result of loss of anadromous life history and habitat degradation

Table 2.3.1-6. Ranked Aquatic Objectives for the Lake Rufus Woods Subbasin, with the limiting factor(s) that each objective was designed to address.

Objectives in Priority Order	Limiting Factor(s) Addressed
(1) Develop an anadromous fish reintroduction feasibility analysis by 2006[5]. **Subbasin Objective 2D1**	Loss of anadromous life history
(2) Begin implementation of habitat strategies for addressing identified limiting factors for all focal species and native fishes by 2005. **Subbasin Objective 1B1**	Habitat limiting factors such as: riparian vegetation, sediment, floodplain connectivity, in-stream flows, fish passage barriers, etc.
(3) If anadromous fish reintroduction is deemed feasible, implement anadromous reintroductions within 5 years of feasibility determination. **Subbasin Objective 2D2**	Loss of anadromous life history
(4) Inventory all barriers in the Rufus Woods Subbasin, including Chief Joseph Dam, by 2005 and begin implementing necessary passage improvements associated with man made barriers by 2006. **Subbasin Objective 1B2***	Fish passage barriers
(5) Increase the amount of salmon available for harvest in areas directly downstream of Chief Joseph Dam utilizing artificial production. **Subbasin Objective 2D3**	Loss of anadromous life history, loss of lotic habitat, habitat degradation
(6) Inventory riparian habitat condition and implement actions to promote riparian area function for all streams within the Subbasin. **Subbasin Objective 1B3***	Riparian habitat degradation
(7) Develop and implement plans to reduce hydropower impacts to native and focal species. **Subbasin Objective 1A1**	Lack of data, habitat degradation
(8) Maintain and/or achieve stream temperatures below 18^{o} C for all streams that support salmonid fish populations. **Subbasin Objective 1B7**	Water temperature
(9) Preserve and enhance native fish where historically present. **Subbasin Objective 2A3**	Nonnative fish, habitat degradation
(10) Reduce width-to-depth ratios to <10 for all streams within the subbasin. **Subbasin Objective 1B5**	Stream channel instability
(11) Maintain total dissolved gases (TDG) below 110% saturation for mainstem Columbia River. **Subbasin Objective 1B8**	Water quality degradation
(12) Maintain average rainbow trout catch rates on Lake Rufus Woods at between 0.5 and 0.75 fish/hour annually, and maintain fish condition with Wr greater than or equal to 100. **Subbasin Objective 2A2**	Loss of fishing opportunity due to loss of anadromous life history, loss of lotic habitat, habitat degradation
(13) Improve or maintain streambed embeddedness between 20% and 30% in all streams with known salmonid populations. **Subbasin Objective 1B4**	Sedimentation, lack of spawning habitat
(14) Protect and maintain flows at or near historic in all intermittent, ephemeral, and perennial streams. **Subbasin Objective 1B6**	In-stream flows
(15) Determine genetic distribution of native focal species (white sturgeon, rainbow/redband trout, kokanee), identify limiting factors, and develop strategies for addressing limiting factors by 2005. **Subbasin Objective 2A1**	Nonnative species impacts, habitat degradation
(16) Artificially produce enough salmonids to supplement a consistent harvest rate of 1 fish per hour, where habitats allow. **Subbasin Objective 2C2**	Loss of fishing opportunity due to loss of anadromous life history, loss of lotic habitat, habitat degradation
(17) Develop and implement plans to enhance sturgeon and burbot populations, based on the evaluation of limiting factors. **Subbasin Objective 1A2**	Loss of lotic habitat, modification of flow regimes, fish passage barriers
(18) Protect the genetic integrity of all focal and native fish species throughout the subbasin. **Subbasin Objective 2A4**	Nonnative species impacts
(19) The Lake Rufus Woods Subbasin is within the Northeast Washington Bull Trout Recovery Unit and is identified as a "Research Needs Area" (USFWS 2002). Surveys are needed in the Subbasin to determine how/if	Lack of information

[5] Not all members of the Work Team agreed that this objective should be first priority. See text for more information on the minority report.

Objectives in Priority Order	Limiting Factor(s) Addressed
the Subbasin can contribute to recovery. **Subbasin Objective 1C1***	
(20) Manage walleye consistent with native and focal species management. **Subbasin Objective 2C1**	Loss of fishing opportunity due to habitat degradation and loss of anadromous life history

2.3.1.3 Definition of Full Mitigation

In the context of the Northwest Power Planning Council's subbasin planning, and in the specific context of subbasin planning activities in the IMP, and not to be inconsistent with the Northwest Power Act, "full mitigation" is defined for the purposes of this subbasin plan as:

> To the extent affected by the FCRPS: protect, restore and enhance resources to completely replace all losses consistent with the fish and wildlife management entities within the CRB and individual eco-provinces and subbasins.

As long as FCRPS dams are in place, the obligation to mitigate for the impacts associated with construction and operations of those projects will continue. Therefore, **full** mitigation would occur when no more opportunity to mitigate exists and when all operational or construction impacts associated with FCRPS dams cease to exist (for example, the dams are gone).

Mitigation is defined as including:

> "(a) avoiding the impact altogether by not taking a certain action or parts of an action; (b)minimizing impacts by limiting the degree or magnitude of the action and its implementation; (c) rectifying the impact by repairing, rehabilitating, or restoring the affected environment; (d) reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and (e) compensating for the impact by replacing or providing substitute resources or environments" (40 CFR Part 1508.20(a-e)).

Since the FCRPS projects are constructed and resource impacts realized, the result of the Northwest Power Act and related Fish and Wildlife Program directed mitigation is that of compensation.

Compensation mitigation is defined as:

> "(1) conduct ... management activities to increase habitat values of existing areas, with project lands and nearby public lands receiving priority.
> (2) conduct habitat construction activities to fully restore or rehabilitate previously altered habitat or modify existing habitat suited to evaluation species for the purpose of completely offsetting habitat value losses.
> (3) build fishery propagation facilities.
> (4) arrange legislative set-aside or protective designation for public lands.
> (5) provide buffer zones.
> (6) lease habitat.
> (7) acquire wildlife easements.

(8) acquire water rights.
(9) acquire land in fee title."

For reference please refer to: http://policy.fws.gov/a1npi89_02.pdf

2.3.2 Province Level Terrestrial Objectives

Columbia River Basin level terrestrial resource goals were developed by the Council in their 2000 Fish and Wildlife Program. The IMP developed province level terrestrial resource objectives that are tiered to the Columbia River Basin level goals. These objectives were prioritized by the OC and are presented below in order of priority. In addition, the six subbasins in the IMP developed subbasin specific objectives and strategies, which are tiered to both the Columbia River Basin and IMP goals. The full lists of subbasin objectives and strategies are presented in the individual subbasin management plans.

These objectives are prioritized and listed in order of their priority.

Columbia River Basin Level Category 1:

A primary overarching objective of the Columbia River Basin 2000 Fish and Wildlife Program is the completion of mitigation for the adverse effects to wildlife caused by the development and operation of the hydrosystem.

***Priority 1*: Columbia River Basin Level Goal 1A:**
Complete the current Wildlife Mitigation Program for construction and inundation losses of federal hydrosystem as identified in Appendix C, Table 11-4 of the Columbia River Basin 2000 Fish and Wildlife Program.

> **Province Level Objective 1A:**
> Fully mitigate for construction and inundation losses incurred from the Chief Joseph Dam, Grand Coulee Dam, and Albeni Falls projects per the requirements of the Northwest Power Act and the current Wildlife Mitigation Program (Appendix C, Table 11-4 of the Columbia River Basin 2000 Fish and Wildlife Program) by 2015. This includes developing and implementing projects within the IMP that protect, enhance, or restore Habitat Units for HEP evaluation species and habitats as specified in the construction loss assessments for Chief Joseph, Grand Coulee, and Albeni Falls dams (Kuehn and Berger 1992; Creveling and Renfrow 1986; Martin et al. 1988); coordinated planning; provision of adequate funding for long-term Operations and Maintenance (O&M); and effectiveness monitoring of projects.

***Priority 2*: Columbia River Basin Level Goal 1B:**
Quantify the operational effects of federal hydrosystem projects on terrestrial resources, develop mitigation plan in coordination with other resource mitigation and resource planning efforts, and implement projects to mitigate the impacts, including maintenance and monitoring.

Province Level Objective 1B:
Quantitatively assess and mitigate operational impacts of the Chief Joseph Dam, Grand Coulee Dam, and Albeni Falls projects per the requirements of the Northwest Power Act and the current Wildlife Mitigation Program. Complete assessment of operational impacts by 2008; develop mitigation plan by 2010; implement initial mitigation by 2015; incorporate formal methods for review and update of effects assessment and mitigation plan on a three-year cycle, to respond to changes in operation and to effectiveness of mitigation actions.

Columbia River Basin Level Category 2:
In consideration of the primary overarching objectives of the Columbia River Basin 2000 Fish and Wildlife Program, provide: 1) sufficient populations of wildlife for abundant opportunities for Tribal trust and treaty right harvest and for non-Tribal harvest; 2) recovery of wildlife species affected by the development and operation of the hydrosystem that are listed under the Endangered Species Act; and 3) a Columbia River ecosystem that sustains an abundant, productive, and diverse community of fish and wildlife.

***Priority 3*: Columbia River Basin Level Goal 2:**
Mitigate for wildlife losses that have occurred through secondary effects of hydrosystem development, including assessment, development of mitigation plan in coordination with other resources and resource managers, implementation, maintenance, and monitoring.

Province Level Objective 2A:
Mitigate for wildlife losses that have occurred through secondary effects of hydrosystem development by protecting, enhancing, restoring, and sustaining populations of wildlife for aesthetic, cultural, ecological, and recreational values. Objective includes assessment of secondary impacts, development of mitigation plan in coordination with other resources and resource managers, implementation, maintenance, and monitoring. Because the secondary effects of hydrosystem development are tightly intermingled with the effects of other activities in the province, this objective also incorporates other actions to maintain or enhance populations of federal, state, and Tribal species of special concern, and other native and desirable nonnative wildlife species, within their present and/or historical ranges in order to prevent future declines and restore populations that have suffered declines or been extirpated.

Province Level Objective 2B:
Mitigate for wildlife losses that have occurred through secondary effects of hydrosystem development by protecting, enhancing, restoring, and sustaining native wildlife-habitat function to maintain or enhance ecological diversity and security for native and desirable nonnative wildlife species. Objective includes assessment of secondary impacts, development of mitigation plan in coordination with other resources and resource managers, implementation, maintenance, and monitoring. Because the secondary effects of hydrosystem development are tightly intermingled with the effects of other activities in the province, this

objective also incorporates other actions to identify, maintain, restore, and enhance priority habitats (wetlands, riparian areas, upland forests, steppe and shrub-steppe, cliffs and rock outcrops, caves, grasslands, and other priority habitats) including their structural attributes, ecological functions, and distribution and connectivity across the landscape to optimize conditions required to increase overall wildlife productivity of desired species assemblages. Strategies may include land acquisition, conservation easements, management contracts, and/or partnerships with other landowners.

Objective 2B1: Identify and implement strategies and opportunities for restoring the diversity, block size, and spatial arrangement of habitat types needed to sustain target wildlife species at ecologically sound levels.

Objective 2B2: Restore the connectivity of habitat types needed to sustain wildlife populations at the landscape level. Encourage and support the implementation of all forest practices, including road building and maintenance, as specified in the Washington Department of Natural Resources and Idaho Department of Lands Forest Practices Rules and Subbasin Forest Plans for all National Forests within the Subbasin.

2.3.2.1 Discussion of Provincial Terrestrial Objectives

Terrestrial objectives are prioritized at the provincial level. The top priority provincial terrestrial objective is Objective 1A: to complete the current Wildlife Mitigation Program for construction and inundation losses of federal hydrosystem. Construction of federal hydropower system projects in the IMP caused the inundation of over 80,000 acres of valuable low elevation wildlife-habitat. The losses were assessed using a scientifically proven methodology (Habitat Evaluation Procedures), and the mitigation/compensation obligation was incorporated into the Congressional record. Completion of this mitigation is not just good science; it's the law.

The second priority terrestrial objectives is Objective 1B: to quantify the operational effects of federal hydrosystem projects on terrestrial resources, develop mitigation plans in coordination with other resource mitigation and resource planning efforts, and implement projects to mitigate the impacts, including maintenance and monitoring.

Priority three are provincial objectives 2A and 2B which mitigate for wildlife losses that have occurred through secondary effects of hydrosystem development, including assessment, development of mitigation plan in coordination with other resources and resource managers, implementation, maintenance, and monitoring. Extirpation of anadromous fishes has led to changes in nutrient supply for wildlife species reliant on anadromous fish and to increased harvest pressure on wildlife for subsistence, cultural, and recreational uses. This mitigation action is necessary to meet the obligation of the hydropower system to the Tribal and non-Tribal communities of the upper Columbia River basin. Human impacts on wildlife populations have been accelerated in the Subbasin as a result of development of federal hydropower projects. A reliable and affordable power source, irrigation water supply, and employment opportunities provided

impetus for development of agriculture and other industry, leading to increased human disturbance levels and human use of wildlife and to reduction in wildlife-habitat quantity and quality.

The provincial terrestrial objectives are designed to respond to the limiting factors identified for the IMP. Strategies and RM&E plans were developed at the subbasin level to correspond to the provincial and subbasin objectives. Figure 2.3-3 (sheets 1 to 3) shows an example of each of the terrestrial provincial objectives with examples of the strategies and RM&E that have been proposed to respond to that objective. This is not meant to be a comprehensive list of all the limiting factors, strategies, or RM&E proposals. Rather this figure is intended to illustrate the connection between the assessment and the management plan. (Refer to the subbasin specific management plans for the full list of subbasin objectives and strategies.)

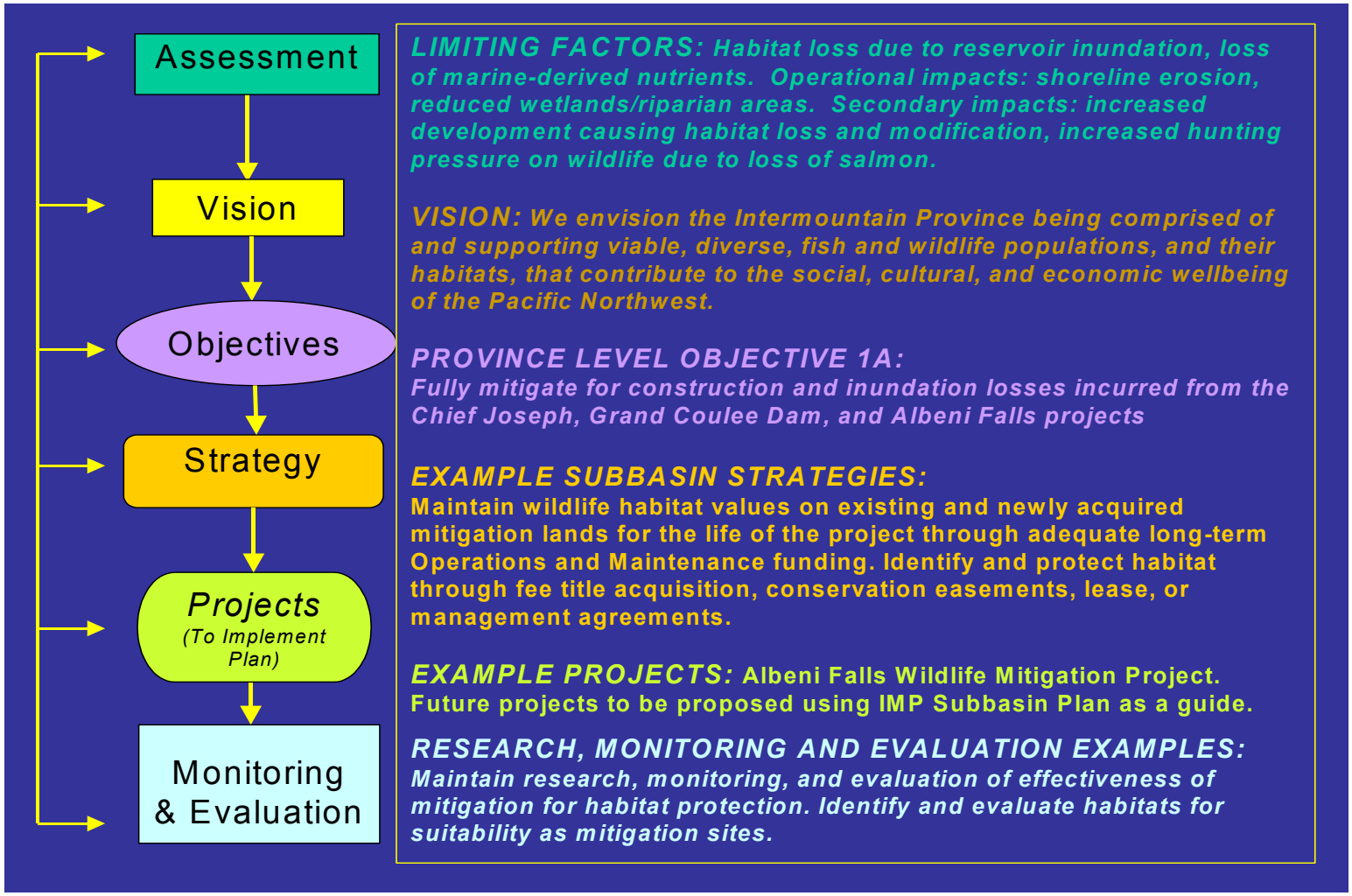

Figure 2.3-3, Sheet 1. Connection between the limiting factors for terrestrial wildlife and habitats and Province Objective 1A and the subbasin strategies and RM&E

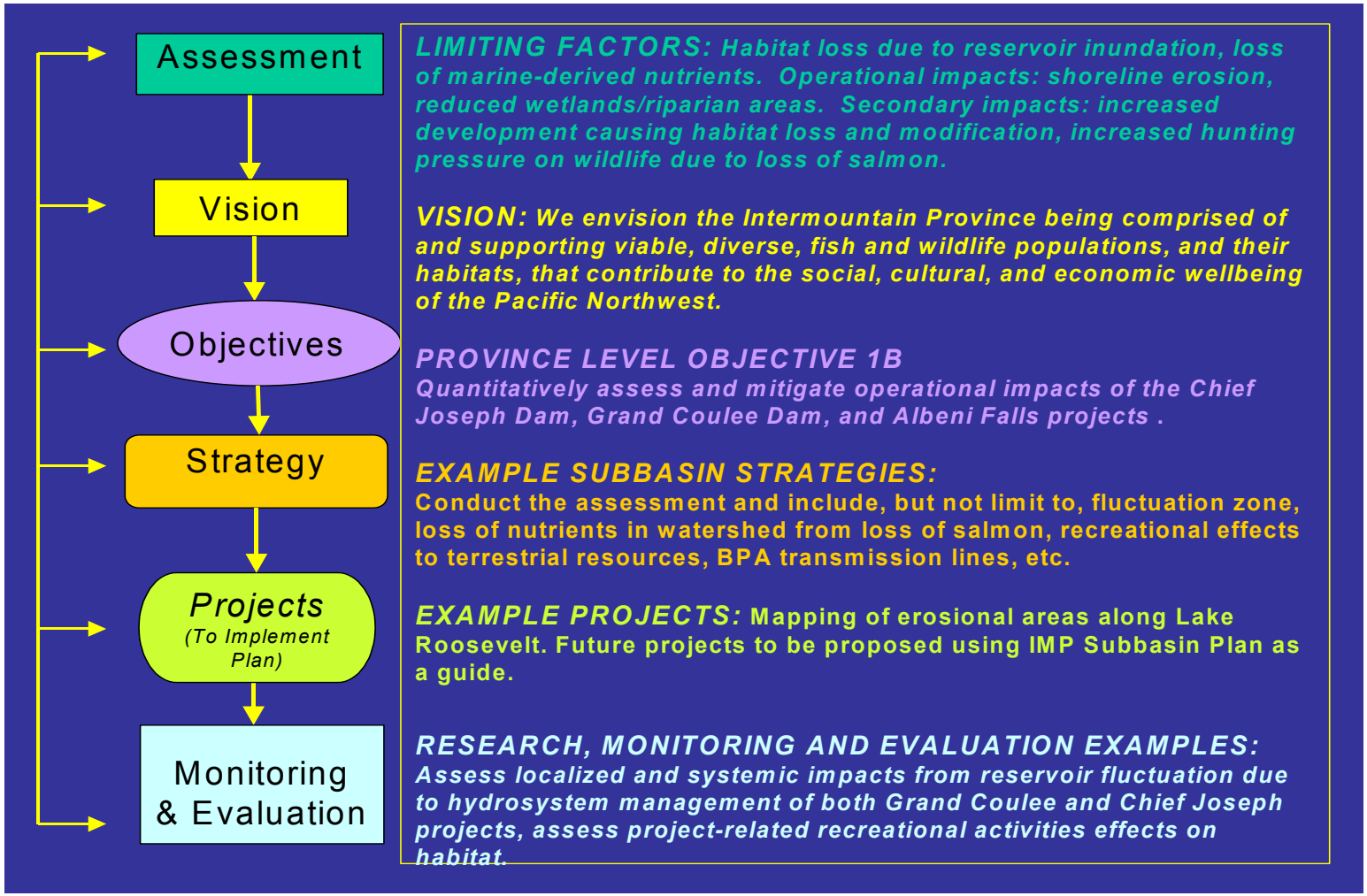

Figure 2.3-3, Sheet 2. Connection between the limiting factors for terrestrial wildlife and habitats and Province Objective 1B and the subbasin strategies and RM&E

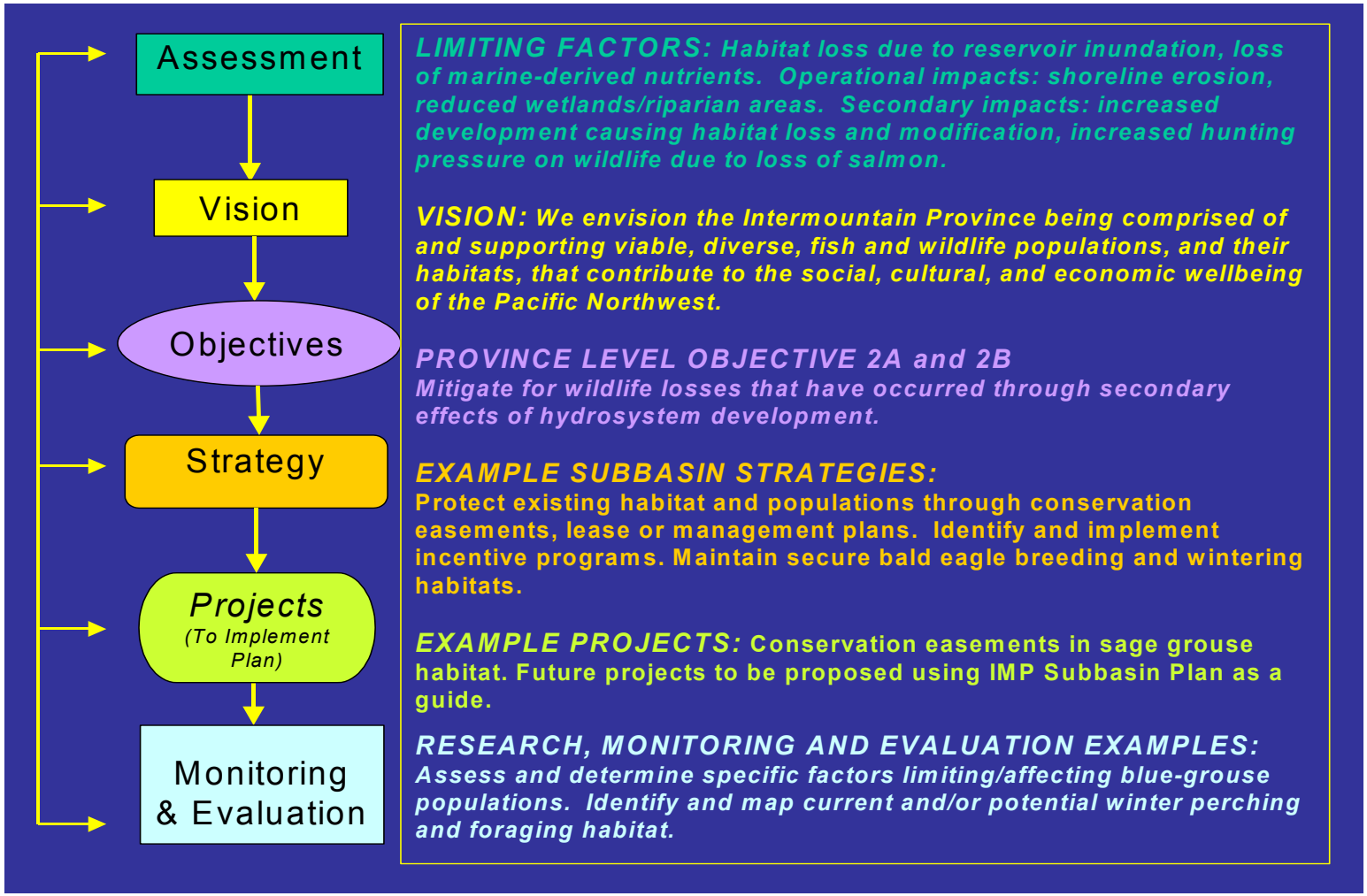

Figure 2.3-3, Sheet 3. Connection between the limiting factors for terrestrial wildlife and habitats and Province Objective 2A and 2B and the subbasin strategies and RM&E

2.3.2.2 Summary of Subbasin Terrestrial Objectives

Each subbasin developed objectives that are subbasin specific and are tiered to the province level objectives (see the subbasin specific management plan sections for more information). The subbasin objectives were prioritized by the Subbasin Work Teams. The following tables (tables 2.3.2-1 to 2.3.2-6) list the terrestrial subbasin objectives in priority order, with the limiting factors that the objectives were designed to address. Planners in each subbasin also developed strategies to implement the objectives. The strategies are described in the subbasin specific management plan sections.

Table 2.3.2-1. Ranked Terrestrial Objectives for the Coeur d'Alene Subbasin, with the limiting factor(s) that each objective was designed to address.

Objectives in Priority Order	Limiting Factor(s) Addressed
Provincial Priority 1 – Mitigate for construction and inundation losses	
Objective 1A: Fully mitigate for terrestrial resource losses incurred from construction and inundation of the Albeni Falls Project per the requirements of the Northwest Power Act. Complete the compensation mitigation consistent with the HEP loss assessment (Appendix C, Table 11-4 of the Columbia River Basin 2000 Fish and Wildlife Program) and the Albeni Falls Dam Wildlife Mitigation Project Operating Guidelines by year 2015. Meet these requirements in conjunction with the Pend Oreille Subbasin.	Terrestrial resource habitat losses incurred from construction and inundation of the Albeni Falls Dam.
(Highest priority) **Objective 1A1:** Protect, enhance, or restore bald eagle breeding Habitat Units to address coniferous and deciduous forest and forested wetland habitat losses resulting from construction of Albeni Falls Project. **Objective 1A3:** Protect, enhance, or restore black-capped chickadee Habitat Units to address deciduous forest habitat losses resulting from construction of Albeni Falls Project. **Objective 1A5:** Protect, enhance, or restore mallard Habitat Units to address floodplain meadow, scrub-shrub, open water, and herbaceous wetland habitat losses resulting from construction of Albeni Falls Project. **Objective 1A8** Protect, enhance, or restore redhead Habitat Units to address open water and near-shore floating aquatic weed bed habitat losses resulting from construction of Albeni Falls project. **Objective 1A2:** Protect, enhance, or restore bald eagle wintering Habitat Units to address coniferous and deciduous forest habitat losses resulting from construction of Albeni Falls Project. **Objective 1A4:** Protect, enhance, or restore Canada goose Habitat Units to address floodplain meadow, shoreline, open water and herbaceous wetland habitat losses resulting from construction of Albeni Falls Project. **Objective 1A6:** Protect, enhance, or restore muskrat Habitat Units to address herbaceous wetland and open water habitat losses resulting from construction of Albeni Falls Project. **Objective 1A7:** Protect, enhance, or restore white-tailed deer Habitat Units to address scrub-shrub wetland habitat losses resulting from construction of Albeni Falls Project.	Terrestrial resource habitat losses incurred from construction and inundation of the Albeni Falls Dam. Terrestrial resource habitat losses incurred from construction and inundation of the Albeni Falls Dam.
(Second Priority) **Objective 1A9:** Maintain wildlife values (Habitat Units) for the life of the project on existing and newly acquired mitigation lands through adequate long-term Operations and Maintenance (O&M) funding.	Terrestrial resource habitat losses incurred from construction and inundation of the Albeni Falls Dam.
Provincial Priority 2 – Quantify and mitigate for operational impacts	
Coeur d' Alene Subbasin Objective 1B*: Quantitatively assess and mitigate operational impacts of Albeni Falls Project on terrestrial resources in the Pend Oreille Subbasin by year 2015; include evaluation of potential mitigation sites and opportunities within the Coeur d' Alene Subbasin.	Lack of data on operational impacts
Objective 1B1*: Conduct an operational loss assessment associated with Albeni	Need to mitigate operational

Falls Project and identify the suite of impacts to wildlife and wildlife-habitat in quantitative terms; begin assessment by year 2005; complete assessment and development of mitigation proposal by year 2008.	impacts
Provincial Priority 3 – Mitigate for secondary effects of FCRPS and other subbasin effects	
Objective 2A2 (Highest priority): Based on established agency plans and decisions, restore and maintain viable populations of other federally-listed wildlife species in the subbasin.	Secondary effects to federally-listed wildlife species
Objective 2A1 (Second priority): To address secondary effects of hydrosystem projects and other development in the Subbasin on wildlife populations, restore and maintain special status species, including state threatened and endangered species, Tribal and state species of special concern, federal candidate species, BLM and USFS sensitive species, and USFS indicator species, in accordance with established agency plans and decisions.	Secondary effects to special status species
(Third Priority) **Objective 2A3:** Identify secondary losses and superimpose Coeur d'Alene aboriginal claims to secondary losses.	Lack of information, Tribal losses
(Fourth Priority): **Objective 2B1:** Identify, maintain, restore, and enhance priority habitats (wetlands, riparian areas, upland forests) within the Coeur d'Alene Subbasin, including their structural attributes, ecological functions, and distribution and connectivity across the landscape.	Secondary effects of FCRPS and other subbasin effects on priority habitats
(Fourth Priority): **Objective 2B2:** Identify and implement strategies and opportunities for restoring the diversity, block size, and spatial arrangement of habitat types needed to sustain target wildlife species at ecologically sound levels.	Secondary effects of FCRPS and other subbasin effects on priority habitats

Table 2.3.2-2. Ranked Terrestrial Objectives for the Pend Oreille Subbasin, with the limiting factor(s) that each objective was designed to address.

Objectives in Priority Order	Limiting Factor(s) Addressed
Provincial Priority 1 – Mitigate for construction and inundation losses	
Objective 1A Fully mitigate wildlife-habitat losses associated with the construction and inundation of the Albeni Falls Project per the requirements of the Council's 2000 Fish and Wildlife Program and Northwest Power Act. Complete the compensation mitigation consistent with the HEP loss assessment (Appendix C, Table 11-4 of the Columbia River Basin 2000 Fish and Wildlife Program) and the Albeni Falls Dam Wildlife Mitigation Project Operating Guidelines by year 2015. (These requirements will be met in coordination with the Coeur d'Alene Subbasin.)	Terrestrial resource losses incurred from construction and inundation of the Albeni Falls Dam
(Highest priority) **Objective 1A1:** Protect, enhance, or restore bald eagle breeding Habitat Units to address coniferous and deciduous forest and forested wetland habitat losses resulting from construction of Albeni Falls Project. **Objective 1A2:** Protect, enhance, or restore bald eagle wintering Habitat Units to address coniferous and deciduous forest habitat losses resulting from construction of Albeni Falls Project. **Objective 1A3:** Protect, enhance, or restore black-capped chickadee Habitat Units to address deciduous forest habitat losses resulting from construction of Albeni Falls Project. **Objective 1A4:** Protect, enhance, or restore Canada goose Habitat Units to address floodplain meadow, shoreline, open water and herbaceous wetland habitat losses resulting from construction of Albeni Falls Project. **Objective 1A5:** Protect, enhance, or restore mallard Habitat Units to address floodplain meadow, scrub-shrub, open water, and herbaceous wetland habitat losses resulting from construction of Albeni Falls Project. **Objective 1A6:** Protect, enhance, or restore muskrat Habitat Units to address herbaceous wetland and open water habitat losses resulting from construction of Albeni Falls Project. **Objective 1A7:** Protect, enhance, or restore white-tailed deer Habitat Units to address scrub-shrub wetland habitat losses resulting from construction of Albeni Falls Project.	Terrestrial resource losses incurred from construction and inundation of the Albeni Falls Dam

Objectives in Priority Order	Limiting Factor(s) Addressed
Objective 1A8: Protect, enhance, or restore redhead Habitat Units to address open water and near-shore floating aquatic weed bed habitat losses resulting from construction of Albeni Falls project. **Objective 1A9:** Maintain wildlife-habitat values (Habitat Units) for the life of the project on existing and newly acquired mitigation lands through adequate long-term Operations and Maintenance (O&M) funding.	
Provincial Priority 2 – Quantify and mitigate for operational impacts	
(2) Complete the assessment of operational effects on terrestrial resources by year 2008. **Objective 1B1***	Lack of data on operational impacts
(3) Complete development of mitigation plan by year 2010 and complete the implementation of initial mitigation by year 2015. **Objective 1B2**	Need for mitigation operational impacts
(4) Perform review and update of effects assessment and mitigation plan on a three-year cycle, to respond to changes in operation and to effectiveness of mitigation actions. **Objective 1B3***	Adaptive management, changing conditions
Provincial Priority 3 – Mitigate for secondary effects of FCRPS and other subbasin effects	
(5) Identify, maintain, restore, and enhance priority habitats (wetlands, riparian areas, upland forests, cliffs and rock outcrops) within the Pend Oreille Subbasin, including their structural attributes, ecological functions, and distribution and connectivity across the landscape. **Objective 2B2***	Secondary effects of FCRPS and other subbasin effects to priority habitats
(6) Fully mitigate for all FERC hydropower terrestrial resources effects within the Pend Oreille Subbasin in-kind and in-place when possible. Complete all mitigation requirements consistent with approved and active guidelines, agreements, and applicable federal (FERC) licenses. **Objective 2B1**	Other subbasin effects, specifically FERC hydropower impacts
(7) Maintain bald eagle populations at or above present levels (2004) within the Pend Oreille Subbasin. **Objective 2A2**	Secondary effects of FCRPS and other subbasin effects to bald eagles
(8) Restore a self-sustaining population of grizzly bears in the Selkirk Recovery Zone that meets the Grizzly Bear Recovery Plan goals (USFWS objective). **Objective 2A3**	Secondary effects of FCRPS and other subbasin effects to grizzly bears
(9) Protect, restore, enhance, and sustain populations of big game species such as black bear, elk, mountain goat, moose mountain lion, mule deer, and white-tailed deer. **Objective 2A6**	Secondary effects of FCRPS and other subbasin effects to big game species
(10) Reverse long-term mule deer population decline by providing for a 25-year increasing trend in the quantity and quality of mule deer habitats, particularly winter and spring habitats. **Objective 2B3**	Secondary effects of FCRPS and other subbasin effects to mule deer habitats
(11) Protect, restore, enhance, and sustain populations of waterfowl, upland game, and furbearers under traditional levels of recreational and subsistence use. **Objective 2A7**	Secondary effects of FCRPS and other subbasin effects to waterfowl, upland game, and furbearers
(12) Maintain or enhance amphibian and reptile populations relative to current levels within present use areas and identify limiting factors within the Subbasin. **Objective 2A10**	Secondary effects of FCRPS and other subbasin effects to amphibians and reptiles
(13) Maintain or enhance neo-tropical migrant bird populations relative to current levels within present use areas and identify limiting factors for these populations within the Pend Oreille Subbasin. **Objective 2A8**	Secondary effects of FCRPS and other subbasin effects to neo-tropical migrant birds
(14) Maintain or enhance invertebrate populations relative to current levels within present use areas and identify limiting factors for these populations within the Subbasin. **Objective 2A11**	Secondary effects of FCRPS and other subbasin effects to invertebrate populations
(15) Increase the Selkirk woodland caribou herd to 75 animals or more by 2010, with the intent to meet ESA delisting criteria by 2020. **Objective 2A1**	Secondary effects of FCRPS and other subbasin effects to Selkirk woodland caribou
(16) Identify, prioritize, and implement habitat improvements that address limiting factors in order to restore or maintain viable lynx populations in the Pend Oreille Subbasin. **Objective 2A4***	Secondary effects of FCRPS and other subbasin effects to lynx
(17) Restore and sustain state threatened and endangered species, Tribal and state species of special concern, federal candidate species, BLM and USFS sensitive species, and USFS indicator species. **Objective 2A5**	Secondary effects of FCRPS and other subbasin effects to TES species
(18) Maintain or enhance populations of cavity nesting species relative to current levels within present use areas and identify limiting factors within the Subbasin. **Objective 2A9**	Secondary effects of FCRPS and other subbasin effects to cavity nesting species

Objectives in Priority Order	Limiting Factor(s) Addressed
(19) Identify and implement strategies and opportunities for restoring the diversity, block size, and spatial arrangement of habitat types needed to sustain target wildlife species at ecologically sound levels. **Objective 2B4***	Secondary effects of FCRPS and other subbasin effects to target wildlife-habitat
(20) Restore the connectivity of habitat types needed to sustain wildlife populations at the landscape level. Encourage and support the implementation of all forest practices, including road building and maintenance, as specified in the WDNR and IDL Forest Practices Rules and Subbasin Forest Plans for all National Forests within the Subbasin. **Objective 2B5**	Secondary effects of FCRPS and other subbasin effects to habitat connectivity

Table 2.3.2-3. Ranked Terrestrial Objectives for the Spokane Subbasin, with the limiting factor(s) that each objective was designed to address.

Objectives in Priority Order	Limiting Factor(s) Addressed
Provincial Priority 1 – Mitigate for construction and inundation losses	
(1) Spokane Subbasin Objective 1A: Fully mitigate for terrestrial resource losses incurred from construction and inundation of the Grand Coulee Project per the requirements of the Northwest Power Act. Complete the compensation mitigation for construction losses at Grand Coulee Dam for wildlife and wildlife-habitat consistent with the HEP loss assessment (Appendix C, Table 11-4 of the Columbia River Basin 2000 Fish and Wildlife Program) by year 2015. (These requirements will be met in coordination with San Poil and Upper Columbia subbasins, which also are influenced by Lake Roosevelt). **Objective 1A1:** Protect, enhance, or restore secure riverine island Canada goose nest sites to address riverine island/bar habitat losses resulting from construction of the Grand Coulee Project. **Objective 1A2:** Protect enhance, or restore mourning dove Habitat Units to address riparian and agricultural habitat losses resulting from construction of the Grand Coulee Project. **Objective 1A3:** Protect, enhance, or restore mule deer Habitat Units to address shrub-steppe and river break habitat losses resulting from construction of the Grand Coulee Project. **Objective 1A4:** Protect, enhance, or restore riparian forest Habitat Units to address habitat losses resulting from construction of the Grand Coulee Project. **Objective 1A5:** Protect, enhance, or restore riparian shrub Habitat Units to address habitat losses resulting from construction of the Grand Coulee Project. **Objective 1A6:** Protect, enhance, or restore ruffed grouse Habitat Units to address riparian/hardwood forest habitat losses resulting from construction of the Grand Coulee Project. **Objective 1A7:** Protect, enhance, or restore sage grouse Habitat Units to address shrub-steppe habitat losses resulting from construction of the Grand Coulee Project. **Objective 1A8:** Protect, enhance, or restore sharp-tailed grouse Habitat Units to address grasslands, shrub-steppe, and riparian draw habitat losses resulting from construction of the Grand Coulee Project. **Objective 1A9:** Protect, enhance, or restore white-tailed deer Habitat Units to address seral forest habitat losses resulting from construction of the Grand Coulee Project. **Objective 1A10:** Maintain wildlife values (Habitat Units) for the life of the project on existing and newly acquired mitigation lands through adequate long-term Operations and Maintenance (O&M) funding.	Terrestrial resource losses incurred from construction and inundation of the Grand Coulee Project
(2) Evaluate effectiveness of mitigation by monitoring and evaluating species and habitat responses to mitigation actions. **Objective 1A11***	Lack of information, adaptive management
Provincial Priority 2 – Quantify and mitigate for operational impacts	
(3) Using an impartial third party contractor, perform assessment of operational impacts of the Grand Coulee Project on terrestrial resources by year 2008. **Objective 1B1***	Lack of data on operational impacts

Objectives in Priority Order	Limiting Factor(s) Addressed
(4) Develop mitigation plan for operational effects by year 2010. **Objective 1B2**	Need to mitigate operational impacts
(5) Implement initial mitigation plan by 2015, incorporating an ongoing revision and review cycle and adequate O&M funding. **Objective 1B3**	Need to mitigate operational impacts
Provincial Priority 3 – Mitigate for secondary effects of FCRPS and other subbasin effects	
(6) Increase sharp-tailed grouse populations within the IMP and associated subbasins to a minimum of 800 grouse by 2010; over the long-term, improve and maintain the habitats necessary to support self-sustaining, persistent populations of grouse, estimated to consist of a minimum of 2,000 birds. **Objective 2A2**	Secondary effects of FCRPS and other subbasin effects to sharp-tailed grouse populations
(7) Maintain bald eagle at or above present levels (2004) in the Spokane Subbasin. **Objective 2A1**	Secondary effects of FCRPS and other subbasin effects to bald eagle populations
(8) Identify specific projects to protect, restore, and/or enhance populations of game species in the subbasin reflecting federal, state, and Tribal management objectives (white-tailed deer, elk, moose). **Objective 2A5**	Secondary effects of FCRPS and other subbasin effects to game species populations
(9) Amphibians and Reptiles. Maintain or enhance amphibian and reptiles populations at current levels within suitable habitat and identify limiting factors within the Subbasin. **Objective 2A9**	Secondary effects of FCRPS and other subbasin effects to amphibians and reptile populations
(10) Increase blue grouse populations by 20 percent within the Spokane Subbasin and adjacent subbasins/provinces by year 2010. **Objective 2A3**	Secondary effects of FCRPS and other subbasin effects to blue grouse populations
(11) Neo-tropical migrant birds: Maintain or enhance neo-tropical migrant bird populations relative to current levels within suitable habitat and identify limiting factors for these populations within the Subbasin. **Objective 2A8**	Secondary effects of FCRPS and other subbasin effects to neo-tropical migrant bird populations
(12) Maintain or increase golden eagle populations at or above 2004 levels. **Objective 2A4**	Secondary effects of FCRPS and other subbasin effects to golden eagle populations
(13) Maintain raptor populations at or above present levels (2004) in the Spokane Subbasin in accordance with federal, state, and Tribal management plans. Protect important raptor sites including active and alternate nest trees, preferred feeding sites, migratory corridors, wintering areas, and perch and roost trees. **Objective 2A6**	Secondary effects of FCRPS and other subbasin effects to raptor populations
(14) Maintain or enhance populations of federal, state, local and tribal species of special concern, and other native and desirable nonnative wildlife species, within their present and/or historical ranges within the Spokane Subbasin in order to prevent future declines and restore populations that have suffered declines. **Objective 2A7**	Secondary effects of FCRPS and other subbasin effects to species of special concern populations
(15) Identify, protect, maintain, restore, and enhance priority habitats (wetlands, riparian areas, upland forests, steppe and shrub-steppe, cliffs and rock outcrops (including caves and mines) in accordance with applicable agency, federal, state, local, and Tribal priority habitat designations), including their structural attributes, ecological functions, and distribution and connectivity across the landscape to optimize conditions required to increase overall wildlife productivity of desired species assemblages. Strategies may include land acquisition, conservation easements, management contracts, and/or partnerships with other landowners. **Objective 2B2***	Secondary effects of FCRPS and other subbasin effects to priority habitats
(16) Increase the quantity and quality of mule deer habitats, particularly winter and spring habitats. **Objective 2B3**	Secondary effects of FCRPS and other subbasin effects to mule deer habitats
(17) Complete mitigation requirements consistent with approved agreements in applicable federal licenses. **Objective 2B1**	Other subbasin effects associated with hydropower development

Table 2.3.2-4. Ranked Terrestrial Objectives for the Upper Columbia Subbasin, with the limiting factor(s) that each objective was designed to address.

Objectives in Priority Order	Limiting Factor(s) Addressed
Provincial Priority 1 – Mitigate for construction and inundation losses	
(1) Fully mitigate for terrestrial resource losses incurred from construction and inundation of the Grand Coulee Project per the requirements of the Northwest Power Act. Complete the compensation mitigation for construction losses at Grand Coulee Dam for wildlife and wildlife-habitat consistent with the HEP loss assessment (Appendix C, Table 11-4 of the Columbia River Basin 2000 Fish and Wildlife Program) by year 2015. (These requirements will be met in coordination with San Poil and Upper Columbia subbasins, which also are influenced by Lake Roosevelt). **Objective 1A** **Sub-objectives listed below are all of equal priority.** **Objective 1A1:** Protect, enhance, or restore secure riverine island Canada goose nest sites to address riverine island/bar habitat losses resulting from construction of the Grand Coulee Project. **Objective 1A2:** Protect, enhance, or restore mourning dove Habitat Units to address riparian and agricultural habitat losses resulting from construction of the Grand Coulee Project. **Objective 1A3:** Protect, enhance, or restore mule deer Habitat Units to address shrub-steppe and river break habitat losses resulting from construction of the Grand Coulee Project. **Objective 1A4:** Protect, enhance, or restore riparian forest Habitat Units to address habitat losses resulting from construction of the Grand Coulee Project. **Objective 1A5:** Protect, enhance, or restore riparian shrub Habitat Units to address habitat losses resulting from construction of the Grand Coulee Project **Objective 1A6:** Protect, enhance, or restore ruffed grouse Habitat Units to address riparian/hardwood forest habitat losses resulting from construction of the Grand Coulee Project. **Objective 1A7:** Protect, enhance, or restore sage grouse Habitat Units to address shrub-steppe habitat losses resulting from construction of the Grand Coulee Project. **Objective 1A8:** Protect, enhance, or restore sharp-tailed grouse Habitat Units to address grasslands, shrub-steppe, and riparian draw habitat losses resulting from construction of the Grand Coulee Project. **Objective 1A9:** Protect, enhance, or restore white-tailed deer Habitat Units to address seral forest habitat losses resulting from construction of the Grand Coulee Project.	Terrestrial resource losses incurred from construction and inundation of the Grand Coulee Project
Provincial Priority 2 – Quantify and mitigate for operational impacts	
(2) Quantitatively assess operational impacts of the Grand Coulee Project on terrestrial resources by year 2008. **Objective 1B1***	Lack of data on operational impacts
(3) Develop mitigation plan by year 2010 and implement initial mitigation by year 2015. **Objective 1B2**	Need to mitigate operational impacts
Provincial Priority 3 – Mitigate for secondary effects of FCRPS and other subbasin effects	
(4) Increase sharp-tailed grouse populations within the IMP and associated subbasins to a minimum of 800 grouse by 2010; over the long-term, improve and maintain the habitats necessary to support self-sustaining, persistent populations of grouse, estimated to consist of a minimum of 2,000 birds. (This objective shared with Lake Rufus Woods, Spokane, and San Poil subbasins.) **Objective 2A2**	Secondary effects of FCRPS and other subbasin effects to sharp-tailed grouse populations
(5) Maintain bald eagle at or above present levels (2004) in the Upper Columbia Subbasin. **Objective 2A1**	Secondary effects of FCRPS and other subbasin effects to bald eagles
(6) Increase quantity and quality of mule deer habitats, particularly winter and spring ranges. **Objective 2C2**	Secondary effects of FCRPS and other subbasin effects to mule deer habitats
(7) Identify, maintain, restore, and enhance priority habitats (wetlands, riparian areas, upland forests, steppe and shrub-steppe, cliffs and rock outcrops, caves,	Secondary effects of FCRPS and other subbasin effects to priority

Objectives in Priority Order	Limiting Factor(s) Addressed
grasslands, and other priority habitats) within the Upper Columbia Subbasin, including their structural attributes, ecological functions, and distribution and connectivity across the landscape to optimize conditions required to increase overall wildlife productivity of desired species assemblages. Strategies may include land acquisition, conservation easements, management contracts, and/or partnerships with other landowners. **Objective 2C1***	habitats
(8) Maintain or increase golden eagle populations at, or above, 2004 levels. **Objective 2A4**	Secondary effects of FCRPS and other subbasin effects to golden eagles
(9) Increase blue-grouse populations by 20% in the Upper Columbia and adjacent subbasins/provinces by year 2010. **Objective 2A3**	Secondary effects of FCRPS and other subbasin effects to blue grouse populations

Table 2.3.2-5. Ranked Terrestrial Objectives for the San Poil Subbasin, with the limiting factor(s) that each objective was designed to address.

Objectives in Priority Order	Limiting Factor(s) Addressed
Provincial Priority 1 – Mitigate for construction and inundation losses	
(1) Protect, enhance, or restore sage grouse Habitat Units to address shrub-steppe habitat losses resulting from construction of the Grand Coulee Project **Objective 1A7**	Inundation of shrub steppe habitat by the Grand Coulee Project.
(2) Protect, enhance, or restore sharp-tailed grouse Habitat Units to address grasslands, shrub-steppe, and riparian draw habitat losses resulting from construction of the Grand Coulee Project. **Objective 1A8**	Inundation of sharp-tailed grouse habitat by the Grand Coulee Project.
(3) Protect, enhance, or restore riparian shrub Habitat Units to address habitat losses resulting from construction of the Grand Coulee Project. **Objective 1A5**	Inundation of riparian shrub habitat by the Grand Coulee Project.
(4) Protect, enhance, or restore riparian forest Habitat Units to address habitat losses resulting from construction of the Grand Coulee Project. **Objective 1A4**	Inundation of riparian forest habitat by the Grand Coulee Project.
(5) Protect, enhance, or restore ruffed grouse Habitat Units to address riparian/hardwood forest habitat losses resulting from construction of the Grand Coulee Project. **Objective 1A6**	Inundation of ruffed grouse habitat by the Grand Coulee Project.
(6) Protect, enhance, or restore mule deer Habitat Units to address shrub-steppe and river break habitat losses resulting from construction of the Grand Coulee Project. **Objective 1A3**	Inundation of mule deer habitat by the Grand Coulee Project.
(7) Protect, enhance, or restore white-tailed deer Habitat Units to address seral forest habitat losses resulting from construction of the Grand Coulee Project. **Objective 1A9**	Inundation of white-tailed deer habitat by the Grand Coulee Project.
(8) Protect enhance, or restore mourning dove Habitat Units to address riparian and agricultural habitat losses resulting from construction of the Grand Coulee Project. **Objective 1A2**	Inundation of mourning dove habitat by the Grand Coulee Project.
(9) Protect, enhance, or restore secure riverine island Canada goose nest sites to address riverine island/bar habitat losses resulting from construction of the Grand Coulee Project. **Objective 1A1**	Inundation of island habitat by the Grand Coulee Project.
Provincial Priority 2 – Quantify and mitigate for operational impacts	
(10) Quantitatively assess operational impacts of the Grand Coulee Project on terrestrial resources by year 2008. **Objective 1B1***	Lack of data on operational impacts
(11) Develop mitigation plan and begin implementation of mitigation by year 2010. **Objective 1B2***	Need to mitigate operational impacts
Provincial Priority 3 – Mitigate for secondary FCRPS effects and other subbasin effects	
(12) Increase sage grouse populations within the Lake Rufus Woods and San Poil subbasins to a minimum of 500 grouse by 2015. **Objective 2A3**	Secondary effects of FCRPS and other subbasin effects to sage grouse population
(13) Increase sharp-tailed grouse populations within the IMP and associated subbasins to a minimum of 800 grouse by 2010; over the long-term, improve and maintain the habitats necessary to support self-sustaining, persistent populations of grouse, estimated to consist of a minimum of 2,000 birds. (This objective shared with Lake Rufus Woods, Spokane, and Upper Columbia subbasins.)	Secondary effects of FCRPS and other subbasin effects to sharp-tailed grouse population

Objectives in Priority Order	Limiting Factor(s) Addressed
Objective 2A2	
(14) Maintain bald eagles at or above present levels, and secure bald eagle breeding habitat including active and alternate nest trees, preferred breeding sites, and perch and roost trees. (Protect within current applicable laws and regulations.) **Objective 2A1**	Secondary effects of FCRPS and other subbasin effects to bald eagles
(15) Maintain or increase golden eagle populations at or above 2004 levels. **Objective 2A5**	Secondary effects of FCRPS and other subbasin effects to golden eagles
(16) Maintain or enhance populations of federal, state, and Tribal species of special concern, and other native and desirable nonnative wildlife species, within their present and/or historical ranges within the San Poil Subbasin in order to prevent future declines and restore populations that have suffered declines. **Objective 2A4**	Secondary effects of FCRPS and other subbasin effects to species of special concern
(17) (Wetlands and Riparian) Protect, restore, and enhance wetland and riparian habitats in the San Poil Subbasin in cooperation with the Colville Confederated Tribes, U.S. Forest Service, and other landowners. Target species include beaver, bald eagle, Canada goose, mourning dove, long-eared owl, yellow warbler, ruffed grouse, white-tailed deer, and other species closely associated with these habitats. **Objective 2B3**	Secondary effects of FCRPS and other subbasin effects to wetland and riparian habitat
(18) (**Steppe and Shrub-Steppe)** Protect, enhance, and restore steppe and shrub-steppe habitats within the subbasin to ensure no net loss of habitat. Target species include: sage grouse, sharp-tailed grouse, mule deer, and other species closely associated with this habitat. **Objective 2B2**	Secondary effects of FCRPS and other subbasin effects to steppe and shrub-steppe habitats
(19) (Upland Forest) Protect, restore, and enhance upland forest habitats in the San Poil Subbasin through partnerships with the Colville Confederated Tribes, U.S. Forest Service, and other landowners. Target species include mule deer, northern flicker, ruffed grouse, white-tailed deer, and other species closely associated with this habitat. **Objective 2B4**	Secondary effects of FCRPS and other subbasin effects to upland forest habitats
(20) (Mule deer habitat) Reverse long-term mule deer population decline by providing for a 25-year increasing trend in the quantity and quality of mule deer habitats, particularly winter and spring habitats. **Objective 2B5**	Secondary effects of FCRPS and other subbasin effects to mule deer habitats
(21) (Rock/cliff/talus/caves) Ensure no net loss of habitat suitability of rocks/cliffs/talus/caves within San Poil Subbasin. Target species that use this habitat include: golden eagle, bushy-tailed woodrat, bats, lemmings, and other species closely associated with this habitat. **Objective 2B1**	Secondary effects of FCRPS and other subbasin effects to rock /cliff/talus/caves

Table 2.3.2-6. Ranked Terrestrial Objectives for the Lake Rufus Woods Subbasin, with the limiting factor(s) that each objective was designed to address.

Objectives in Priority Order	Limiting Factor(s) Addressed
Provincial Priority 1 – Mitigate for construction and inundation losses	
(1) Protect, enhance, or replace 1,179 sage grouse Habitat Units to address rock land and shrub-steppe losses resulting from construction of the Chief Joseph Project. **Objective 1A2**	Inundation of sage grouse habitat by Chief Joseph Project
(2) Protect, enhance or replace 2,290 sharp-tailed grouse Habitat Units to address shrub-steppe, rock land, and riparian losses resulting from construction of the Chief Joseph Project. **Objective 1A1**	Inundation of sharp-tailed grouse habitat by Chief Joseph Project
(3) Protect, enhance, or replace 58 yellow warbler Habitat Units to address palustrine habitat losses resulting from construction of the Chief Joseph Project. **Objective 1A3**	Inundation of yellow warbler habitat by Chief Joseph Project
(4) Protect, enhance, or replace 920 mink Habitat Units to address riverine/riparian losses resulting from construction of the Chief Joseph Project. **Objective 1A7**	Inundation of mink habitat by Chief Joseph Project
(5) Protect, enhance, or replace 1,992 mule deer winter range Habitat Units to address mixed forest, ponderosa pine savanna, shrub-steppe and rock-land losses resulting from construction of the Chief Joseph Project. **Objective 1A8**	Inundation of mule deer winter range habitat by Chief Joseph Project
(6) Protect, enhance, or replace 401 bobcat Habitat Units to address rock and rock- land losses resulting construction of the Chief Joseph Project. **Objective 1A9**	Inundation of bobcat habitat by Chief Joseph Project

Objectives in Priority Order	Limiting Factor(s) Addressed
(7) Protect, enhance, or replace 1,254 spotted sandpiper Habitat Units to address the sand/gravel/cobble losses resulting from construction of the Chief Joseph Project. **Objective 1A10**	Inundation of spotted sandpiper habitat by Chief Joseph Project
(8) Protect, enhance, or replace 286 Lewis' woodpecker Habitat Units to address ponderosa pine savanna and mixed forest losses resulting from construction of the Chief Joseph Project. **Objective 1A6**	Inundation of Lewis' woodpecker habitat by Chief Joseph Project
(9) Protect, enhance, or replace 213 Canada goose Habitat Units to address island/sandbar losses resulting from construction of the Chief Joseph Project. **Objective 1A4**	Inundation of Canada goose habitat by Chief Joseph Project
(10) Protect, enhance or replace 239 ring-necked pheasant wintering Habitat Units to address agricultural losses resulting from construction of the Chief Joseph Project. **Objective 1A5**	Inundation of ring-necked pheasant wintering habitat by Chief Joseph Project
Provincial Priority 2 – Quantify and mitigate for operational impacts	
(11) Assess operational impacts of the Chief Joseph Project on terrestrial resources in the Lake Rufus Woods Subbasin by year 2008. **Objective 1B1***	Lack of data on operational impacts
(12) Upon completion of assessment of operational impacts, develop plan for mitigation of effects by year 2010 and implement initial plan measures by year 2015. **Objective 1B2***	Need to mitigate operational impacts
Provincial Priority 3 – Mitigate for secondary effects of FCRPS and other subbasin effects	
(13) Increase sage grouse populations within the Lake Rufus Woods and San Poil subbasins to a minimum of 500 grouse by 2015. **Objective 2A3**	Secondary effects of FCRPS and other subbasin effects on sage grouse
(14) Increase sharp-tailed grouse populations within the IMP and associated subbasins to a minimum of 800 grouse by 2010; over the long-term, improve and maintain the habitats necessary to support self-sustaining, persistent populations of grouse, estimated to consist of a minimum of 2,000 birds. (This objective shared with San Poil, Spokane, and Upper Columbia subbasins.) **Objective 2A2**	Secondary effects of FCRPS and other subbasin effects on sharp-tailed grouse populations
(15) Maintain bald eagle at or above present levels (2004) in the Lake Rufus Woods Subbasin. Annually maintain and/or enhance the integrity of bald eagle nesting territories and winter roost sites. **Objective 2A1**	Secondary effects of FCRPS and other subbasin effects on bald eagles
(16) Maintain or enhance populations of federal, state, and tribal species of special concern, and other native and desirable nonnative wildlife species, within their present and/or historical ranges within the Lake Rufus Woods Subbasin in order to prevent future declines and restore populations that have suffered declines. **Objective 2A4**	Secondary effects of FCRPS and other subbasin effects on special concern species
(17) Reverse long-term mule deer population decline by providing for a 25-year increasing trend in the quantity and quality of mule deer habitats, particularly winter and spring habitats, in Okanogan County. **Objective 2B2**	Secondary effects of FCRPS and other subbasin effects on mule deer habitats
(18) Identify, maintain, restore, and enhance priority habitats (wetlands, riparian areas, upland forests, steppe and shrub-steppe, cliffs and rock outcrops, caves, and other priority habitats) within the Lake Rufus Woods Subbasin, including their structural attributes, ecological functions, and distribution and connectivity across the landscape. **Objective 2B1***	Secondary effects of FCRPS and other subbasin effects on priority habitats

2.4 Inventory of Existing Programs in the Intermountain Province

A variety of agencies, Tribes, and private citizens are involved in a wide range of programs to enhance fish and wildlife-habitats and populations in the IMP. This chapter describes many of the activities that are going on in the province as a whole, or in multiple subbasins within the province. Agencies and activities that are specific to only one subbasin are described in the subbasin chapters.

2.4.1 Current Management Direction

2.4.1.1 Federal Government

Bonneville Power Administration

The Bonneville Power Administration is the power marketing authority for power generated by the Federal Columbia River Power System (FCRPS). They are responsible for production, distribution, and sales for all energy generated at FCRPS facilities. They are also the funding authority for FCRPS mitigation as identified in the Northwest Power Planning and Conservation Act (1980).

U.S.D.A Forest Service

The USFS manages over half of the upper Pend Oreille Subbasin and half of the Coeur d' Alene Subbasin as part of the Idaho Panhandle National Forests (IPNF) and the portions of the lower Pend Oreille, Upper Columbia, and San Poil subbasins as part of the Colville National Forest. The USFS uses several documents to manage lands: the Colville National Forest Land and Resource Management Plan, the Idaho Panhandle National Forest Plan, Inland Native Fish Strategy (INFISH), and the National Forest Management Act. These plans provide standards and guidelines for management of national forest resources within the subbasin.

The USFS is directed to maintain viable native vertebrate populations under the National Forest Management Act. The *Colville Forest Plan* directs the Colville National Forest office to protect native fish by reducing the risk of population loss and the potential negative effects to their aquatic habitat. The Colville National Forest fisheries goal is to restore degraded riparian and in-stream habitat on USFS lands.

The INFISH interim strategy was adopted in 1995 to protect inland native fish and their habitat. The INFISH program has riparian management objectives, riparian goals, riparian habitat conservation areas, and standards and guidelines for all resource management activities in order to protect and/or restore native fish habitat.
All projects on the National Forest System Lands in the IMP are required to be in compliance with INFISH guidelines, which include mandatory setbacks from streams unless site-specific management criteria for improving these habitats are met.

The USFS currently has a Memorandum of Understanding (MOU) with WDFW. The MOU stipulates that both agencies agree to cooperate in the formulation and application of practical long-range objectives, plans and programs for the management of fish and wildlife species and their habitats on USFS lands.

Federal Energy Regulatory Commission

Among other responsibilities, the Federal Energy Regulatory Commission (FERC) licenses privately-owned hydropower facilities. In the IMP, Avista projects on the Clark Fork River (Cabinet Gorge Dam) and on the Spokane River are licensed by FERC. Pend Oreille River hydropower projects (Pend Oreille PUD, Box Canyon and Seattle City Light, Boundary Dam) are also licensed by FERC. New licenses for Cabinet Gorge and Noxon Rapids (located upstream of Cabinet Gorge, outside the IMP) were issued in 2000 and require fish and wildlife mitigation activities. The Avista Spokane projects are

currently in re-licensing proceedings, as is Box Canyon Dam. Additional fish and wildlife mitigation may occur through the FERC re-licensing process.

U.S. Army Corps of Engineers

The USACE, Seattle District, manages Albeni Falls Dam and Lake Pend Oreille as a multi-purpose project for hydropower production, flood control, recreation, fish and wildlife conservation, and navigation. Land allocation, management standards, and guidelines are outlined in the *Albeni Falls Project Master Plan* (1981). Management of USACE lands and waters is guided by federal and state legislation, Army and USACE policies, and local policy. Within the Pend Oreille Subbasin, the USACE manages approximately 1,716 ha of land and water in fee-title interest. Of this total, 1,626 ha are licensed to IDFG for the purpose of development, conservation, and management of wildlife resources. The remaining acreage is managed by the USACE as developed recreation sites, natural areas, or operations areas designated for authorized purposes other than recreation or wildlife management. Additionally, the USACE Regulatory Branch, Walla Walla District, administers activities within the Idaho portion of the province subject to Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act.

In addition, the USACE is the regulatory entity that controls water levels within Lake Rufus Woods. They also regulate water flows (flood control) and irrigation easements.

Bureau of Land Management

The Bureau of Land Management (BLM) administers several small, isolated tracts in northern Idaho, and management emphasis is directed at water-based recreation. The BLM also administers some lands in the Upper Columbia and Spokane subbasins and approximately 6 miles of shoreline along the Pend Oreille River north of Metaline Falls.

U.S.D.I. Bureau of Reclamation

The U.S. Bureau of Reclamation operates the Grand Coulee Power Office and is responsible for regulation of Lake Roosevelt.

National Park Service

The National Park Service manages lands in Lake Roosevelt National Recreation Area according to direction in the General Management Plan and the new Upper Columbia Inventory and Monitoring Plan currently under development.

U.S. Fish and Wildlife Service

The mission of the U.S. Fish and Wildlife Service (USFWS) is to work with others to conserve, protect and enhance fish, wildlife, plants and their habitats for the continuing benefit of the American people. Within the IMP**,** the USFWS, in the Department of the Interior, is responsible for administration of the Endangered Species Act for resident and native fish and wildlife.

The USFWS is the primary federal agency responsible for the conservation, protection, and enhancement of migratory birds, endangered species, and resident fish. The USFWS administers and manages the National Wildlife Refuge System, including the Little Pend Oreille National Wildlife Refuge in the Upper Columbia Subbasin. To protect and enhance fish and wildlife-habitat, the USFWS reviews land management plans and permit applications for activities such as timber harvest, stream alteration, and hydroelectric projects.

The USFWS provides funding for habitat restoration projects and is the lead agency for administering the Native Salmonid Restoration Plan (NSRP) associated with the re-licensing of Cabinet Gorge Dam on the Clark Fork River. The NSRP is an adaptive management approach to restoring fish passage and connectivity between the Idaho and Montana portions of the Lower Clark Fork and Pend Oreille subbasins. The NSRP also has provisions for improving habitat and other measures to benefit native fish.

The USFWS administers the Endangered Species Act (ESA). The USFWS is developing bull trout and lynx recovery plans that include subbasins within the IMP. Recovery plans for grizzly
bears, caribou, and bald eagles are in effect. Federal plans, policies, and guidelines associated with the IMP include the *Canada Lynx Conservation Assessment and Strategy* (Ruediger et al. 2000), *Selkirk Mountain Woodland Caribou Recovery Plan* (USFWS 1994), and the *Grizzly Bear Recovery Plan* (USFWS 1993). The Interagency Grizzly Bear Committee also established strategies for reducing female grizzly bear mortalities in the Selkirk and Cabinet-Yaak Recovery Zones, which are located in the Pend Oreille Subbasin.

The USFWS also: works with private landowners to protect, enhance, and restore fish and wildlife-habitat through its Partners for Fish and Wildlife Program; operates numerous fish hatcheries throughout the Columbia River basin; investigates effects from environmental contaminants and works with numerous stakeholders to restore affected fish and wildlife resources and their habitats; and assures the conservation of Tribal trust resources.

Natural Resources Conservation Service

The Natural Resources Conservation Service (NRCS) provides technical support to landowners and assists with funding projects designed to reduce soil erosion and provide streambank protection. The NRCS works with farmers and ranchers, mostly on a voluntary basis to assess and mitigate fish and wildlife resources on or adjacent to their private lands. A variety of analysis models and technical studies are used to prescribe eligibility for cost-share mitigation programs including Conservation Reserve Program (CRP) and Wildlife-habitat Improvement Program (WHIP), and Wetland Reserve Program (WRP). Other NRCS programs are listed in Appendix H.

U.S. Environmental Protection Agency

The U.S. Environmental Protection Agency (EPA) is responsible for implementing the Clean Water Act, including ensuring that Total Maximum Daily Load (TMDL) plans are

developed and implemented. EPA also oversees the NPDES permitting system for pollutant dischargers and assists Tribes and state governments in protecting water quality.

2.4.1.2 Tribal Governments

The Tribes of the Upper Columbia have organized into the Upper Columbia United Tribes (UCUT). The UCUT goals for the Upper Columbia Blocked Area are: effective management of Tribal natural resources in the Upper Columbia Blocked Area; water, fish, wildlife, and cultural resources for the benefit of Tribal peoples and society as a whole; functional aquatic and terrestrial habitat in the rivers and tributaries should be protected first; potentially functional habitats should be restored and enhanced through improved land use practices and management; and integrated fish and wildlife-habitats should support functional aquatic and terrestrial communities characterized by productive populations of key fish and wildlife species.

Confederated Tribes of the Colville Reservation

The Colville Reservation covers 1.4 million acres and fishing and hunting rights cover at least another 1.5 million acres outside of the reservation boundaries mostly within the IMP. The Colville Tribes have sovereignty over approximately half of the San Poil and Lake Rufus Woods subbasins and co-manage the remaining areas. The Colville Tribes have co-management authority over the largest portion of the Upper Columbia Subbasin and sovereignty over more lands in the IMP than any other agency other than the states of Washington and Idaho.

The Natural Resources Department of the Colville Tribes has management and regulatory authority that includes but is not limited to the following areas: fish and wildlife management, enforcement, land use activities, water rights and adjudication, development permitting, hydraulics permitting and shoreline protection (for example, Confederated Tribes of Colville Reservation (CTCR) Shoreline Management Act). CTCR/Bureau of Indian Affairs uses the Colville Reservation Forest Plan, Integrated Resource Management Plan, Code of Federal Regulations, and others to manage land, fish, and wildlife on the Colville Reservation.

The Colville Tribes are currently involved in writing a specific Fish and Wildlife Plan to direct future efforts. This fish and wildlife management plan will define the long-term goals and objectives of the Colville Tribes Fish and Wildlife Division. To best meet the needs of the Tribal Membership, the Fish and Wildlife Division uses sound resource management to provide sustainable populations of fish and wildlife resources. Each year, progress is reviewed and annual work plans developed in order to adaptively manage the resources to achieve the long-term goals as described in the plan. It is the mission of the Fish and Wildlife Division, "To provide subsistence, cultural opportunities and economic benefits for the Tribal Membership through sustainable ecosystem management. We accept our responsibility to manage, protect, and enhance tribal natural resources and to provide multiple products and services for the tribal membership on the reservation and on accustomed and traditional lands."

Kalispel Tribe

Traditionally, the Kalispel Tribe occupied the territory extending throughout the entire Pend Oreille/Clark Fork watershed (including the Priest River watershed) from within Canada to Thompson Falls, Montana. Cultural and traditional resources were abundant throughout the area and Tribal members continue to depend upon resources in this area as a means of providing subsistence, recreational, and traditional resources for their families as their ancestors had once done. This includes such resources as caribou, elk, deer, bear, moose, other wildlife species, salmon and resident fish, camas, Indian carrot, etc. Tribal use of these areas in accordance with applicable state and federal law is supported through the United States Constitution, Indian Claims Commission findings, executive order rights, and working agreements with the states of Idaho and Washington.

The Kalispel Natural Resource Department (KNRD) *Fish and Wildlife Management Plan* is a comprehensive accumulation of current and future KNRD enhancement activities on lands transferred to reservation status pursuant to Executive Order dated March 23, 1914. The Plan identifies resource mission statements that are supported by specific goals and objectives. The Plan directs each division's annual work plan. Strategies are developed annually and drive each division's on-the-ground activities to achieve its stated mission. The KNRD's approach is to manage sustainable native populations and habitats using watershed management principles. Nonnative populations and/or artificial habitat management will be addressed based upon population health, habitat condition, and feasibility. The Kalispel Tribe entered into an MOU with WDFW to work cooperatively to restore and recover depressed populations of native fisheries such as bull trout and cutthroat trout in the lower Pend Oreille River and its tributaries.

Other documents that pertain to plans, policies, and guidelines relevant to the Lower Pend Oreille Subbasin include the *Kalispel Tribe of Indians Natural Resource Department Fish and Wildlife Management Plan* (1997), *Kalispel Resident Fish Project Annual Report* (1995), and *Kalispel Tribe of Indians Wildlife Mitigation and Restoration for Albeni Falls Dam: Flying Goose Ranch Phase I* (1993) and *Tacoma/Trimble Area Management Plan (*2003*)*.

Coeur d' Alene Tribe

Traditionally, the Coeur d' Alene people occupied the territory extending roughly from Lake Pend Oreille to the north to the Clearwater River to the south, the Bitterroot Mountains to the East and the Channel Scablands to the west (Sprague 1996; Coeur d' Alene Tribe EAP 2000 Draft). Cultural and traditional resources are abundant throughout the area and Tribal members continue to depend upon this area as a means of providing subsistence, recreational, and traditional resources for their families as their ancestors had for thousands of years before them. This includes such resources as elk, deer, bear, moose and other wildlife species, fish, camas, water potato, etc. Tribal occupation of these areas is supported through the United States Constitution, executive order rights, and government-to-government agreements with the State of Idaho.

The Coeur d' Alene Tribe's Natural Resources Department is dedicated to the management of all natural resources within the historical and cultural territories of the

Coeur d' Alene Tribe. The Department is comprised of fisheries, wildlife, water resources, forestry, fire management, land services, air quality, pesticides, GIS, NRDA, and environmental planning programs, each dedicated to management of lands and resources and enforcement of Tribal regulations. The Tribal fish and wildlife programs operate under a mission to restore, protect, expand, and reestablish native fish and wildlife populations to sustainable levels to provide harvest opportunities.

The Coeur d' Alene Tribe is the only Tribal agency responsible for fish and wildlife populations in the Coeur d' Alene Subbasin. The Tribe is also responsible for the management and enforcement of all Tribal member harvest within the Subbasin, including the establishment of all seasons, bag limits, harvest techniques, etc. The Tribe serves as a core member of the Albeni Falls Interagency Work Group and uses this forum as the mechanism for mitigating the impacts that the construction and operation of Albeni Falls Dam had, and continues to have, upon the fish and wildlife resources throughout the ceded, usual, and accustomed lands of the Coeur d' Alene peoples. This includes the mitigation of the existing construction and inundation losses, operational losses, and secondary losses that may exist.

The Coeur d' Alene Tribe has developed a Resident Fish Management Plan (RFMP) for the enhancement of resident fish within the Coeur d' Alene Reservation (Lillengreen, Vitale, and Peters 1999). This document summarizes all assessment information collected in waters of the reservation and identifies goals, objectives and strategies for the Tribe's Fisheries Program. It outlines a conceptual approach for enhancement activities and provides uniform instructions for the planning, implementation, monitoring, and evaluation of these activities. The Tribe works with private landowners and other agencies to implement riparian corridor enhancement activities. The Tribe has also prepared a Forest Management Plan (2002) and an Environmental Action Plan (EAP) Assessment of Environmental Concerns on and near the Coeur d' Alene Reservation (2000).

Spokane Tribe of Indians

The Spokane Tribe of Indians (STOI) were historically a river people whose main staple diet pre-European settlement consisted of salmon harvested at three primary locations within the IMP, Spokane Falls and Little Falls along the Spokane River (Spokane Subbasin) and Kettle Falls located on the Columbia River (Upper Columbia Subbasin). The Spokane Tribe was bounded on three sides by water and has one of the richest fishing archeological/histories in the Interior Columbia River Basin.

President Hayes signed the Executive Order establishing the Spokane Indian Reservation on January 18, 1881. The executive order established the reservation size to be approximately 157,000 acres (mol) and stated the following:

> "It is hereby ordered that the following tract of land situated in Washington Territory be, and the same is hereby, set aside and reserved for the use and occupancy of the Spokane Indians, namely:

> Commencing at a point where Chamokane Creek crosses the forty eight parallel of latitude; thence down the East bank of said creek to where it enters the Spokane River; thence across said Spokane River westwardly along the southern bank thereof to a point where it enters the Columbia River; thence across the Columbia River northwardly along its western bank to a point where said river crosses the said forty eight parallel of latitude thence East along said parallel to the place of beginning."

The mission of the Spokane Tribe of Indians Department of Natural Resources is to preserve, protect, manage and enhance the long term sustainability of the natural resources for present and future generations, through interdisciplinary process by developing and implementing Best Management Practices.

The Department of Natural Resources of the Spokane Tribe has management authority that includes areas such as: fish and wildlife management, enforcement, land use activities, water rights and adjudication, development, hydraulics permitting and shore line protection. STOI DNR/Bureau of Indian Affairs use the Forest Management Plan, Integrated Resource Management Plan, Code of Federal Regulations, and the Spokane Tribal Law and Order Code to assist in the decision-making of management for land use, water resources and fish and wildlife resources. An Environmental Code and a Non-Point pollution source plan are currently under development.

The STOI have a reservation in the Spokane and Upper Columbia subbasins. The Spokane Tribal Wildlife Program currently manages over 2,950 acres of land for protection and enhancement of habitats lost from construction of Grand Coulee Dam. Site-specific management plans address mule deer, white-tailed deer, ruffed grouse, and sharp-tailed grouse habitat.

Kootenai Tribe of Idaho

The Kootenai Tribe of Idaho has a reservation outside the IMP. However, the Tribe is involved in subbasin planning in the IMP because the IMP is a portion of the Tribe's ceded lands, where they retain hunting and fishing rights. In addition, they are involved in the Albeni Falls Interagency Work Group, which works on planning and implementation of Albeni Falls Dam wildlife mitigation.

2.4.1.3 State Government

Idaho Department of Fish and Game

The Idaho Department of Fish and Game (IDFG) is charged with "preserving, protecting, and perpetuating" Idaho's fish and wildlife resources for present and future generations, and is the state agency responsible for managing fish and wildlife populations in the state of Idaho. IDFG developed and has updated a Fisheries Management Plan (FMP) for the subbasins on a five-year review cycle beginning in 1981. The existing plan covers the 2001-2006 time frame. IDFG's fisheries management policies emphasize providing diverse sport fishing opportunities while conserving wild, native fish stocks.

In 1996, the State of Idaho completed its Bull Trout Conservation Plan (BTCP). Coeur d' Alene and its tributaries were designated a bull trout key watershed. A bull trout

Technical Advisory Team (TAT), consisting of state, Tribal, federal, and private industry scientists, completed the *Coeur d' Alene Lake Key Watershed Bull Trout Problem Assessment* in 1998. The plan recommended specific, prioritized actions that will benefit bull trout, and the plan established two restoration targets for bull trout: 1) ensure the Coeur d' Alene Lake Basin bull trout population is not vulnerable to extinction, and 2) provide for an overall bull trout population sufficient to produce an annual harvestable surplus. IDFG efforts in bull trout restoration involve population monitoring, harvest regulation, enforcement and habitat protection.

The IDFG has developed and updated numerous wildlife plans since the mid-1980s focusing primarily on the big game species. Species plans are currently in place for black bear, mountain lion, white-tailed deer, mule deer, elk, moose and mountain goat. Other management plans cover groups of species including waterfowl, upland game, furbearers, and non-game wildlife. Annual reports are prepared that document harvest, research activities and other information used in management decisions. Information relevant to other species, both game and non-game, is collected in a variety of programs and reports.

The IDFG manages the Idaho Conservation Data Center (ICDC), a database of occurrence information for rare, threatened, and endangered plants and animals in the state.

Idaho Department of Lands

The Idaho Department of Lands (IDL) enforces the Idaho Forest Practices Act (IFPA) regulating commercial timber production and harvest on state and private lands within the Subbasin. The IFPA contains guidelines to protect fish-bearing streams during logging and other forest management activities which address stream buffers and riparian management, road maintenance and construction standards, as well as other topics. The IDL assists private landowners with the development of timber management plans so that they comply with site-specific best management practices. Additionally, the IDL is responsible for administering mining laws and the State's lake protection act, and holds regulatory authority for lake shoreline developments for the northern portion of Coeur d' Alene Lake.

Idaho Department of Environmental Quality

The Idaho Department of Environmental Quality (IDEQ) has more than a dozen water quality programs. These include Beneficial Use Reconnaissance Program (BURP) monitoring; 305(b) water quality assessments; 303(d) reports of impaired waters and pollutants; TMDL assessments, pollutant reduction allocations, and implementation plans; water quality issues associated with bull trout recovery planning; 319 non-point source pollution management; anti-degradation policy; water quality certifications; municipal wastewater grants and loans; NPDES inspections; water quality standards promulgation and enforcement; general ground water monitoring and protection; source water assessments; and specific watershed management plans identified by the legislature. The Idaho Board of Environmental Quality oversees direction of the agency to meet responsibilities mandated through Idaho Code, executive orders, court orders, and agreements with other parties.

The IDEQ has been developing subbasin assessments of the water quality and total maximum daily loads (TMDLs) where appropriate for each of the fourth order HUCs of the Coeur d' Alene Subbasin.

Idaho Department of Parks and Recreation

Idaho Department of Parks and Recreation's (IDPR) mission is as stated in legislation, " … IDPR shall formulate and put into action a long range, comprehensive plan and program for the acquisition, planning, protection, operation, maintenance, development and wise use of areas of scenic beauty, recreational utility, historic, archaeological or scientific interest, to the end that the health, happiness, recreational opportunities and wholesome enjoyment of the life of the people may be further encouraged." IDPR's vision states, "We are innovators in outdoor recreation, committed to excellent service and resource stewardship. We foster experiences that renew the human spirit and promote community vitality."

To this end, IDPR manages nine state parks in the province providing opportunities ranging from camping to hiking to interpretive programs to water-based activities. These parks serve over 1,000,000 visitors annually. IDPR works closely with their various counterparts in north Idaho to provide and enhance recreational opportunities. The province contains 26 percent of the Idaho's boatable water acres and 32 percent of the state's motorized boating access. Six of Idaho's grooming programs are located in the province. IDPR administers the registration program for snowmobiles (8,300 in 2002), boats (33,000 in 2003), and off-highway vehicles (almost 15,000 in 2003), and the permit program for the State's Park N'Ski areas. Money from those registrations and other sources goes to develop and maintain trails, facilities, and programs in the Idaho portion of the province for recreationists.

Idaho Water Resources Board

The Idaho Water Resources Board has identified and adopted stream maintenance flows for Grouse Creek, Granite Creek, Sullivan Springs, Lightning Creek, and Pack River. The Idaho Department of Water Resources is responsible for managing Idaho's water rights program and the Stream Channel Protection Act, which requires permits for in-channel work or developments.

Idaho Office of Species Conservation

The Idaho Office of Species Conservation was established in 2000. The duties of the Office include coordination of all Idaho State departments and divisions with duties and responsibilities affecting endangered species, threatened species and species petitioned to be listed; coordinating state implementation and response to federal recovery plans, biological opinions, guidance and projects among all state and local governments in the state of Idaho; and participation in regional efforts to cooperatively address endangered species and threatened species, providing input and comment to federal and state agencies and Tribes on issues relating to endangered species, threatened species, petitioned, rare and declining species. Duties also include cooperating and consulting with the IDFG regarding agreements pursuant to 16 U.S.C. Section 1535; negotiating

agreements with federal agencies concerning endangered species, threatened species and candidate species, including, but not limited to, agreements pursuant to 16 U.S.C. Section 1533(d) and 16 U.S.C. Section 1539(a), other than those agreements negotiated pursuant to 16 U.S.C. Section 1535. It further provides the people of the state of Idaho with an ombudsman who can listen to citizens being harmed or hindered by the regulations of the ESA and direct them to the appropriate state or federal agency and/or speak on their behalf, as deemed appropriate by the ombudsman, to address issues or concerns related to the ESA, and serve as a repository for agreements and plans among governmental entities in the state of Idaho to conserve threatened and endangered species.

State policy on threatened, endangered and petitioned species and state management plans shall be developed in consultation with the appropriate state agencies. The appropriate state agency for wildlife biological and species management issues and for plant life biological and species management issues is the Department of Fish and Game. The appropriate state agency for timber harvest activities, oil and gas exploration activities and for mining activities is the Department of Lands. The appropriate state agencies for agricultural activities are the Department of Agriculture and the Soil Conservation Commission. The appropriate state agency for public road construction is the Transportation Department. The appropriate state agency for water rights is the Department of Water Resources. The appropriate state agency for water quality is the Department of Environmental Quality. The appropriate state agency for outfitting and guiding activities is the Idaho Outfitters and Guides licensing board.

Washington Department of Fish and Wildlife

The Washington State Legislature has given WDFW the responsibility of preserving, protecting, and perpetuating all fish and wildlife resources of the state. The Wild Salmonid Policy (WSP) (State of Washington 1997) is one of the guidance documents used to review and modify current management goals, objectives, and strategies related to wild salmonid stocks within the IMP. Under the WSP, the goal of WDFW is to protect, restore, and enhance the productivity, production, and diversity of wild salmonids and their ecosystems to sustain ceremonial, subsistence, commercial, recreational fisheries, non-consumptive fish benefits, and other related cultural and ecological values. The WSP will serve as the primary basis for review of Washington hatchery and harvest programs, as well as development of watershed-based plans that insure adequate habitat protection.

The Washington State Legislature in 1949 passed the “Hydraulic Code” (RCW 75.20.100-160). The law requires that any person, organization, or government agency wishing to conduct any construction activity in or near state waters must do so under the terms of a permit, called the Hydraulic Project Approval (HPA), issued by WDFW. State waters include all marine waters and fresh waters of the state. The law’s purpose is to ensure that needed construction is done in a manner to prevent damage to the state’s fish, shellfish, and their habitat.

WDFW currently manages several wildlife management areas in the Lake Rufus Woods and Upper Columbia subbasins, as well as elsewhere in the Columbia River Basin, for the

mitigation/compensation of habitat losses incurred by the construction of Grand Coulee and Chief Joseph dams.

The Washington State Legislature established Lead Entities in ESHB 2496, the state Salmon Recovery Act (1998). The legislature provides funding to WDFW to support the infrastructure and capacity needs of Lead Entities engaged in salmon recovery at the watershed level. There is currently one Lead Entity in the IMP. The Pend Oreille Lead Entity, which is administered by the Pend Oreille Conservation District, covers that area of Washington state known as Water Resource Inventory Area (WRIA) 62. WRIA 62 includes the lower Pend Oreille River and its tributaries between Albeni Falls Dam and the Canadian border. The WRIA also includes tributaries to Priest River/Priest Lake which originate in Washington.

The State of Washington Priority Habitats and Species (PHS) program was developed by WDFW to provide management recommendations for species and habitats that are of concern in Washington State. Priority species are wildlife species requiring protective measures for their perpetuation as a result of their population status, sensitivity to habitat alteration, and/or recreational importance.

Priority Habitats are habitat types with unique or significant value to many species. An area classified and mapped as "priority habitat" must have one or more of the following attributes: comparatively high wildlife density, high wildlife species diversity, important wildlife breeding habitat, important wildlife seasonal ranges, important wildlife movement corridors, limited availability, high vulnerability to habitat alteration, and unique or dependent species.

WDFW PHS management recommendations are designed as guidelines to direct, rather than to dictate site-specific activities. They cannot incorporate the wide diversity of habitats, existing land uses, landowner/manger objectives, or social-political factors which exist across the state. Because the recommendations are generalized to cover the entire state, site-specific plans are generally necessary to adapt them to best meet local conditions.

In January 2003, WDFW published the Washington Game Management Plan (WDFW 2003 Game Management Plan, Wildlife Program, Olympia, Wash.). This plan will guide the management of hunted species in Washington for the period of 2003-2009.

WDFW also maintains a list of Washington State endangered, threatened and sensitive species (Washington Administrative Codes 232-12-014 and 232-12-011, Appendix A). The first step in the listing procedure is to develop a preliminary species status report. Several species status reports have been completed for species which occur in the IMP, including reports for common loon (Richardson et al. 2000), peregrine falcon (Hayes and Buchanan 2002), bald eagle (Stinson et al. 2001), fisher (Lewis and Stinson 1998), northern leopard frog (McAllister et al. 1999), pygmy whitefish (Hallock and Mongillo 1998), sage grouse (Hays et al. 1998), and sharp-tailed grouse (Hays et al. 1998).

Recovery plans have also been completed for some species, including lynx (Stinson 2001), sage grouse (draft, Stinson et al. 2003), pygmy rabbit (WDFW 1995), and sandhill crane (Littlefield and Ivey 2002).

The WDFW is conducting the following work within the IMP:

- State regulation enforcement of fish and wildlife laws
- Habitat enhancement and protection through the Washington State Hydraulics Code and other applicable regulations for wetland, riparian, in-stream, and other habitat types
- Fish population assessments within regional lowland lakes and streams for fish management purposes
- Sport fishing and recreational hunting regulation development
- Water quality monitoring
- Coordination with federal, state, Tribal, and local government entities for land use application and development for protection of fish and wildlife resources
- Outreach educational efforts for fish wildlife and habitat issues

Ecoregional Conservation Assessments

Unlike fish, wildlife are not confined to subbasins. Individual animals move across watershed boundaries to utilize resources in neighboring subbasins. The viability of a local population can be improved by dispersal of individuals from nearby subbasins. A metapopulation may consist of populations that are distributed widely across many subbasins. Some subbasins may provide "source' habitats while other subbasins may contain mostly lower quality "sink" habitats. For these reasons, understanding the regional context of a subbasin is necessary for effective conservation strategies. Ecoregional Conservation Assessments (ECAs) provide subbasin plans with a regional context for making conservation decisions.

ECAs identify areas of greatest importance and opportunity for conserving an ecoregion's biodiversity – both plants and animals. Ecoregional conservation assessments are the product of a partnership between The Nature Conservancy (TNC) and the WDFW. ECAs use an approach developed by TNC (Groves et al. 2000; Groves et al. 2002; Groves 2003) and other scientists (Possingham et al. 2000; McDonnell et al. 2002) to establish long-term conservation priorities within the natural boundaries of ecoregions.

ECAs are one of many science-based tools that will help WDFW fulfill the agency's mission. WDFW will use the results of ECAs in four ways. First, WDFW's future land acquisitions will be prioritized. Lands inside identified conservation areas will be a higher priority than those outside. Secondly, ECAs will assist grant programs decide where to focus limited conservation resources, for example, financial assistance or incentives for local habitat protection projects. Thirdly, the results of ECAs will be used to influence the management of public lands. ECAs will indicate the most important public land parcels for the conservation of fish and wildlife populations. Finally, the results of ECAs will be provided to counties for their planning under the Growth Management Act (GMA).

The IMP intersects the Canadian Rockies and Okanagan Ecoregions. The Canadian Rockies ECA was completed in 2003. The Okanagan ECA will be completed by TNC and WDFW sometime in 2005. Future mitigation projects should refer to the ECA for additional guidance about where to do mitigation in the subbasins of the IMP.

Washington State Department of Natural Resources
Two of Washington State Department of Natural Resources (DNR) largest and most important responsibilities in resource protection are fire prevention and suppression, and regulating forest practices (or timber harvest). The Washington DNR is responsible for a continuing program of orientation and training relating to forest practices and regulation thereof, pursuant to RCW 76.09.250.

The DNR maintains the Washington Natural Heritage Program, which includes a database of occurrences of rare, threatened, and endangered plants in the state. The Washington Natural Heritage Plan is administered by DNR; this plan was developed in response to the Natural Area Preserves Act (RCW 79.70) and is aimed at establishing and protecting a statewide system of natural area preserves.

Washington State Department of Ecology
The mission of the Washington State Department of Ecology (WDOE) is to protect, preserve, enhance Washington's environment, and promote the wise management of its air, land, and water for the benefit of current and future generations. WDOE is the agency charged with carrying out the federal regulations of the Clean Water Act that is administered by the USEPA. Other WDOE goals are to prevent pollution, clean up existing pollution, and support sustainable communities and natural resources. A major responsibility of the WDOE is to allocate water rights and to enforce the State's surface and ground water rules and regulations. WDOE is also responsible for watershed planning, through counties.

2.4.2 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 nonnative trout species, i.e., eastern brook trout (imminent).

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

Many other state and federal laws and regulations protect natural resources within the IMP. Tribal governments and local governments also have regulations that protect specific areas or locations within the IMP. The complete list of regulations at all levels is too numerous to detail in this section, but a sense of the scope of existing regulatory

authority can be determined from Section 2.4.1. A few of the more important protections are detailed in the following sections.

Land ownership and management protection status is discussed in Section 4.3.3.3 of this plan. Figure 4.4 shows the management protection status of lands within the IMP. The majority of the province (58 percent) is in the "no or unknown" protection status category, representing privately-owned lands with no specific habitat protections. Low protection status lands comprise another 39 percent, reflecting primarily the multiple use mandate of National Forest System lands. Only one percent of province lands are protected at medium protection status, and less than one percent is managed under the high protection status, which includes Wilderness Areas.

2.4.2.1 Fish and Wildlife and the Growth Management Act

The Growth Management Act (GMA) (RCW 36.70A) is intended to avoid the possibility of uncoordinated and unplanned growth inherent in anticipated population increases. It requires county and city governments to adopt locally-derived plans and regulations around a basic framework of natural resources issues defined by the state legislature. One of the primary intents of the GMA is to prevent unwise use of natural resource and critical areas in accommodating urban growth. Each jurisdiction must classify and designate their resource lands and critical areas, and each must adopt development regulations for their critical areas. In addition, some jurisdictions must adopt planning policies and comprehensive plans that address many aspects of urban growth and development that are expected to occur in the county, including land use, housing, utilities, transportation, and others. Subsequent amendments to the GMA require that counties and cities include the best available science in developing policies and development regulations to protect the functions and values of critical areas. In addition, counties and cities must give special consideration to conservation or protection measures necessary to preserve or enhance anadromous fisheries.

The WDFW has biologists in 5 of its 6 regions who provide technical assistance to local jurisdictions in complying with the requirements of the GMA regarding fish and wildlife resources. One of the primary goals of WDFW is to integrate its Priority Habitats and Species (PHS) program into the local jurisdictions' GMA planning activities.

2.4.2.2 Clean Water Act Permitting – Work in Navigable Waters

A U.S. Army Corps of Engineers (USACE) permit (Section 10 permit) is required when locating a structure, excavating, or discharging dredged or fill material in waters of the United States or transporting dredged material for the purpose of dumping it into ocean waters. Typical projects requiring these permits include the construction and maintenance of piers, wharfs, dolphins, breakwaters, bulkheads, groins, jetties, mooring buoys, and boat ramps.

However, not every activity requires a separate, individual permit application. Certain activities and work can be authorized by letters-of-permission, nationwide permits, or regional permits. Some activities authorized by these permits are permitted in advance. Typically, little or no paperwork is required, and consequently permitting time is

reduced. So, before submitting an application, applicants should contact the District Engineer's office for current information about the type of permit required.

Activity which requires the permit: Locating a structure, excavating, or discharging dredged or fill material in waters of the United States or transporting dredged material for the purpose of dumping it into ocean waters.

2.4.2.3 Clean Water Act Permitting – Discharge of Dredge and Fill Material

A USACE permit (Section 404 permit) is required when locating a structure, excavating, or discharging dredged or fill material in waters of the United States or transporting dredged material for the purpose of dumping it into ocean waters. Typical projects requiring these permits include the construction and maintenance of piers, wharfs, dolphins, breakwaters, bulkheads, groins, jetties, mooring buoys, and boat ramps.

However, not every activity requires a separate, individual permit application. Certain activities and work can be authorized by letters-of-permission, nationwide permits, or regional permits. Some activities authorized by these permits are permitted in advance. Typically, little or no paperwork is required, and consequently permitting time is reduced. So, before submitting an application, applicants should contact the District Engineer's office for current information about the type of permit required.

Activity which requires the permit: Locating a structure, excavating, or discharging dredged or fill material in waters of the United States or transporting dredged material for the purpose of dumping it into ocean waters.

2.4.2.4 Water Quality Certification – Section 401

Applicants receiving a Section 404 permit from the USACE, a Coast Guard permit, or license from the Federal Energy Regulatory Commission (FERC), are required to obtain a Section 401 water quality certification from the Washington Department of Ecology (DOE). Issuance of a certification means that the DOE anticipates that the applicant's project will comply with state water quality standards and other aquatic resource protection requirements under DOE's authority. The 401 Certification can cover both the construction and operation of the proposed project. Conditions of the 401 Certification become conditions of the federal permit or license.

For 404 permits the USACE has developed nationwide permits to streamline the process for specific activities. The USACE reviews a proposed project to determine if an individual 404 permit is required, or if the project can be authorized under a nationwide permit. The nationwide permits also need 401 Certification from DOE. The Washington Department of Ecology has already approved, denied or partially denied specific nationwide permits. If approved, no further 401 Certification review by DOE is required. If partially denied without prejudice, an individual certification or Letter of Verification from DOE is required. If denied without prejudice, an individual certification is required for all activities under that nationwide permit.

Activity which requires the permit: Applying for a federal permit or license to conduct

any activity that might result in a discharge of dredge or fill material into water or non-isolated wetlands or excavation in water or non-isolated wetlands.

2.4.2.5 Road Maintenance/Transportation

RCW 77.55.060 requires that "a dam or other obstruction across or in a stream shall be provided with a durable and efficient fishway approved by the director." Culverts and other stream crossing structures often create obstructions to upstream or downstream fish passage. Water diversions can result in significant mortality to juvenile fishes.

WDFW has developed the *Fish Passage Barrier and Surface Water Diversion Screening Assessment and Prioritization Manual* (contact Dave Caudill, Habitat Technical Applications Division, 360-902-2486), which includes protocols for assessing fish passage barrier status at culverts and other in-stream structures, and juvenile fish screening and bypass status at water diversions. WDFW conducts fish passage barrier assessments and provides protocol training to other agencies and grant groups interested in conducting fish passage barrier assessments. WDFW also maintains a statewide *Fish Passage and Diversion Screening Inventory* database (contact Brian Benson, Habitat Science Division, 360-902-2570) that includes information on barrier status of inventoried culverts and other stream crossing structures, as well as known diversion screening information.

The WDFW Habitat Program Technical Applications Division (TAPPS) also provides technical assistance to fish passage, screening, and habitat restoration project sponsors to help them develop habitat-related projects. In addition, WDFW in cooperation with other state and federal agencies have developed Aquatic Habitat Guidelines technical guidance documents for certain types of habitat projects. The two guidance documents currently available include the *Fish Passage Design at Road Culverts* and *Integrated Streambank Protection Guidelines* (ISPG); soon to be available will be *Salmon Habitat Restoration Guidelines* (SHRG). Information on technical assistance opportunities and contacts are available on the WDFW website at http://wdfw.wa.gov/hab/tapps.index.htm

2.4.2.6 Watershed Planning Act

In 1998, the Washington State Legislature passed ESHB 2514, the Watershed Planning Act (RCW 90.82), to provide a framework for developing local solutions to water issues on a watershed basis (See: http://www.ecy.wa.gov/watershed). Based on the State's 62 Water Resource Inventory Areas (WRIAs), this voluntary process was designed to allow local citizens, interest groups, governments, and Tribes to form Planning Units to collaboratively develop watershed management plans. Department of Ecology is the lead state agency for the process and manages grants and coordinates WRIA actions through their local Watershed Lead staff. They and other agencies (including WDFW) provide technical assistance and, if requested, serve on Planning Units.

Initially, there were three phases to Watershed Planning Act planning, culminating in the writing and adoption of a watershed plan. Watershed plans are required to deal first with water quantity concerns, and they may also choose to deal with water quality, in-stream flow, and habitat concerns. In 2003, the legislature established an implementation (Phase

4) stage to the process. Planning units are encouraged to integrate watershed planning with local comprehensive plans (both GMA and non-GMA), salmon recovery efforts (including the Salmon Recovery Planning Act, ESHB 2496), and the State Environmental Policy Act (SEPA).

Currently, 36 Planning Units representing 45 WRIAs are in various stages of Watershed Planning Act watershed planning. Approximately half of these plans are due for Phase 3 completion prior to the end of 2004.

2.4.2.7 Shoreline Management Act

Washington's Shoreline Management Act (SMA) was passed by the State Legislature in 1971 and adopted by the public in a 1972 referendum (See: http://www.ecy.wa.gov/programs/sea/SMA/index.html). It is codified within RCW 90.58. The SMP is essentially a shoreline comprehensive plan and zoning ordinance with an environmental orientation customized to local circumstances. The SMA emphasizes accommodation of reasonable and appropriate shoreline uses, protection of shoreline environmental resources, and protection of the public's right to access and use shorelines. All allowed uses are required to mitigate for any adverse environmental impacts and preserve the natural character and aesthetics of the shoreline.

The SMA seeks to provide for a balance of authority between local and state government. Cities and counties are the primary regulators. The SMA applies to all 39 counties and more than 200 cities with "shorelines of the state" or "shorelines of statewide significance" within their jurisdictional boundaries. DOE is the lead state agency, and it provides technical assistance and reviews local programs and permit decisions. The SMA places a strong emphasis on public involvement in developing local shoreline programs, and it provides opportunities for public involvement in individual permits.

In December 2003, new shoreline master program (SMP) guidelines were adopted by the state. These state rules are used by cities and counties as they update plans that regulate development and the use of shorelines of marine waters, rivers and larger streams, lakes and reservoirs over 20 acres, associated wetlands, and portions of floodplains. In addition, the 2003 legislature adopted amendments to the SMA addressing integration with the Growth Management Act.

2.4.3 Inventory of Restoration and Conservation Projects

During the subbasin planning effort, a database was created of 245 restoration and conservation projects that are ongoing or were recently completed (within the last five years) in the IMP. A summary of the complete database is found in Appendix H. The database includes both BPA and non-BPA funded projects. The current status of BPA-funded projects in the IMP is depicted in Figure 2.4.

Projects varied widely in size and scope. Large projects include the Albeni Falls Wildlife Mitigation Project and the Resident Fish Stock Status above Chief Joseph and Grand Coulee dams. Both of these projects include a wide range of activities in multiple subbasins. Examples of small projects include sediment and storage ponds on Upper

Lake Creek (Coeur d' Alene Subbasin) or riparian fencing of livestock allotments on Middle Branch LeClerc Creek (Pend Oreille Subbasin).

Each project was coded to describe the limiting factor that the project was designed to address and the type of strategy that the project employed. Many projects addressed more than one limiting factor and employed more than one type of strategy. Projects were also coded depending on whether they primarily benefited resident fish, wildlife, or both. Of the 245 projects in the database, 135 primarily benefited resident fish, 41 primarily benefited wildlife, and 69 benefited both fish and wildlife.

Many of these projects are subbasin specific, and are discussed in more detail in the individual subbasin chapters. Projects that affect multiple subbasins are discussed in this section, with the affected subbasins named in parentheses. Lake Roosevelt is within three subbasins, the Upper Columbia, Spokane, and San Poil. However, Lake Roosevelt is only a small portion of the San Poil Subbasin. Therefore, details about projects that address issues in Lake Roosevelt are discussed in the Upper Columbia and Spokane Subbasin chapters.

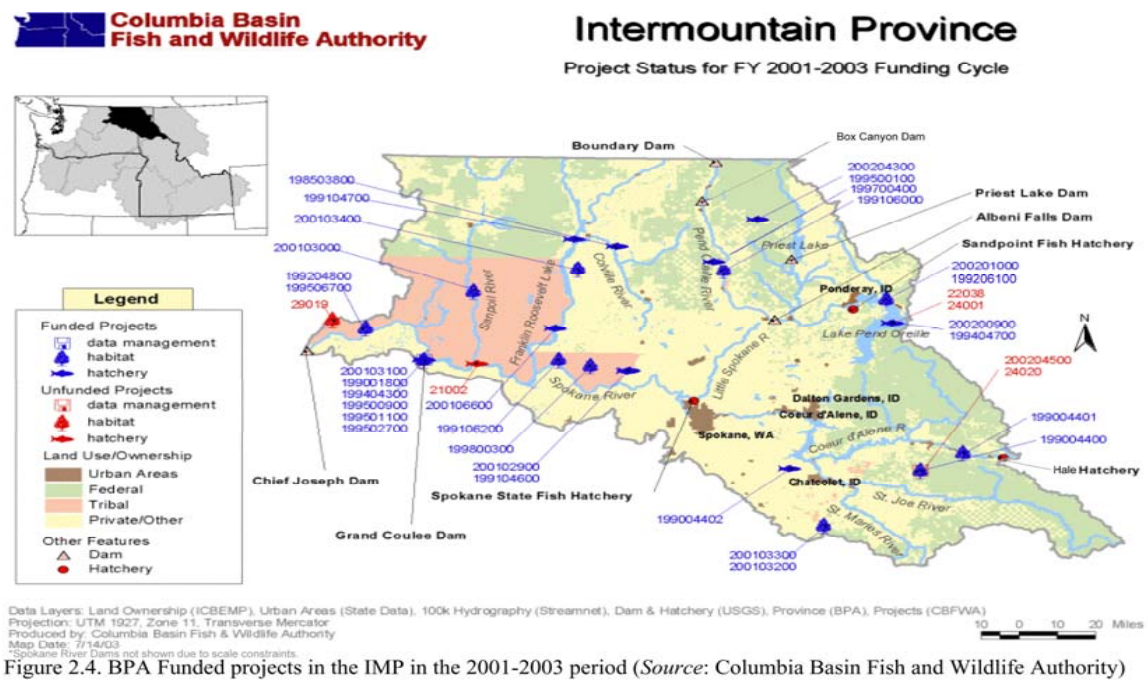

Figure 2.4. BPA Funded projects in the IMP in the 2001-2003 period (*Source*: Columbia Basin Fish and Wildlife Authority)

Figure 2.4. BPA Funded projects in the IMP in the 2001-2003 period (*Source*: Columbia Basin Fish and Wildlife Authority)

2.4.3.1 Albeni Falls Wildlife Mitigation Project (Pend Oreille, Kootenai, and Coeur d' Alene Subbasins)

The Albeni Falls Wildlife Mitigation Project (Project) was developed to protect, enhance, and maintain the long-term quality of wetland and riparian wildlife-habitat in the Lake Pend Oreille vicinity as ongoing mitigation for construction of Albeni Falls Dam. Albeni Falls Dam, and the associated impacts on Lake Pend Oreille, are located on lands within and near the ceded and traditional use areas of the Coeur d'Alene Tribe, the Kootenai Tribe of Idaho, and the Kalispel Tribe of Indians. In addition to mitigation within the Pend Oreille Subbasin, off-site mitigation in the Coeur d' Alene and Kootenai subbasins is included within the *Albeni Falls Interagency Work Group Operating Guidelines and Guiding Principles for Mitigation Implementation* (1998) for effects to aquatic and terrestrial resources traditionally used by the tribes in the Pend Oreille Subbasin and as described in the *Albeni Falls Wildlife Protection, Mitigation, and Enhancement Plan* (Martin et al. 1988).

The Albeni Falls Wildlife Mitigation Project has received annual implementation funding from BPA since 1995 (Project #9206100). The long-term conservation potential for the Project is primarily the protection of existing high-quality wetland habitat, but also includes protection of habitat with high restoration potential. The Albeni Falls Interagency Work Group (Work Group) members include the IDFG, the Coeur d' Alene Tribe, the Kalispel Tribe of Indians, the Kootenai Tribe of Idaho, the USFWS, the USACE, the NRCS, and the USFS. The Work Group established priority mitigation focus areas by taking into consideration in-place/in-kind opportunities, the threat to wetland plant communties in the primary areas of impact, juxtaposition to other management areas, and availability of protection opportunities. The Work Group implements the Albeni Falls Wildlife Mitigation Project by way of formal agreement, and implements projects in the Upper Pend Oreille, Lower Pend Oreille, Priest River, Kootenai, and Coeur d' Alene subbasins. The purpose of the *Albeni Falls Interagency Work Group Operating Guidelines and Guiding Principles for Mitigation Implementation* (1998) is to establish membership roles and responsibilities as well as a decision-making and dispute resolution process for implementing projects.

Using BPA funds, the IDFG, in coordination with the Work Group, developed *the Albeni Falls Wildlife Protection, Mitigation, and Enhancement Plan* (Martin et al. 1988). The plan not only identifies the wildlife-habitat benefits and impacts associated with the construction and operation of Albeni Falls Dam, but it also identifies potential areas in which to mitigate wildlife-habitat losses. The BPA completed the *Albeni Falls Wildlife Management Plan Environmental Assessment* in 1996. The plan is a programmatic guide to the development of wildlife mitigation projects in the Upper Pend Oreille, Lower Pend Oreille, Priest River, Kootenai, and Coeur d' Alene subbasins.

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

The Resident Fish Stock Status above Chief Joseph and Grand Coulee Dams Project, commonly known as the Joint Stock Assessment Project (JSAP), is a management tool that uses ecosystem principles to manage artificial fish assemblages in altered

environments existing in the Columbia River System above Chief Joseph and Grand Coulee dams (Blocked Area). The JSAP (NWPPC 1994 program measure 10.8B.26) is designed and guided jointly by fisheries managers in the Blocked Area. The project employs a three-phase approach that will enhance the fisheries resources of the Blocked Area by compiling existing data and identifying data gaps, filling data gaps with research, and implementing management recommendations based on research results. The information collected through this project including fisheries, habitat, and water quality data are housed in a unified database that will allow managers to view data for the entire system while making decisions, rather than basing management decisions on isolated portions of the system.

Synthesis of the existing data revealed an enormous gap in baseline data for fish, habitat, and water quality throughout the Blocked Area, particularly in streams and small to mid-sized fish-bearing lakes. The focus of the JSAP since the 1999 field season has been to fill these data gaps using the standardized criteria and methodologies developed by the Blocked Area managers. Conducting a baseline inventory of fish and habitat status provides the necessary information for a coordinated system-wide management strategy. Management to this point has largely been one of individual agencies targeting fragments of game species populations within their local sphere of influence. Many of the past management decisions have been made without a complete picture of what effects those decisions will have system-wide. Bringing together all the managing entities to conduct a baseline inventory will foster system-wide, informed, and coordinated decisions for all species (game and non-game). Management will be able to prioritize waterbodies of concern with regard to threatened and endangered species, enabling a proactive management approach.

Accomplishments to date for WDFW include:

- Baseline fish population assessment of Boundary Reservoir, Pend Oreille River.
- Baseline water quality, algae, zooplankton, and macroinvertebrate assessment of Boundary Reservoir, Pend Oreille River.
- Baseline fish and habitat assessments in eight tributaries (Peewee, Slate, Sand, Flume, Sweet, Lunch, Lime, and Sullivan creeks) to the Boundary Reservoir, Pend Oreille River.
- DNA characterization of cutthroat populations in eight Pend Oreille River tributaries (Sullivan, Cedar, Mill, Middle, West Branch LeClerc, East Branch LeClerc, North Fork Sullivan, and Slate creeks).
- Baseline fish and habitat assessments in the Little Spokane River drainage (mainstem and 22 tributaries).
- Baseline fish distribution and densities in the lower Spokane River from Spokane Falls to Nine Mile Falls.
- DNA characterization of wild rainbow trout populations in the upper and lower Spokane River and the Little Spokane River drainage.
- Assessment of the Sullivan Lake kokanee spawning run in Harvey Creek.
- Development of the JSAP database and coordinated data sharing with the StreamNet database.

2.4.3.3 Hellsgate Big Game Winter Range Wildlife Mitigation Project (Lake Rufus Woods and Lake Roosevelt Subbasins)

The Hellsgate Big Game Winter Range Wildlife Mitigation Project (Hellsgate Project) was proposed by the Confederated Tribes of the Colville Reservation as partial mitigation for hydropower's share of the wildlife losses resulting from Chief Joseph and Grand Coulee dams.

The focus of the Hellsgate Project is the protection, restoration, and enhancement of critical winter habitat for big game and shrub-steppe/sharp-tailed grouse habitat on lands purchased/managed for mitigation on the Colville Indian Reservation. At present, the Hellsgate Project protects and manages 25,501 acres for the biological requirements of wildlife. Currently there are 12 management units that make up the Hellsgate Project, most are located on or near the Columbia River (Lake Rufus Woods and Lake Roosevelt) and surrounded by Colville Reservation land. These management units contain a wide diversity of vegetative types and habitats for a variety of wildlife. In addition, the CCT have set aside special management areas (Hellsgate Reserve, Tribal lands, and Agency Butte) surrounding certain Hellsgate Project management units/land parcels to conserve and protect big game winter range and sharp-tailed grouse habitat.

Initial BPA funding for land acquisition at the Hellsgate Project began in 1992. The Habitat Evaluations Procedures (HEP) methodology developed by the USFWS was selected for the evaluation and accounting of habitat losses and gains. HEP is based on ecological principals and the assumption that habitat for selected wildlife species can be described as a numerical value known as a Habitat Suitability Index (HSI). This value is derived from an evaluation of the ability of key habitat components to supply the life requisites for selected species of fish and wildlife. Evaluation and monitoring involves repeating HEP for the target species at specified time intervals and comparing changes. HEP studies are carried out on each new acquisition (baseline data) and repeated over time to document (monitoring) results for mitigation crediting issues. To date a total of approximately 14,920 HUs have been acquired towards a total 35,819 HUs lost from hydropower development on the Colville Reservation.

2.4.3.4 Hatchery Genetic Management Plans

The Council is coordinating an Artificial Production Review and Evaluation (APRE) in order to document progress toward hatchery reform in the Columbia Basin. The APRE process includes both anadromous and non-anadromous fish in its analysis. The Hatchery and Genetic Management Plan (HGMP) process also seeks to document and implement hatchery reform in the Columbia Basin. Much of the initial work on the HGMP process was coordinated and combined with efforts to complete the APRE analysis. The HGMP process was initiated to identify offsite mitigation opportunities associated with operation of the Federal Columbia River Power System. The HGMP process is designed to describe existing propagation programs, identify necessary or recommended modifications of those programs, and help achieve consistency of those programs with the ESA.

According to the *Technical Guide for Subbasin Planners,* subbasin planners are required to submit completed HGMPs for all artificial production programs in the province as part

of the inventory of existing activities. A number of HGMPs have been prepared in the IMP. These plans are accessible on the web at http://www.cbfwa.org/cfsite/documents.cfm. HGMPs include: Colville kokanee and rainbow trout, Ford kokanee, Sherman Creek kokanee and rainbow trout net pens, Spokane kokanee and rainbow trout, Colville brook trout and coastal rainbow trout, and Lake Roosevelt rainbow trout.

There are three phases to the HGMP process. Phase I HGMPs largely reflect current programs, including applicable U.S. v Oregon production agreements and other existing conservation, mitigation, and production programs. The Phase I HGMPs are intended to feed into collaborative Phase II and III steps of the process. Phase II involves a series of workshops centered on specific HGMPs in an area (provinces or groups of subbasins). These workshops involve deliberations among the parties affected by particular artificial production programs, including but not necessarily limited to the states, tribes, and federal agencies. Phase II HGMPs will incorporate the collaborators' discussions for each program or facility, and identify appropriate hatchery reforms that could benefit listed fish and/or better achieve non-ESA objectives.

In the IMP Phase I HGMPs were completed. Throughout the Columbia River Basin, wherever anadromous fish are present, the HGMP process has moved into Phase II and Phase III. Conversely, no efforts have been expended by the NOAA Fisheries or U.S. Fish and Wildlife Service to move the IMP Phase I HGMPs to Phase II.

2.4.4 Strategies Currently Being Implemented Through Existing Projects

The fish and wildlife projects in the IMP inventory were categorized by the limiting factors that the project was designed to address. Many projects addressed more than one limiting factor. The categories used were:

1. **Barriers or impediments to fish and/or wildlife passage**
   For fish, includes upstream fish passage barriers (such as dams and culverts) as well as entrainment. For wildlife, includes loss of connectivity as a result of highways, urban development, etc.

2. **Water quality or quantity**
   Includes low flow, high flow, low temperature, high temperature, pollutants, and total dissolved gases. Also includes acquiring ownership or management rights to water.

3. **Physical structure of fish and/or wildlife-habitat (habitat quality)**
   For fish, includes riparian condition, channel stability, habitat diversity, and fine sediment. Also includes conversion of rivers to reservoirs. For terrestrial species, includes lack of key habitat features for target species, noxious weed control, etc.

4. **Habitat quantity**
   Includes acquiring management rights to land through a variety of methods and water rights easements to partially mitigate for losses that may not be directly connected to the affected areas.

5. **Competition/predation and/or hybridization**
   Includes researching competition, predation, or hybridization.

6. **Disease**

7. **Lack of information**
   Lack of information is not actually a limiting factor but a reason for conducting studies. This category includes monitoring and evaluation.

8. **Indirect mitigation**
   In some cases the limiting factors cannot be corrected directly, such as the limiting factors that are created by Grand Coulee Dam. This is the category for projects that are designed to mitigate for these types of limiting factors. Artificial production is the primary example. This category also includes modifying dam operations to make more fish habitat available. Indirect mitigation is not the same as off-site mitigation, which is mitigation applied to a location different from where the impact occurred.

In the scientific sense, a lack of information is not a limiting factor. However, without knowledge it is impossible to address true limiting factors. Some of the projects in the inventory were primarily or partially research oriented. These projects were coded in the database as addressing limiting factor #7, lack of information.

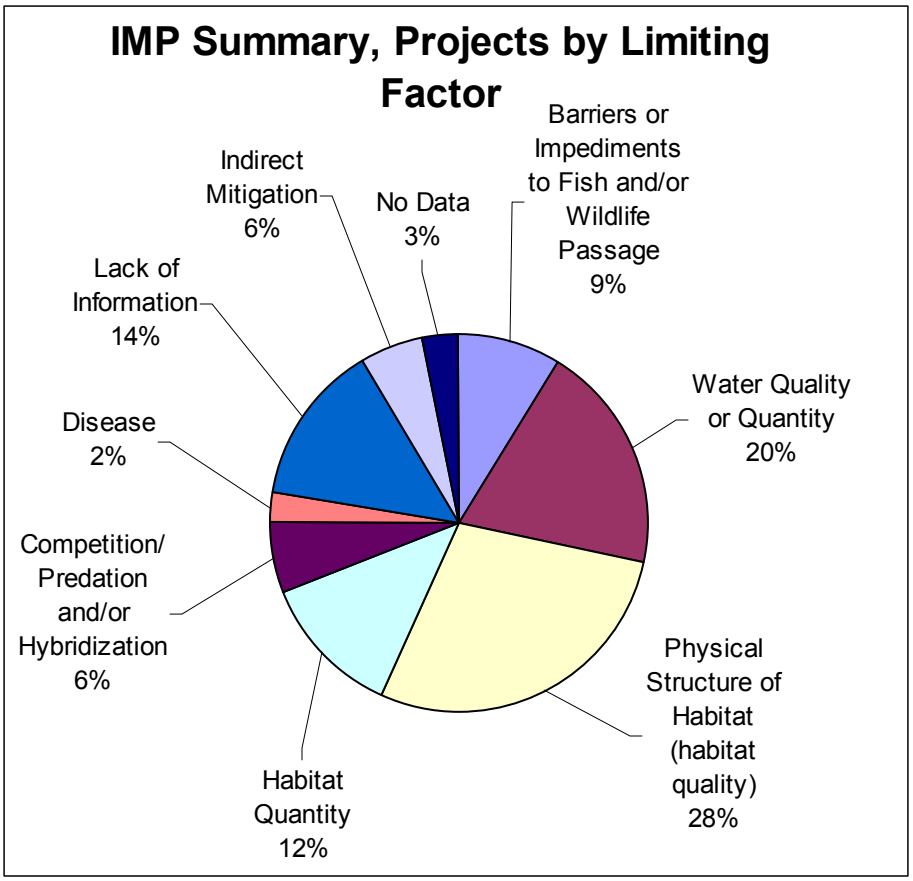

Figure 2.5. Limiting factors that are addressed by recent and ongoing projects in the IMP

As described in the section on the working hypothesis (above), the federal and federally-licensed hydropower system created a wide range of direct (construction and inundation), indirect (operational), and secondary impacts on fish and wildlife. Some of these impacts cannot be directly mitigated. For example, the dams create reservoirs that are poor habitats for many species of native fish and wildlife. Reservoir habitats can be improved through a variety of measures, but they will never return to the flowing rivers that they once were, as long as the dams remain in place. Therefore, projects have been implemented to improve fish and wildlife populations in spite of the existing limiting factors, rather than to try to eliminate the limiting factor directly. Artificial production is an example of an indirect mitigation. When the limiting factor is, for example, the lack of spawning habitat, and it is not possible to create more spawning habitat, then hatcheries can be used as indirect mitigation. The category of indirect mitigation should not be confused with "off-site mitigation," a phrase which refers to the location of the mitigation, rather than the type of mitigation.

The Council's 2000 Fish and Wildlife Program states, "This is a habitat-based program, rebuilding healthy, naturally producing fish and wildlife populations by protecting, mitigating, and restoring habitats and the biological systems within them, including anadromous fish migration corridors. Artificial production and other non-natural

interventions should be consistent with the central effort to protect and restore habitat and avoid adverse impacts to fish and wildlife." As shown on Figure 2.5, the majority (69 percent) of projects implemented in the IMP have addressed habitat quantity or quality in some manner (28 percent have addressed habitat quality, 12 percent habitat quantity, 9 percent fish or wildlife passage, and 20 percent water quality and quantity). This indicates that managers have largely been focused on addressing habitat issues. Indirect mitigation activities have been a relatively minor 6 percent of projects. Disease has been the least addressed limiting factor, at 2 percent of projects.

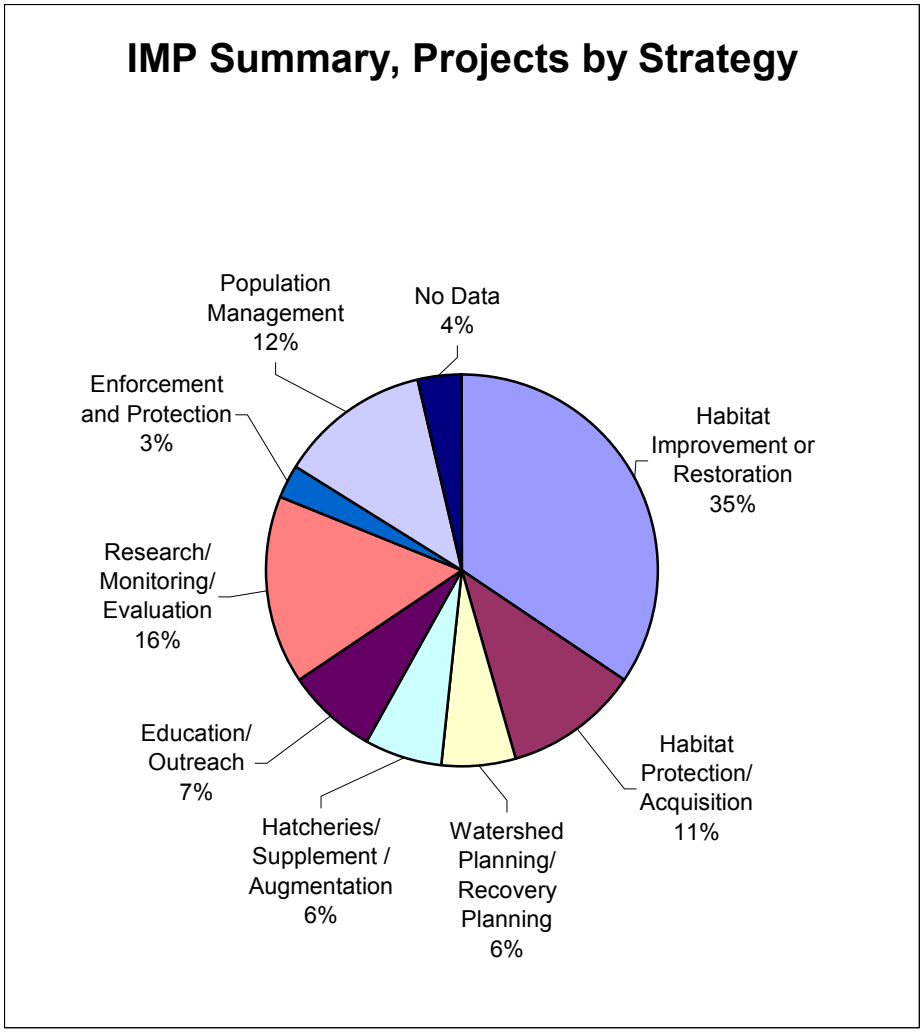

Figure 2.6. Strategies that have been implemented by projects in the IMP

A review of the projects that have been implemented in the IMP indicated that there are approximately eight general categories of strategies that are employed to address limiting factors. These categories are:

1. Habitat Improvement or Restoration
2. Habitat Protection/Acquisition
3. Watershed Planning/Recovery Planning
4. Hatcheries/Supplementation/Augmentation
5. Education/Outreach
6. Research/Monitoring/Evaluation
7. Enforcement and Protection
8. Population Management

Figure 2.6 shows that all of these strategies have been employed in the IMP. Habitat improvement, acquisition and protection are the largest categories with 46 percent of projects using these strategies. Research, monitoring, and evaluation has been a strategy employed by 16 percent of recent projects. Enforcement and protection has been used the least often, with 3 percent of projects employing this strategy.

2.4.5 Value and Efficacy of Restoration and Conservation Projects

While the restoration and conservation projects implemented in the IMP have improved conditions for fish and wildlife and their habitats, there is still much work to be done. Mitigation for the construction and inundation of the federal and federally-licensed hydropower system is not complete. Assessments of indirect and secondary impacts of the federal and federally-licensed hydropower system have not been done. Anadromous fish are not able to access the IMP. Water quality and fish habitat continue to be degraded as a result of the federal and federally-licensed hydropower system, and focal species continue to decline.

In summary, problems in the IMP do not stem from ineffective past restoration and conservation projects, they stem from an inadequate number of research, restoration and conservation projects.

2.5 Goals for Listed and Non-listed Species and Habitats

This section of the subbasin plan describes the fish and wildlife goals that have been set by other entities, prior to the completion of this subbasin plan. One of the guiding principles of subbasin planning in the IMP is that subbasin plans should be consistent with the Northwest Power Act, the Council's Fish and Wildlife Program, and technical guidance for subbasin planning, while complementing existing plans, policies, and planning efforts. Toward that end, the goals set by the Council and other fish and wildlife managing agencies were recognized. For both wildlife and fisheries, the Council set goals in their Fish and Wildlife Program. Additionally, the goals set for bull trout by the USFWS in their draft recovery plan have been incorporated into the subbasin plan.

2.5.1 Fisheries Goals

2.5.1.1 Non-listed Fish Species

The Council's Fish and Wildlife Program is intended to be a comprehensive response to losses of fish and wildlife in the Columbia River Basin. The Council's charge in the Northwest Power Act is to develop a program to "protect, mitigate and enhance" fish and wildlife in the Columbia River Basin that were affected by development and operation of

the hydroelectric system. The Council is to treat the Columbia Basin as a "system," while balancing the requirements of hydropower production, ensuring an "adequate, efficient, economical and reliable power supply system" with fish and wildlife needs.

To date, the resident fish populations in the upper Columbia River Blocked Area have not been protected and enhanced to the extent that is needed to mitigate for losses of anadromous fish runs and the ongoing operation of the FCRPS. To that end, the resident fish mitigation and substitution policies were established in the Resident Fish Section of the Council's Fish and Wildlife Program.

The substitution of resident fish to make up for losses of anadromous fish in areas now currently blocked to salmon and steelhead reflects the Council's resolve to address complex, long-term problems (Council 1995). Historical records show that the Columbia River Basin Indian Tribes relied extensively on salmon and steelhead, and the permanent loss of these resources has had permanent impacts on Tribal economies, cultures and religions (Council 1995).

Unless fish passage modifications to the dams and upstream tributaries are implemented, salmon and steelhead cannot physically return to the blocked areas. In addition, salmonid habitat upstream of the dams has been degraded by inundation or other human activities. Therefore, full mitigation for anadromous fish will require both fish passage and habitat restoration. In its analysis of the contribution of the hydropower system to salmon and steelhead losses, the Council concluded that:

1) mitigation in blocked areas is appropriate where salmon and steelhead were affected by the development and operation of the hydroelectric projects;

2) to treat the Columbia River and its tributaries as a system, resident fish substitutions are reasonable for lost salmon and steelhead in areas where in-kind mitigation cannot occur; and,

3) flexibility in approach is needed to develop a program that complements the activities of the fish and wildlife agencies and Tribes and is based on the best available scientific knowledge (Council, 1995).

The Council's 2000 Fish and Wildlife Program identified the following objectives to address resident fish losses:

> Assess resident fish losses from the hydrosystem in terms of population characteristics.
>
> Maintain and restore healthy watersheds to preserve biological habitat links.
>
> Protect and expand habitat and ecosystem functions to promote abundance and diversity of resident fish.

Achieve population characteristics of these species within 100 years that represent on average full mitigation for losses of resident fish (Council, 2000).

2.5.1.2 Listed Fish Species

Bull trout, a resident fish species in the IMP, is listed as threatened under the federal ESA. The USFWS has released a draft recovery plan for bull trout (refer to http://pacific.fws.gov/bulltrout/recovery.htm).

The goals of the recovery plan include the long-term persistence of self-sustaining local populations that may have overlapping spawning and rearing areas distributed across the species' native range.

To recover bull trout, the following four objectives have been identified:

1. Maintain current distribution of bull trout within core areas as described in recovery unit chapters and restore distribution where recommended in recovery unit chapters.
2. Maintain stable or increasing trend in abundance of bull trout.
3. Restore and maintain suitable habitat conditions for all bull trout life history stages and strategies.
4. Conserve genetic diversity and provide opportunity for genetic exchange (USFWS 2002).

In the IMP there are three different bull trout recovery units. The Northeast Washington Recovery Unit encompasses the mainstem Columbia River and all tributaries above Chief Joseph Dam up to the Canadian border, Spokane River and its tributaries upstream to Post Falls Dam, and the Pend Oreille River and its tributaries from the Canadian border upstream to Albeni Falls Dam. That is, the Lake Rufus Woods, San Poil, Spokane, Upper Columbia, and a portion of the Pend Oreille subbasins are included in this recovery unit. To accomplish the recovery goal in this recovery unit, four objectives dealing with distribution, abundance, habitat, and genetics were identified for the Northeast Washington Recovery Unit. The distribution objective is to maintain current distribution of bull trout and restore distribution in previously occupied areas within the Northeast Washington Recovery Unit. In addition, objectives 2 to 4 (above) also apply.

The second recovery unit is the Coeur d' Alene Recovery Unit, which encompasses the Spokane River and its tributaries upstream of Post Falls Dam and Lake Coeur d' Alene and its tributaries. The boundary of the Coeur d' Alene Recovery Unit is approximately the same as the boundary of the Coeur d' Alene Subbasin. The distribution objective is to maintain the current distribution of bull trout and restore distribution in previously occupied or depressed areas within the Coeur d' Alene Recovery Unit. In addition, objectives 2 to 4 (above) also apply.

The third recovery unit is the Clark Fork River, the largest and one of the most diverse recovery units in the species' range, encompassing four recovery subunits (Upper Clark

Fork, Lower Clark Fork, Flathead, and Priest). It also includes 38 existing core areas and about 150 currently identified local populations. Portions of the Pend Oreille Subbasin (the upper Pend Oreille and the Priest River drainage) are within the Clark Fork Recovery Unit (USFWS 2002).

Specifically, the goal for the Clark Fork Recovery Unit is a sustained net increase in bull trout abundance and increased distribution of some local populations within existing core areas (as measured by standards accepted by the Clark Fork Recovery Unit Teams) (USFWS 2002). In addition, objectives 2 to 4 (above) also apply.

2.5.2 Wildlife Goals

The primary overarching objective of the Columbia River Basin 2000 Fish and Wildlife Program is the completion of mitigation for the adverse effects to wildlife caused by the development and operation of the hydrosystem. Construction and inundation losses due to Chief Joseph, Grand Coulee, and Albeni Falls dams have been partially compensated through acquisition and enhancement of wildlife-habitat. Operational and secondary losses due to these hydroelectric facilities have not been estimated or addressed. However, the 2000 Fish and Wildlife Program includes a commitment to mitigate for these losses.

Specific wildlife objectives from the 2000 Fish and Wildlife Program include the following:

- *Complete the current Wildlife Mitigation Program for construction and inundation losses of federal hydrosystem as identified in Appendix C, Table 11-4 of the Columbia River Basin 2000 Fish and Wildlife Program;*
- *Quantify the operational effects of federal hydrosystem projects on terrestrial resources, develop mitigation plans, and implement projects to mitigate the impacts;*
- *Mitigate for wildlife losses that have occurred through secondary effects of hydrosystem development, including assessment, development of mitigation plans, and implementation of mitigation actions;*
- *Provide sufficient populations of wildlife for abundant opportunities for Tribal trust and treaty right harvest and for non-Tribal harvest;*
- *Provide recovery of wildlife species affected by the development and operation of the hydrosystem that are listed under the Endangered Species Act;*
- *Provide a Columbia River ecosystem that sustains an abundant, productive, and diverse community of fish and wildlife.*
- *Coordinate mitigation activities throughout the basin and with fish mitigation and restoration efforts, specifically by coordinating habitat restoration and acquisition with aquatic habitats to promote connectivity of terrestrial and aquatic area;*
- *Maintain existing and created habitat values; and*
- *Monitor and evaluate habitat and species responses to mitigation actions.*

Six species listed under the ESA occur within the IMP and/or adjacent subbasins. These species are the bald eagle, Canada lynx, gray wolf, grizzly bear, mountain caribou, and pygmy rabbit.

Construction of the federal hydrosystem projects directly affected both food resources (salmon) and riparian habitats used by bald eagle. However, bald eagles are also able to use reservoir habitats, and have persisted in areas affected by FCRPS construction. Nationwide, the bald eagle population has shown dramatic recovery from its estimated low of 417 pairs in the lower 48 states in 1963. In 1999, the bald eagle was proposed for removal from the list of threatened and endangered species, as recovery goals had generally been met or exceeded throughout the range of the species in the coterminous states (64 FR 36543).

Shrub-steppe habitat that may have been suitable for pygmy rabbit was affected by construction of both Chief Joseph and Grand Coulee dams. This species is presently known in Washington from only one site, located west of the IMP in Douglas County. An emergency action plan was developed for pygmy rabbit (Hays 2001); this plan guides current recovery activities in Washington.

Elimination of salmon within the IMP may have affected food resources and potential habitat for the federally-threatened grizzly bear. The USFWS manages recovery efforts within identified grizzly bear recovery zones (USFWS 1993). Most of the Pend Oreille Subbasin is within the Selkirk Recovery Zone, and it also borders the Cabinet/Yaak Recovery Zone. The Coeur d' Alene Subbasin borders the Bitterroot Recovery Zone. The other subbasins in the IMP are outside any recovery zone. Federal recovery efforts in the Selkirk Recovery Zone include (1) population monitoring, (2) coordinated protection enforcement, (3) selective pest control, (4) reduction in human disturbance or habitat loss from timbering, livestock grazing, energy/mineral development, recreation, or land use zoning, and (5) public awareness.

The three other federally-listed species, Canada lynx, gray wolf, and woodland caribou, are not thought to have suffered direct habitat loss as a result of FCRPS project construction, but may have been influenced by operational and secondary effects of the projects' development. Recovery efforts are underway in portions of the province for these species.

Several species designated as endangered, threatened, or sensitive by the states of Idaho and Washington occur within the province. Two of these species, sage grouse and sharp-tailed grouse, lost significant quantities of habitat as a result of reservoir inundation behind Chief Joseph and Grand Coulee dams and are currently considered to be at high risk in Washington. Sage grouse has been documented in the Upper Columbia Subbasin, and sharp-tailed grouse is present in Lake Rufus Woods and the Upper Columbia subbasins, with the largest populations in the state on Colville Reservation lands. Recovery efforts for these species are ongoing in Washington, and are coordinated between State and Tribal wildlife managers.

Other state threatened and endangered species that occur in the province include ferruginous hawk, fisher, northern leopard frog, peregrine falcon, sandhill crane, and upland sandpiper.

2.6 Funding Options/Resources

The *Technical Guide for Subbasin Planners* says that, "Beyond BPA-specific responsibilities, subbasin plans should be developed broadly enough to take into account other federal, state, and local activities, objectives, and responsibilities. Including these other elements, though they may not be a funding responsibility of Bonneville, should enable planners and implementers to coordinate their activities in a more cost-effective manner and in a way that produces cumulative and synergistic benefits."

In order to aid in the implementation of this plan, especially for those objectives and strategies that will not be funded through the BPA, a list of other funding sources is included. This list (in Appendix F) will assist fish and wildlife managers in the IMP to locate funding for projects that are within the scope of this plan, but are not funded through BPA.

2.7 Consistency with Endangered Species Act and Clean Water Act Requirements

The *Technical Guide for Subbasin Planners* says that "the management plan should describe how the objectives and strategies are reflective of, and integrated with, the recovery goals for listed species within the subbasin, and the water quality management plan within that particular state. Coordination with the USFWS and the Tribal and state agencies charged with implementing the CWA will be an important step in ensuring consistency with ESA and CWA requirements."

In the IMP, there is one federally-listed fish species, the bull trout. In the subbasins where the bull trout remain (primarily the Pend Oreille and Coeur d' Alene), the subbasin work teams chose to include the USFWS draft recovery goals as subbasin objectives. (See the subbasin management plan sections for more information on the specifics of the draft recovery goals.) Federally-listed wildlife species are recognized in the management plans with objectives that call for protection of these species and their habitats. Therefore, the management plan is consistent with ESA requirements.

The IMP is developing objectives and strategies that will lead to improvements in water quality. This is particularly emphasized in those subbasins where water quality does not currently meet water quality standards. In some cases, the subbasin plan specifically acknowledges the work being done by other entities to improve water quality and recommends consistency with other management plans, such as TMDL. Therefore, the subbasin management plan is consistent with CWA requirements.

2.8 Relationship to Other Planning Efforts

In the IMP, other planning efforts have been coordinated through the Subbasin Work Teams. The Subbasin Work Teams included members who were working on watershed planning, TMDL, water quality planning, salmon recovery planning, and hydropower re-

licensing. Participation of these members assures that this subbasin plan is compatible with other planning efforts. A primary strategy developed by the Subbasin Work Teams is the establishment of technical and policy working groups that will meet regularly over the long term to coordinate, evaluate, and implement mitigation measures within each subbasin.

SECTION 3 – Table of Contents

3 Aquatic Resources in the Intermountain Province

Most of the assessment analysis for aquatic resources was conducted at the subbasin scale. Detailed, subbasin-specific information can be found in the subbasin specific sections. This section describes aquatic resources in the Intermountain Province (IMP) in general, and the methods used in the aquatic assessment.

3.1 Historic Aquatic Resource Conditions in the Intermountain Province

Prior to settlement, the aquatic habitats of the IMP were primarily affected by natural conditions such as geology, climate, and natural stochastic events such as fires and floods. Natural barriers may have blocked the migration of salmon in the Pend Oreille River near Z Canyon and Metaline Falls. In the Spokane River, Spokane Falls presented a formidable obstacle to migrating salmon and steelhead and was impossible for at least most of the anadromous fish population. Above and below these barriers, resident fish species were present including bull trout, westslope cutthroat trout, redband trout, mountain whitefish, and burbot.

Much of the following material was summarized in a report by Scholz et al (1985), which compiled information about the pre-dam salmon and steelhead fisheries in the upper Columbia River basin. Before construction of the impassible Grand Coulee Dam, summer Chinook salmon and steelhead trout migrated to the Spokane River, San Poil River, and Kettle Falls in extraordinary numbers (Figure 3.1). In the Spokane River watershed, on August 3, 1826, naturalist David Douglas recorded in a notebook, later published by the Royal Horticulture Society (London, England) in 1914, that 1,700 salmon were collected by Spokane Indians in a weir placed in the Little Spokane River near its confluence with the Spokane River in a single day. As late as 1882, Livingston Stone, who surveyed the Spokane River for the U.S. Fisheries Commission, reported that 40,000 to 50,000 salmon were observed on drying racks in the Indian encampment on the Little Spokane River. In 1866, Cadastral surveyor L.P. Beach recorded in his surveying notebook that Indians fishing at Little Falls on the Spokane River mainstem put up at least 250 tons of dried fish during the salmon season. The Spokane and Coeur d' Alene Tribes recorded a harvest of approximately 150,000 salmon per year from five fishing weirs on the Spokane River alone (Scholz et al. 1985).

Figure 3.1. San Poil man spearing fish on the San Poil River near Keller, Washington. Photo courtesy of the Northwest Museum of Arts and Culture/Eastern Washington State Historical Society, Spokane, Washington

In describing the now inundated fishery at Kettle Falls (Figure 3.2), Angus McDonald, who ran the Fort Colville trading post between 1852 and 1872, wrote, "salmon as heavy as one hundred pounds have been caught in those falls. … One basket has caught a thousand salmon in a day" (Howay et al. 1907). At Kettle Falls, U.S. Naval Captain Charles Wilkes (1845), a member of the U.S. Exploring Expedition of the Columbia Basin conducted in 1843, recorded that about 900 salmon a day were collected in baskets

suspended over the falls (Scholz et al. 1985). In 1870, the author of an annual report to the Commissioner of Indian Affairs, described the salmon chief (a Colville Indian) distributing salmon among his own and different tribes of Indians including: San Poil, Spokane, Kalispel, Kootenai, Coeur d' Alene, and Nez Perce that assembled at Kettle Falls for the purpose of catching their winter's food supply (Scholz et al. 1985). Based on Wilkes' estimate, Craig and Hacker (1940) computed that the yield of the Kettle Falls fishery was approximately 600,000 pounds of salmon during a 60-day fishing season, with 500 fish caught per day weighing an average of 20 pounds apiece. These figures included only the catch collected in communal basket traps and not those caught by individuals spearing or dipnetting salmon at Kettle Falls (Scholz et al. 1985).

Figure 3.2 Colville men fishing, Kettle Falls, Washington, before 1939. Photo courtesy of the Northwest Museum of Arts and Culture/Eastern Washington State Historical Society, Spokane, Washington.

Dr. George Suckley, who published the results of fish collected during the Pacific Railroad Surveys directed by Governor Isaac Stevens, declared that the Indians at Kettle Falls annually kill hundreds of thousands of salmon. Additionally, Suckley reported that during the fishing season, Indians from all the surrounding country congregate at Kettle

Falls and the population numbered about 1,000 individuals. Other accounts note that Indians from as far away as western Montana and the Dakotas came to Kettle Falls to trade buffalo meat and hides for salmon (Reyes 2002). He also noted, "The Indians sow a little wheat and plant some potatoes but their principle subsistence is salmon" (cited in Scholz et al. 1985). Although Kettle Falls was the preeminent fishery, it was only one of many upper Columbia River fisheries important to the Tribes of the region, such as the San Poil River fishery.

Resident salmonids were also abundant in the Columbia, Spokane and Pend Oreille rivers. For example, in a U.S. Fish Commission Survey, Bean (1894) and Gilbert and Evermann (1895) noted that cutthroat trout and mountain whitefish were abundant in the Spokane River system. Gilbert and Evermann (1895) said of the Pend Oreille River, "Trout are abundant in this river; salmon trout are also quite abundant, and both bite readily." (Salmon trout was the commonly used term for bull trout in historic documents.) Ray (1937) noted that the Kalispel Tribe maintained a fish trap on Calispell Creek near its confluence with the Pend Oreille River. In the spring, before the salmon season on the Columbia and Spokane Rivers, Indians from several Tribes in the surrounding territory gathered there. They were attracted by the communal distribution of the catch from the trap, which included resident salmonid (trout, whitefish), catostomid (suckers), and cyprinid (minnows) fishes as well as the opportunity to dig camas, which grew in abundance there. In exchange, the resident Colville band – the Sxoielpi – at Kettle Falls reciprocated the hospitality of the Kalispel Tribe by providing them with salmon fishing access at Kettle Falls (Chance 1973). To provide an idea of the numbers of resident trout found in these systems, J.G. Cooper, another naturalist working for the Pacific Railroad Survey noted that, in the Spokane River, Spokane Falls arrested migration of salmon but above the falls, "an abundance of trout, almost equal to the salmon compensate for their loss." In August 1877, Lt. Abercrombie (U.S. Army) reported that a party of three anglers caught about 450 salmon trout (bull trout or steelhead) in one afternoon fishing on the Spokane River near the City of Spokane Falls. Abercrombie stated, "As fast as we dropped in a hook baited with a grasshopper we would catch a big trout. In fact, the greatest part of the work was catching the grasshoppers."

3.2 Historic and Current Aquatic Resources in the Subbasins of the Intermountain Province

The fisheries community currently existing throughout the IMP has been severely modified from the historic. Today, a total of 36 resident fish species have been identified, of which many are nonnative and none are anadromous. Current problems for fish populations are summarized in Section 1.4.

3.2.1 Coeur d' Alene Subbasin

Migratory fishes from the Columbia River were not present in the Coeur d' Alene Subbasin prior to the construction of Grand Coulee and Chief Joseph dams, due to natural barriers on the Spokane River. The Coeur d' Alene Indian Tribe historically fished for salmon in portions of the Spokane River and its tributaries downstream of Post Falls,

Idaho – areas downstream of the Coeur d' Alene Subbasin. The blockage of anadromous salmon at Grand Coulee Dam eliminated potential for anadromous fish runs that the Coeur d' Alene Tribe used for subsistence and cultural harvest.

Following the loss of anadromous salmon, the Coeur d' Alene Tribe placed more importance on the resident fishes of the Subbasin. Large migratory bull trout and westslope cutthroat trout were historically abundant in the Coeur d' Alene Subbasin. The Coeur d' Alene Tribe still use westslope cutthroat trout for subsistence and cultural purposes, but their populations have been significantly reduced. Main factors implicated in the declines of westslope cutthroat trout and bull trout are habitat degradation, over-harvest, and the introduction of nonnative species. Subsistence and recreational fishing opportunities for introduced nonnative fishes such as kokanee and Chinook salmon have helped to fill the void left from the decrease in the native salmonid populations.

3.2.2 Pend Oreille Subbasin

Originally, the lower sections of the Pend Oreille River supported anadromous Chinook salmon and steelhead trout. Anadromous Chinook salmon and steelhead trout are thought to have been restricted to the lower portions of the Pend Oreille River downstream of either Z Canyon or Metaline Falls. The construction of Grand Coulee Dam without fish passage facilities eliminated the potential for anadromous fish to migrate from the Columbia River into the lower Pend Oreille River.

Bull trout and westslope cutthroat trout are still present, although at decreased numbers in the Pend Oreille Subbasin. The construction of five dams on the mainstem Pend Oreille River has reduced the amount of riverine habitat and created large reaches of slow moving slackwater habitat. All five dams located on the mainstem Pend Oreille River are without fish passage facilities, thus eliminating the natural biological connectivity of the system. Although the increase in warmer slackwater habitat has been detrimental to many native fishes such as westslope cutthroat trout, bull trout, and mountain whitefish, it has increased the habitat capacity within the subbasin for nonnative fishes like largemouth bass, yellow perch, and pumpkinseed. The increase in nonnative game fishes within the subbasin has increased the diversity of the sport fishery, while possibly jeopardizing the native fish assemblage. Today, managers try to balance fishing opportunities for nonnative fishes with restoration and management of native fish species.

3.2.3 Upper Columbia Subbasin

Construction of Grand Coulee Dam without fish passage facilities eliminated the potential for anadromous and resident fish to migrate from lower reaches of the Columbia River to the Upper Columbia River Basin. Prior to hydropower development, the Upper Columbia River supported a diverse fish assemblage, which included eleven anadromous salmonid stocks and the Pacific lamprey (Scholz et al. 1985). In addition, anadromous white sturgeon were likely present, migrating considerable distances throughout the Columbia River system. However, construction of Grand Coulee Dam without fish passage caused the extirpation of anadromous salmon and lamprey above the dam, greatly reducing the native species assemblage. The loss of connectivity and free flowing

sections of the Columbia River also affected native white sturgeon, bull trout, and burbot. These native fishes are currently well below their historic capacity.

Currently, the fish assemblage of the Upper Columbia Subbasin is characterized by a mix of nonnative sport fishes such as brown trout, coastal rainbow trout, kokanee salmon, brook trout, and warmwater species such as walleye and yellow perch. Native bull trout, westslope cutthroat trout, and redband trout are all still present in the subbasin, although at diminished numbers and are the focus of much of the restoration work that is being done in the subbasin. A white sturgeon recovery plan was developed in 2002 to direct international recovery efforts for white sturgeon in the Upper Columbia River Subbasin and adjacent areas.

3.2.4 Spokane Subbasin

Nine Mile Falls Dam blocked anadromous fish passage in the upper portions of the Spokane River Subbasin in 1908. It was the first of three dams on the Spokane River constructed without fish passage facilities (Little Falls Dam was constructed in 1911 and Long Lake Dam in 1915). The construction of Grand Coulee Dam without fish passage eliminated the potential for anadromous fish to return to all portions of the subbasin. Grand Coulee Dam also flooded the lower reach of the Spokane River, which is now the Spokane Arm of Lake Roosevelt.

Chinook salmon and steelhead trout dominated the Spokane River below Spokane Falls prior to the construction of hydroelectric dams (Scholz et al. 1985). The adult return of anadromous salmonids to the Spokane River system, in its natural condition, was nearly 500,000 fish annually (Scholz et al. 1985). The resident salmonid assemblage currently present in the Spokane Subbasin (primarily redband trout) is at severely diminished numbers from the historic. Habitat degradation, pollutants, sedimentation, declining stream flows, urbanization, fish barriers, and nonnative fishes have all contributed to the decline in native fishes in the Subbasin. While the current nonnative fishes provide recreational opportunities throughout the Subbasin, they also pose a serious threat to the remaining native fish assemblages from direct predation, competition, and hybridization.

3.2.5 San Poil Subbasin

Prior to the construction of Grand Coulee Dam anadromous salmonids spawned and reared in much of the San Poil Subbasin. The San Poil River had no significant natural barriers and anadromous salmonids had access to most of the watershed. Grand Coulee Dam eliminated all anadromous runs of salmon and steelhead to the entire watershed. The San Poil River had large runs of fall and summer Chinook salmon, but was best known for its large runs of summer steelhead, which were a significant resource for the people of the San Poil Subbasin.

Resident fishes of the San Poil Subbasin were also affected by the construction of Grand Coulee and Chief Joseph dams. Portions of the lower San Poil River are no longer free flowing riverine habitat; they are now part of Lake Roosevelt. The exotic species introduced into Lake Roosevelt thrived in the new lake environment and prey heavily on

native fish produced in the San Poil River especially when juvenile fish migrate to the lake to rear. Hybridization occurred when nonnative stocks were introduced to bolster over fished resident populations after the anadromous fish stocks were eliminated. The loss of marine-derived nutrients and habitat alteration also contributed to the loss or reduction in the native fish assemblage of the Subbasin. Today, the major salmonid fishes of the subbasin are remnant steelhead hybrids that have adapted an adfluvial life history, genetically pure native resident interior Columbia redband trout still exist above natural barriers, kokanee salmon, and eastern brook trout. Managers focus on these species and enhancing coldwater habitats to maintain an adequate recreational and subsistence fishery for the people of the San Poil Subbasin.

3.2.6 Lake Rufus Woods Subbasin

Historically the Lake Rufus Woods Subbasin supported anadromous and resident salmonids. Anadromous salmonids migrated through and spawned in the former mainstem Columbia River now Lake Rufus Woods. Today only 13 percent of the riverine habitat in the entire Columbia River mainstem still exists. One of the major spawning areas for fall Chinook salmon in the Columbia River basin was located between River Mile (RM) 502 to 596 (River Kilometer (RK) 809 to 960) however most of this area was inundated by Lake Rufus Woods once the Chief Joseph Dam was constructed without fish passage in 1958 at RM 545 (RK 879) (Dauble et al. 2003). Today the habitat is very similar to other reaches that support spawning congregations of fall Chinook in the Columbia River but fish passage still does not exist at Chief Joseph Dam making this habitat inaccessible to anadromous fish. Anadromous salmon also spawned in the lower sections of the Nespelem River, below a natural barrier 1.5 miles upstream from the confluence with the Columbia River.

Historically, resident fish used the mainstem Columbia River as a migration corridor and refuge often entering smaller tributaries to spawn or forage before moving to other areas to meet all of their life history requirements. The passage barrier at Chief Joseph Dam and along tributaries interrupted this process and made migratory life histories strategies obsolete. Resident life history forms now had a competitive advantage. The impacts to resident fish species from passage barriers is poorly understood but steelhead and bull trout, known to have predominantly a migratory life history strategy, are both threatened in the areas around Chief Joseph Dam.

Today, resident kokanee salmon, and nonnative rainbow trout make up the majority of the salmonid fish assemblage within the mainstem reservoir habitats along with other introduced exotic game species. The stream habitats and lakes in the area support naturally reproducing populations of brook, and brown trout and hatchery supplemented rainbow trout populations. A large population of naturally reproducing kokanee salmon is present in Lake Rufus Woods. Managers rely heavily on this population, along with artificial propagation of rainbow trout, to fill the void of lost anadromous salmonid stocks. Habitat degradation, flow alterations, inundation, pollution, and nonnative species interactions are all responsible for the diminished populations of the native fishes in the Subbasin. White sturgeon, Pacific lamprey, and burbot along with several other native

species were also impacted but information on historic and current populations of these and other species is largely nonexistent for the Rufus Woods Subbasin.

3.3 Aquatic Assessment Methods

3.3.1 Focal Species

The *Technical Guide for Subbasin Planners* (Council, 2001) suggests that Subbasin plans should include a list of focal species. A focal species has special ecological, cultural, or legal status, and is used to evaluate the health of the ecosystem and the effectiveness of management actions. The focal species are used to characterize the status, functions, and management actions in the subbasin. Criteria to be used in selecting focal species include, in order of priority: a) designation as federal endangered or threatened species, b) ecological significance, c) cultural significance, and d) local significance. Guidance was provided by the Technical Coordination Group, with input from each Subbasin Work Team on the selected focal species.

Fish are uniquely different from other wildlife and must be treated differently. They are confined to a more limited range of the landscape (water) and the technologies for analyzing fish and wildlife are quite different and will be discussed separately throughout this document.

In the IMP, the Oversight Committee recommended additional criteria for selecting focal fish species. These criteria were:

- When selecting a focal species, consider species to which one or more criteria apply.
- Endangered Species Act-listed species should be widely distributed within the subbasin.
- Non-game species should be culturally significant, or have subsistence or commercial value.
- Nonnative species should have recreational and/or commercial value.
- Focal species must represent two or more habitat types found within the subbasin.
- Native species must be native to the subbasin (that is, not introduced; for example, rainbow in the Pend Oreille Subbasin).
- If species of international importance are present, they should receive higher consideration.
- Focal species should be indicators of ecological/environmental health.
- Subbasins may select two to five focal species per subbasin.
- Use a tiered approach. For example, focal species may include historic/extirpated species, but they should receive lower priority than currently present species.

Using these criteria, the Technical Coordination Group selected a focal species list for each subbasin to consider (Table 3.1). The loss of anadromous fish has forced local fisheries managers to substitute resident fish for anadromous fish, an approach that has been recognized and supported in the Council's Fish and Wildlife Program. In addition, habitat degradation has, in some situations, forced fisheries managers to manage for nonnative fishes rather than native fishes. For this reason, nonnative fish species were selected as focal species in some subbasins. The selection of focal fish species in the IMP reflects both the desire to re-establish anadromous fish and to manage for native resident fish, and the realistic necessity of managing for nonnative fish. The focal species selected and the reasons for their selection are described in detail in subbasin chapters.

Table 3.1 Focal fish species in the IMP

Species	Subbasins	Reason for selection
Bull trout	Pend Oreille, Coeur d'Alene,	ESA-listed, native species, indicator of environmental health, cultural value, international importance
Westslope cutthroat trout	Pend Oreille, Coeur d'Alene,	Potential ESA-listed species, indicator of environmental health, native species, cultural value
Kokanee	Pend Oreille, Coeur d'Alene, Spokane, Upper Columbia, Lake Rufus Woods, San Poil	Ecological significance, local significance, recreational value
Largemouth bass	Pend Oreille, Spokane (Limited Geographic Area)	Cultural value (resident fish substitution), recreational value
Mountain whitefish	Pend Oreille, Spokane	Ecological significance, native species, indicator of environmental health, cultural value
Rainbow/redband trout	Spokane, Upper Columbia, San Poil, Lake Rufus Woods	Cultural value, recreational value, redband native species, commercial value, indicator of environmental health, international importance.
White sturgeon	Upper Columbia, Lake Rufus Woods	Cultural value, ecological significance, native species, international significance
Burbot	Upper Columbia	Cultural value, native species
Chinook salmon	Lake Rufus Woods, San Poil, Upper Columbia, Spokane	Cultural significance, native species. Considered Tier 2, Reintroduction potential
Brook trout	Lake Rufus Woods	Recreational value, resident fish substitution, subsistence value, habitat suitability
Pacific lamprey	Lake Rufus Woods Upper Columbia, Spokane	Will be discussed in the narrative, fish passage for lamprey is of interest to the Tribes, native species.

The technical assessment includes an assessment of limiting factors for the focal species in each subbasin. Limiting factors are any biological, cultural or economic conditions that are constraining the biological potential of a focal species. For salmonid fishes in rivers and streams, limiting factors were assessed using the Qualitative Habitat Analysis (QHA) model.

3.3.2 Qualitative Habitat Assessment

Beginning in early 2002 subbasin planners in the IMP began discussing potential tools to use for the aquatic assessment in the IMP. IMP subbasin planners met with Council staff and other experts to discuss the use of the Ecosystem Diagnosis and Treatment (EDT) model in the IMP on numerous occasion throughout 2002 and early 2003. A great deal of the guidance in the Technical Guide for Subbasin Planners is derived directly from the EDT model's outputs. However, at the time of these discussions the EDT model was not configured to evaluate resident fish species or lake and reservoir conditions (and with very limited exceptions still is not). Moreover, the Qualitative Habitat Assessment (QHA) model, which provides subbasin planners with an alternate tool to address some of the outputs associated with EDT, was not developed and made available to planners until late 2003. During these initial meetings, IMP subbasin planners were assured that the EDT model would be adapted for use with a handful of resident fish species in time to be used in the subbasin planning process.

As part of efforts to adapt EDT for use in areas with no anadromous fish, the San Poil Subbasin was used to run a test of some revised EDT rules. The Colville Tribes contributed significant time and resources to work with representatives from Mobrand Biometrics to populate the San Poil model and provide input on early development of rules. However, outputs from this effort were never completed. In light of the lack of other alternatives, and in their desire to meet, to the extent possible, the requirements of the Technical Guide for Subbasin Planners, subbasin planners in the IMP elected to use the QHA model. It is important to note that the outputs from the QHA model are in some areas substantially different from EDT and therefore do not in all cases align well with the portions of the Technical Guide for Subbasin Planners which are oriented specifically toward anadromous fish and related EDT outputs.

The QHA technique provides a structured, "qualitative" approach to analyzing the relationship between a given fish species and its habitat. It does this through a systematic assessment of the condition of several aquatic habitat attributes that are thought to be key to biological production and sustainability. Habitat attributes are assessed for each of several stream reaches or small watersheds within a larger hydrologic system where selected focal species were historically and/or are currently distributed. The decisions about how to divide the subbasins into stream reaches or small watersheds were made by the local biologists based on their familiarity with the available data and the uniformity of aquatic habitats. Habitat attribute findings were then considered in terms of their influence on a given species and respective life stage (that is, spawning and incubation, growth and feeding, migration). Definitions of the 11 physical habitat attributes used in the QHA are summarized below:

> **Riparian Condition:** Condition of the streamside vegetation, land form and subsurface water flow.
>
> **Channel Stability:** How the channel can move laterally and vertically and to form a "normal" sequence of stream unit types.

Habitat Diversity: Diversity and complexity of the channel including amount of large woody debris (LWD) and multiple channels. The complex of habitat types formed by geomorphic processes (including LWD) within the stream (for example, pools, riffles, glides, etc.)

Sediment Load: Amount of fine sediment within the stream, especially in spawning riffles.

High Flow: Frequency and amount of high flow events.

Low Flow: Frequency and amount of low flow events.

Oxygen: Dissolved oxygen in water column and stream substrate.

Low Temperature: Duration and amount of low winter temperatures that can be limiting to fish survival.

High Temperature: Duration and amount of high summer water temperatures that can be limiting to fish survival.

Pollutants: Introduction of toxic (acute and chronic) substances into the stream.

Obstructions: Natural or man-made barriers preventing the upstream or downstream migration of fish.

QHA relies on the expert knowledge of natural resource professionals with experience and data in a given local area to describe current and historical "reference" physical conditions in the target stream and to create a working hypothesis about how the habitat attribute would be used by a given fish species during each life stage. In July 2003, data input was completed as a collaborative effort of the fisheries Technical Coordination Group based on available data and best professional judgment and reviewed by the group in September 2003 for accuracy (Figure 3.3-1).

Figure 3.3-1. Biologists in the IMP work on populating the QHA model for the IMP Subbasin Plan, July 2003

The QHA model assesses both reference and current conditions for 11 physical habitat parameters using a ranking system between 0 (poor condition) and 4 (optimal condition). Reference conditions regarding current reservoir habitats referred to pre-impoundment conditions. In general, reference (or historic) habitat conditions were considered optimal (value = 4) unless otherwise noted. For example, some reaches had natural fish barriers or geological characteristics prone to greater sedimentation, thus lowering habitat conditions less than optimal.

The working hypothesis is the "lens" through which physical stream habitat conditions are assessed. The hypothesis consists of weighted scores that were assigned by the Technical Coordination Group to each life stage and habitat attribute specific for that life stage with respect to each focal species. The life stage weighted score ranges from 0 to 3, with 3 being the highest value assigned based on the duration of the life stage and its potential vulnerability to physical habitat conditions. For example, the life stage of spawning and incubation was often ranked higher that migration for resident fishes. The habitat attribute weighted score ranges from 0 to 2 with 2 being the highest value based on the importance ascribed to the attribute in regard to the life stage for that focal species.

The composite weighted score (life stage and habitat attribute) results in an overall reach score depicting the difference between current and the reference physical habitat condition in each reach. The reference condition represents un-impacted or "desired" conditions. QHA reach score and rank (not a prioritization list) depicts the relative degree of physical habitat deviation from reference conditions and the least amount of habitat deviation from reference conditions within each subbasin for a selected focal species. The QHA process is shown in Figure 3.3.2.

The QHA model was adapted from the Ecological Diagnosis and Treatment (EDT) Model to assess salmonids potential in streams. Keep in mind that the QHA model does not address lake or ocean environments and was not used to analyze focal species requiring lake or ocean habitat during their life history (for example, largemouth bass), with the exception of kokanee salmon. Kokanee salmon often utilize stream habitat for spawning and incubation and natural resource professionals participating in the decision-making process elected kokanee salmon to be incorporated into the QHA model. For the other non-salmonid species requiring lake habitats, a narrative assessment of limiting factors is presented describing the best available scientific information about the limiting factors for those species or those habitats. Additionally, reservoirs historically classified as rivers prior to impoundment were included into the QHA analysis.

Readers should be cautious not to interpret the rankings as a priority list for restoration. In some situations, the watersheds and streams that have the greatest deviation from the reference condition are not recommended to be the top priority for restoration because these streams are so degraded that restoration activities are not practical at this time. In addition, the QHA model only considers physical habitat factors. Biological considerations, such as competing species, disease, hybridization or current population abundance, are not included in the analysis. Some of these considerations, where known, are included in the species by species descriptions in the text.

The QHA output is shown in the form or tables, tornado diagrams, and maps that are presented within the aquatic assessment for each subbasin as well as incorporated within the discussion for the respective focal species. The tornado diagrams and maps display the reach scores for both current habitat condition (ranging from zero to positive one) and protection (ranging from zero to negative one). Scores closest to negative one depict reaches most representative of reference habitat conditions. Scores closest to positive one depict reaches with habitat conditions least similar to reference conditions. Confidence scores range from zero to one and are associated with the ratings assigned by local biologists based on documentation or their expert opinion regarding reference and current habitat attributes for each reach.

The results of the QHA modeling are presented in the aquatic assessment sections for each subbasin. The modeling results give site-specific information about watersheds within each subbasin that will be most useful for planning specific projects during the next phase of fish and wildlife planning.

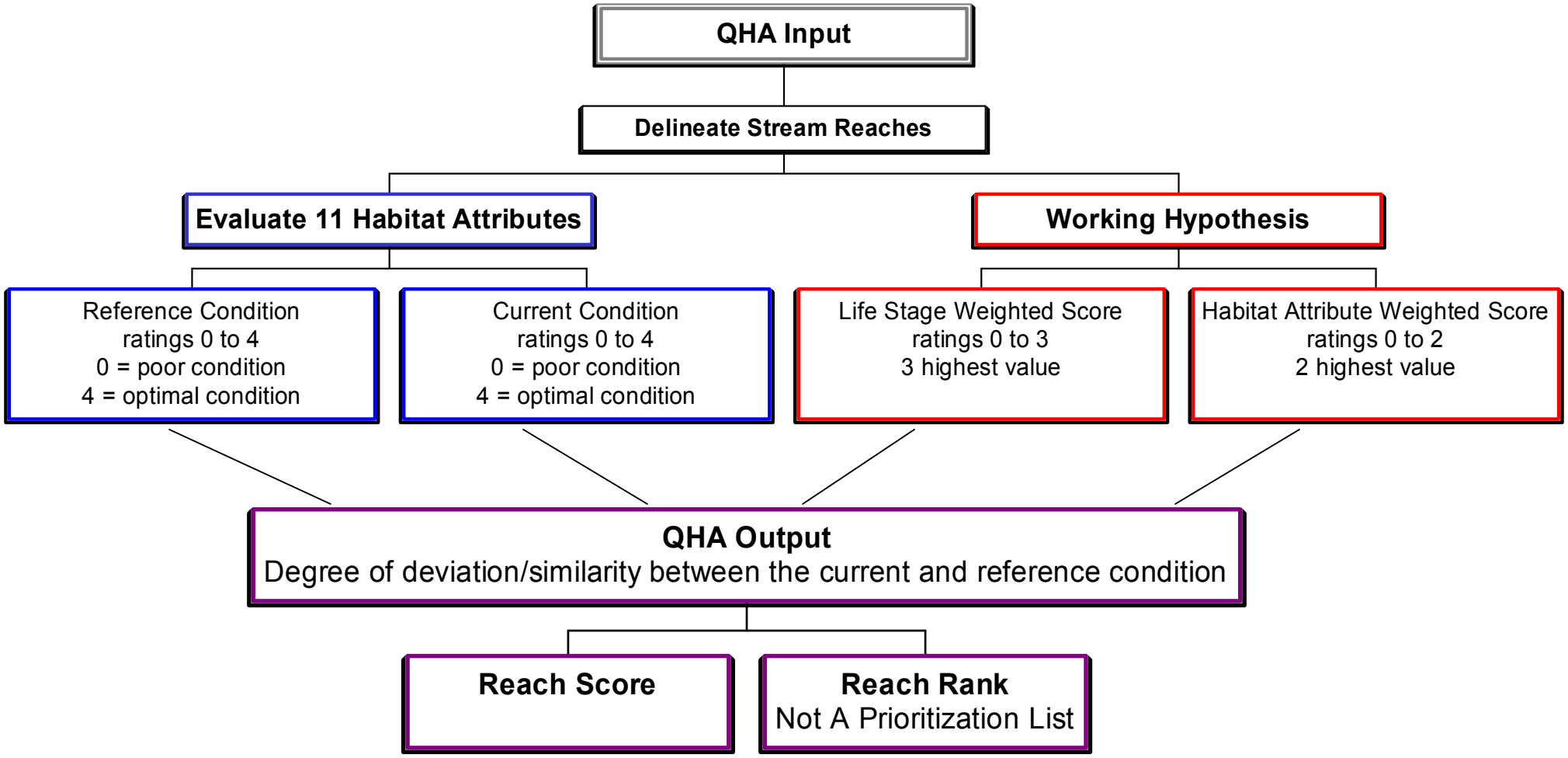

Figure 3.3.2 Logic path for QHA process

SECTION 4 – Table of Contents

4 Terrestrial Resources in the Intermountain Province

4.1 Terrestrial Resource Assessment Methods

4.1.1 Habitat Assessment Methods

4.1.1.1 Vegetation-Wildlife Associations

Wildlife-habitat types of the Intermountain Province are described in this Section based on the system developed by Johnson and O'Neil (2001). The researchers involved in the Wildlife-Habitat Relationships project evaluated 287 plant alliances, based on the national vegetation classification system of Grossman et al. (1998). These plant alliances were combined into 85 vegetative groups and supplemented with categories for marine habitats, agricultural lands, and urban sites, for a total of 119 cover types. The cover types were linked to use levels of 541 native breeding wildlife species and analyzed using multivariate statistics to determine similar habitats based on species' associations. The end-product was a total of 32 wildlife-habitat types for Oregon and Washington. This system was later expanded to include Idaho (IBIS 2003).

4.1.1.2 IMP Focal Habitats

Wildlife-habitat types occurring in the Intermountain Province were grouped into six habitat categories (Table 4.1). The Intermountain Province selected four of the six habitat categories as focal habitats (Terrestrial Resources Ad-Hoc Technical Group Meeting May 5, 2003). Wetlands, riparian habitats, and steppe/shrub-steppe habitats were selected because they have been substantially affected by construction and operation of the FCRPS projects. These habitats are of high value to native plants and wildlife species and make up a relatively low proportion of the total habitat in the province. Upland forested habitats were also selected as focal habitats. Upland forests are dominant habitats in the province, and have been affected by construction, operation, and secondary effects of hydro project development. The Intermountain Province planners also considered cliff and rock outcrop habitats focal habitats. These habitat types are not represented as habitat types in the Johnson and O'Neil system, but rather are considered fine scale habitat elements occurring within other, more widespread, habitat types.

4.1.1.3 Habitat Area Estimates, Current and Historic

The Interactive Biodiversity Information System (IBIS) provided maps of the defined wildlife-habitats in the Intermountain Province and its six Subbasins. The current condition map is based on 1999 satellite imagery, prepared at a scale of 1:100,000, with a pixel size of 25 meters (82 feet). The historic condition map was created at a scale of 1:1,000,000 with a pixel size of 1000 meters (3,280 feet). The historic map was prepared without benefit of aerial photography or satellite imagery, using written accounts, vegetation models, and expert opinions.

Table 4.1 presents the list of wildlife-habitat types present in the Intermountain Province and provides a brief description of each habitat type. Detailed descriptions of the habitat types can be found in Johnson and O'Neil (2001) and IBIS (2003).

Table 4.1. Abridged descriptions of wildlife-habitat types of the Intermountain Province

Wetlands (IMP Focal Habitat)	
Lakes, Rivers, Ponds, and Reservoirs	Natural and human-made open water habitats.
Herbaceous Wetlands	Emergent herbaceous wetlands with grasses, sedges, bulrushes, or forbs; aquatic beds with pondweeds, pond lily, other aquatic plant species; sea level to upper montane.
Montane Coniferous Wetlands	Forest or woodland dominated by evergreen conifers; deciduous trees may be co-dominant; understory dominated by shrubs, forbs, or graminoids; mid- to upper montane.
Riparian and Riparian Wetlands (IMP Focal Habitat)	
Eastside (Interior) Riparian-Wetlands	Shrublands, woodlands and forest, less commonly grasslands; often-multilayered canopy with shrubs, graminoids, forbs below.
Steppe and Shrub-Steppe (IMP Focal Habitat)	
Westside Grasslands	Native bunchgrass dominated, with forbs, mosses, or lichens; occasionally with shrub or tree cover.
Eastside (Interior) Grasslands	Dominated by short to medium height native bunchgrass with forbs, cryptogam crust.
Shrub-Steppe	Sagebrush and/or bitterbrush dominated; bunchgrass understory with forbs, cryptogam crust.
Upland Forests and Woodlands (IMP Focal Habitat)	
Western Juniper and Mountain Mahogany Woodland	Western juniper and/or mountain mahogany dominated with bunchgrass or shrub-steppe understory.
Westside Lowland Conifer-Hardwood Forest	Conifer dominated forest typical of west side, western hemlock and Douglas-fir dominated; understory dominated by shrubs, swordfern, forbs and grasses.
Montane Mixed Conifer Forest	Coniferous forest of mid-to upper montane sites with persistent snowpack; several species of conifer; understory typically shrub-dominated.
Eastside (Interior) Mixed Conifer Forest	Coniferous forests and woodlands; Douglas-fir commonly present, up to 8 other conifer species present; understory shrub and grass/forb layers typical; mid-montane.
Lodgepole Pine Forest and Woodlands	Lodgepole pine dominated woodlands and forests; understory various; mid- to high elevations.
Ponderosa Pine Forest and Woodland	Ponderosa pine dominated woodland or savannah, often with Douglas-fir; shrub, forb, or grass understory; lower elevation forest above steppe, shrub-steppe.
Upland Aspen Forest	Quaking aspen dominated woodland or forest with shrub, forb, or grass dominated understory; rocky sites or moist microsites.
Alpine and Subalpine (Non-focal Habitat)	
Alpine Grasslands and Shrublands	Grassland, dwarf-shrubland, or forb dominated, occasionally with patches of dwarfed trees.
Subalpine Parklands	Ground layer of dwarf-shrubland, graminoids, forbs, moss, or lichens with tree layer of 10-30 percent canopy cover.
Developed (Non-Focal Habitat)	
Agriculture, Pasture, and Mixed Environs	Cropland, orchards, vineyards, nurseries, pastures, and grasslands modified by heavy grazing; associated structures.
Urban and Mixed Environs	High, medium, and low (10-29 percent impervious ground) density development.

(*Source*: Johnson and O'Neil 2001, IBIS 2003)

4.1.1.4 Habitat Ownership

The IBIS database also was used to determine land ownership categories and Gap Analysis Program (GAP) management status of lands within the province. The GAP identifies and classifies components of biological diversity to determine which components already occur in protected areas, and which are under-represented or not present in protected areas. These IBIS products are based on a different land cover source than the wildlife-habitat types; individual vegetation types were grouped to match the IBIS wildlife-habitat types as closely as possible, but the acres within each wildlife-habitat category do not match in all cases.

4.1.2 Limitations of the Habitat Assessment Methods

The current conditions map is limited in its ability to accurately represent habitats that are in small patches or corridors less than 25 meters wide. It also may under-represent small patches of habitats that occur at or near the canopy edge of forested habitats. Wetlands, riparian areas, small and/or linear aquatic habitats, and habitats of characteristically patchy and infrequent occurrence are likely somewhat underrepresented on this map.

Due to the much larger pixel size and less extensive information base, the historic map is even more limited in its ability to accurately represent habitats that are located in small patches or narrow corridors. Habitat types that may be substantially underrepresented on this map include herbaceous wetlands, montane coniferous wetlands, interior riparian wetlands, upland aspen forest, alpine and subalpine habitats, and small aquatic habitats such as lakes, rivers, and ponds.

The IMP Oversight Committee recognizes the assumptions and limitations of the IBIS analysis. However, the data provide a good indication of the trends in habitat abundance and distribution from the historic to current condition for those habitat types that are well represented. Due to the limitations and inaccuracies associated with the IBIS mapping, the IBIS historic and current maps were not used for subbbasin-level analyses.

The following discussion is based in part on the IBIS wildlife-habitat information. Supplementing the IBIS data is information on historic and current habitat distribution, condition, and trends available in other published reports and documents.

4.1.3 Wildlife Assessment Methods

IBIS was used to determine the general occurrence of terrestrial vertebrate species in the province. In addition, IBIS was used to determine specific ecological functions of selected focal wildlife species in the province. The IBIS system relates species to the structural conditions and habitat elements of wildlife-habitat types and indicates important attributes of the species' life histories and key ecological functions.

The IBIS database indicates wildlife species occurrence based on wildlife-habitat presence. Most of the wildlife occurrence data is categorical and is not quantified or verified locally. Habitats that are under-represented by the mapping methods will also under-represent occurrence of wildlife species closely associated with the habitat. Conversely, a species may be shown to occur in a habitat, even though the structural conditions within the habitat to support the species are absent. Due to these sources of error, the Oversight Committee chose not to use the IBIS wildlife species occurrence data

for the historic condition. General species occurrence data for the province is derived from the IBIS database; assessments of key wildlife are supported through citation of current, local information on populations and habitats in the province.

4.2 Historic Focal Habitat Conditions

4.2.1 Historic Distribution of Focal Habitats

Table 4.2 and Figure 4.1 present the acres and distribution of wildlife-habitat types in the Intermountain Province under the historic (c. 1850) condition.

4.2.1.1 Wetlands

Open water habitats comprised about 2.6 percent of all habitats in the Intermountain Province historic condition, including the Columbia River and its tributaries (Table 4.2 and Figure 4.1). The Columbia River flowed over 160 miles within the province. Major tributaries included the Pend Oreille, Kettle, Spokane, San Poil rivers. Large lakes with significant inflows and outflows included Coeur d' Alene Lake, Lake Pend Oreille, Priest Lake, plus numerous smaller lakes.

Herbaceous wetlands and montane coniferous wetlands are not represented in the historic mapping due to scale inaccuracies; however, these wetland types were likely present in quantities equal to or greater than the current condition. Montane coniferous wetlands would have been present at mid- to upper elevations along streamcourses or adjacent to other wetlands (Chappell et al. 2001). These forested wetlands were characteristically of relatively small size and patchy distribution, occurring within large tracts of montane mixed conifer forest, or, less often, lower elevation conifer forests. These wetlands typically included tree, shrub, and grass/forb strata, and provided a broad range of forest habitat elements in proximity to seasonal or permanent water sources.

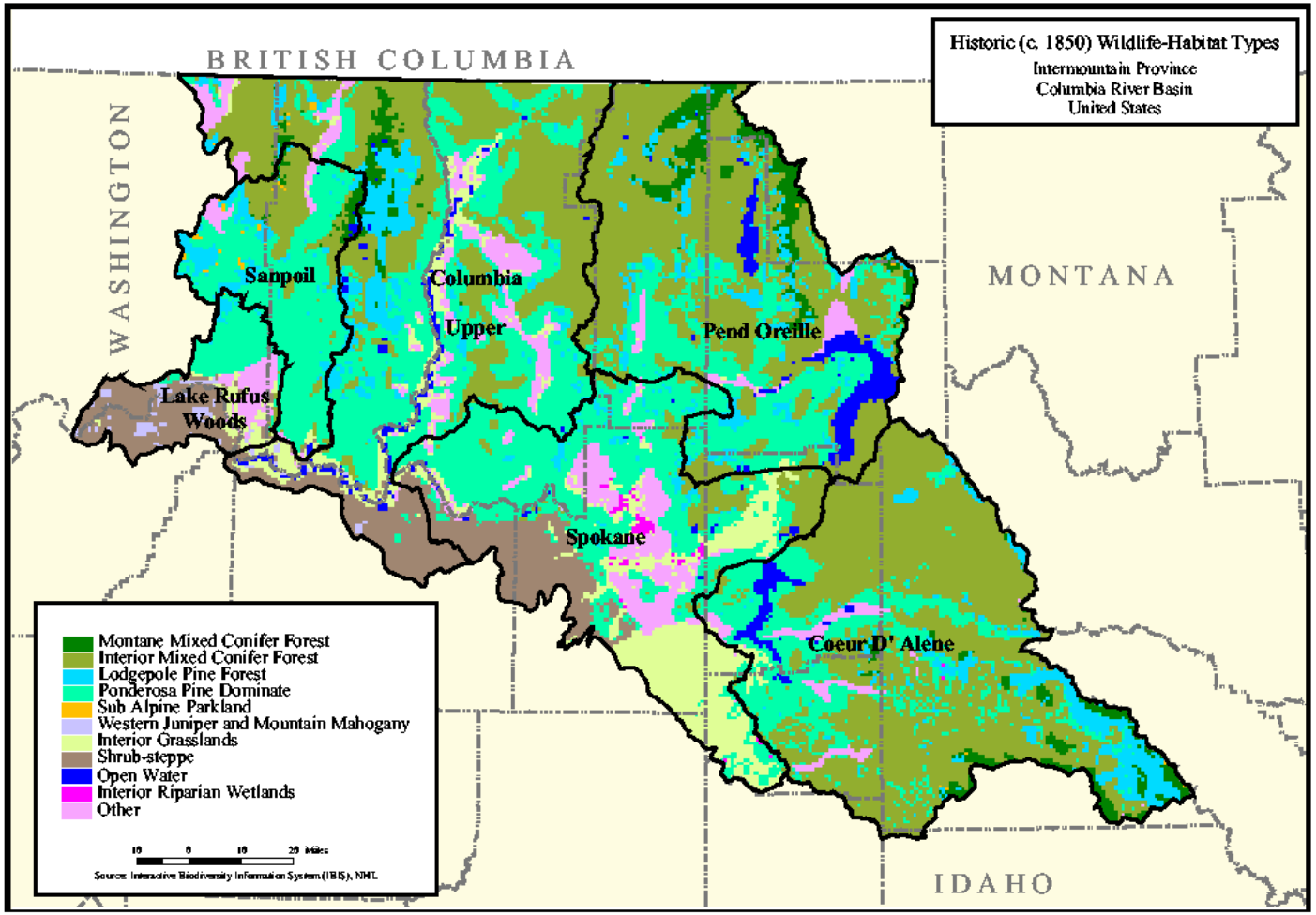

Figure 4.1. Historic wildlife-habitat types

Figure 4.1

Table 4.2. Historic and current wildlife-habitats of the Intermountain Province

	Total Historic	Total Current	Change Historic to Current	Percent Change	Historic percent of Total	Current percent of Total
Wetlands (Focal Habitat)						
Lakes, Rivers, Ponds, and Reservoirs	258,150	317,155	59,005	22.9%	2.6%	3.2%
Herbaceous Wetlands	N/A	9,750	N/A	N/A	N/A	0.1%
Montane Coniferous Wetlands	N/A	107,082	N/A	N/A	N/A	1.1%
Riparian and Riparian Wetlands (Focal Habitat)						
Eastside (Interior) Riparian-Wetlands	37,358	22,825	-14,533	-38.9%	0.4%	0.2%
Steppe and Shrub-Steppe (Focal Habitat)						
Eastside (Interior) Grasslands	865,563	702,944	-162,619	-18.8%	8.6%	7.0%
Shrub-Steppe	641,208	501,195	-140,013	-21.8%	6.4%	5.0%
Western Juniper and Mt. Mahogany Woodland	39,197	0	-39,197	-100.0%	0.4%	0.0%
Upland Forest (Focal Habitat)						
Westside Lowland Conifer-Hardwood Forest	0	107,576	107,576	+	0.0%	1.1%
Montane Mixed Conifer Forest	348,317	335,895	-12,422	-3.6%	3.5%	3.3%
Eastside (Interior) Mixed Conifer Forest	3,780,619	5,203,399	1,422,780	37.6%	37.7%	51.9%
Lodgepole Pine Forest and Woodlands	702,101	142,803	-559,298	-79.7%	7.0%	1.4%
Ponderosa Pine Forest and Woodland	3,337,778	1,138,396	-2,199,382	-65.9%	33.3%	11.4%
Upland Aspen Forest	N/A	18,884	18,884	N/A	N/A	0.2%
Alpine and Subalpine						
Alpine Grasslands and Shrublands	N/A	85,436	85,436	N/A	N/A	0.9%
Subalpine Parklands	16,882	11,423	-5,459	-32.3%	0.2%	0.1%
Developed						
Agriculture, Pasture, and Mixed Environs	0	1,226,578	1,226,578	+	0.0%	12.2%
Urban and Mixed Environs	0	95,712	95,712	+	0.0%	1.0%
Total[1]	10,027,173	10,027,053			100.0%	100.0%

(*Source*: IBIS 2003)

N/A: Historic condition data not available due to mapping scale and lack of source data; change and percent change not calculable.
+ : Indicates habitat type not present in historic condition; percent change not calculable.
[1] : Totals for historic and current condition do not match due to different mapping scales.

Herbaceous wetlands would have been present in all habitats at elevations below subalpine, on sites where seasonal to semi-permanent water sources provided year-round soil saturation (Chappel et al. 2001). These wetlands varied in size from small, isolated sites to extensive marshes. In the IMP, large emergent wetlands were present along many rivers where they drained to or from natural lakes; for example, the Pend Oreille River at Lake Pend Oreille supported over 2,300 acres of marshlands prior to hydroelectric project construction (Martin et al. 1988). Although limited to emergent or aquatic herbaceous vegetation, these wetlands provided wildlife value through roots and shoots, seed production, security cover for aquatic and terrestrial species, and breeding habitat.

Wetlands provide a large number of important functions affecting habitat, hydrology, and water quality: reduction in flooding impact, water quality enhancement, groundwater effects, primary and secondary biological productivity, and creation of habitat for fish, wildlife, and

plants (Novitzki et al. 1994). Wetland habitats support a diverse array of species closely or occasionally linked to wetland use, including waterfowl, wading birds, amphibians, numerous mammalian wildlife species, fish, and rare, threatened, and endangered species. (Refer to Section 4.5 for additional information on wildlife species relationships to wetland habitats.)

4.2.1.2 Riparian and Riparian Wetlands

Eastside riparian wetlands, dominated by woody vegetation, are estimated to have occupied less than one percent of the historic landscape (Table 4.2). This habitat type is under-represented by the historic mapping, due to the narrow, linear configuration of riparian zones. These habitats would have been present along the Columbia River and its tributaries, including intermittent streams, wherever aspect, slope, soils, and hydrology combined to allow seasonal soil saturation (Chappell et al. 2001). These wetlands would also have been located along seeps within eastside mixed conifer forest, ponderosa pine forest and woodlands, and shrub-steppe habitats.

Riparian habitats in the Intermountain Province varied greatly in structure, including single and multi-canopy forests, woodlands, and shrublands (Chappell et al. 2001, Kovalchik 2001). Tree layers may have included black cottonwood, quaking aspen, paper birch, and other deciduous species at lower elevations. In shrub-steppe habitats, ponderosa pine or Douglas-fir would have been the typical dominant species. At higher elevations, conifers were more dominant in riparian zones, interspersed with deciduous trees and shrubs. A wide variety of shrubs, both hydrophytic species and those tolerant of drier conditions, may have been present.

The high value of riparian habitat to wildlife is well-documented (Brown 1985, Thomas 1979, Raedeke 1988). These habitats currently support a disproportionate level of use by wildlife, and would have served the same function historically. Kauffman et al. (2001) estimate that 53 percent of wildlife species occurring in Oregon and Washington use riparian zones, which comprise only 1 to 2 percent of habitats. Diverse vegetative structure, a wide variety of habitat elements, proximity to water, and microclimate all contribute to the importance of riparian zones as wildlife habitat. Riparian zones also function as important travel corridors for wildlife migration and dispersal.

Riparian floodplain communities are dependent on large scale events including channel migration, flooding, and formation of depositional areas, to create suitable habitat for the establishment of riparian pioneering species such as cottonwood and willow (Hughes et al. 2001, Winward 2000). Flow variations continue to exert a primary influence after seeds have reached suitable sites and germinated; inadequate or excess soil moisture and high flows can cause mortality of small seedlings (Amlin and Rood 2002, Braatne and Jamieson 2001; Scott et al. 1997). High water events allowing groundwater recharge can be important to the maintenance of established cottonwood stands (Braatne and Jamieson 2001).

4.2.1.3 Steppe and Shrub-Steppe

Eastside grasslands (8.6 percent) and shrub-steppe (6.4 percent) were present along the southern portion of the Intermountain Province in the historic condition (Table 4.2, Figure

4.1). The most extensive grasslands were in the southern portion of the Spokane Subbasin. Grasslands occurred in patchy distribution throughout the Upper Columbia and San Poil Subbasins and extended along the Columbia River corridor.

Eastside grasslands occurred in very dry, hot locales on both plateaus and canyons, mostly below the ponderosa pine and western juniper mountain mahogany woodland zones, based on classifications by Daubenmire (1970) and Chappell et al. (2001). Grassland structure was a single, herbaceous layer of short- to medium-height grasses and forbs; however, the habitat ranged from sparsely to densely vegetated. Bunchgrasses dominated, providing an irregular, patchy distribution of cover within the habitat. A presumably important feature of native grassland habitats was the presence of a cryptogam crust composed of bacteria, lichens, mosses, and algae (PNL 2003).

Shrub-steppe habitats were typically located at elevations below ponderosa pine forests and western juniper-mountain mahogany woodlands, and were often present in a mosaic with Eastside grassland habitats. Shrub cover varied greatly, with sagebrush species as the dominant shrubs. Grass and forb cover, mostly between individual shrubs, also varied in extent, with a large number of both annual and perennial forb species potentially present, based upon current classification by Dobler et al. 1996. Cryptogam crusts were presumably typical on non-vegetated soils in good condition shrub-steppe habitats (PNL 2003).

4.2.1.4 Upland Forests and Woodlands

Interior mixed conifer forests dominated the northern and eastern portions of the Intermountain Province in the historic condition (37.7 percent of total; Table 4.2). This forest habitat extended across the province, and was contiguous with forests located to the east, west, and north into present-day Canada. Montane mixed conifer forests (3.5 percent) and lodgepole pine forests and woodlands (7 percent) interrupted the extensive tracts of mixed conifer forest on sites at mid-montane to montane elevations that retained a persistent winter snowpack.

Ponderosa pine dominated forests and woodlands (33 percent) were distributed widely across the central and southern portion of the Intermountain Province, transitional from the higher, moister, coniferous forests to the arid steppe and shrub-steppe habitats (Figure 4.1). Western juniper and mountain mahogany woodlands (less than one percent) were present only in scattered locations within shrub-steppe or ponderosa pine habitats.

Eastside (interior) mixed conifer forest was located on a broad range of mid-elevation ranges, primarily from about 3,000 to 5,500 feet (Chappell et al. 2001). Douglas-fir was the most common species, but at least eight other conifer species may also have been present. Structure varied from single layer forest canopy in younger seral stages, to multi-canopy forests in late and old seral stages. Shrub layers were dominated by deciduous shrubs, and a wide variety of graminoids and forbs were present. Montane mixed conifer forests were located at higher elevations, and were typically dominated by Pacific silver fir, mountain hemlock, subalpine fir, or other conifer species, often with Douglas-fir as a codominant (Chappell et al. 2001). Both types of coniferous forest habitat provided structural diversity, a

patchwork of ages and stand complexity, snags, downed wood, and other habitat elements, used by a variety of wildlife species.

Lodgepole pine stands occurred at mid- to high elevations, typically subject to cold and relatively dry conditions, but also on poorly drained depressions (Franklin and Dyrness 1988). Lodgepole is strongly associated with disturbance by fire (Chappell et al. 2001). Stands of lodgepole varied from open canopy to closed canopy, with a single canopy layer until later seral stages within which shade-tolerant understory trees had developed. Understory species were dominated by shrubs or graminoids, depending on site conditions. A variety of wildlife species were associated with lodgepole stands, perhaps most notably in the Intermountain Province, the lynx. Lynx are now known to be highly dependent upon snowshoe hares, which tend to be abundant in relatively young lodgepole stands with very high stem density (Stinson 2001).

Ponderosa pine habitats ranged from open savannah to more dense woodlands, with well-spaced overstory trees, based upon analysis by Chappell et al. (2001). Understory species included conifers, shrubs of various heights, and grasses and forbs. A multi-level canopy would have been interspersed with openings between the dominant conifers. Structure was diverse, and many habitat elements such as snag cavities, logs, and dense shrub cover would have been present. Few wildlife species were restricted to ponderosa pine habitats, but numerous species used the habitat.

4.2.1.5 Non-Focal Habitat Types

Alpine grasslands and shrublands, subalpine parklands, and upland aspen forests were likely present in the historic condition in relatively small amounts. Urban and agricultural habitats were essentially non-existent in the province in the historic condition.

4.2.2 Factors Limiting Historic Focal Habitats

The distribution of vegetation across the Intermountain Province in the historic condition was determined by a combination of factors including geology, soils, and climate. Wildlife-habitats were also affected by naturally-occurring disturbance events of both small and large scale. These disturbance events served both to influence the distribution of habitats and to shape the structural characteristics of habitats within the province.

4.2.2.1 Fire

The vegetated landscape of northeastern Washington and northwestern Idaho was frequently disturbed by fire in historic times (Daubenmire and Daubenmire 1968). Fire intervals in the inland northwest between 1540 and 1940 were studied by Barrett et al. (1997). Ponderosa pine habitats had the shortest interval of the habitats studied, with low-intensity fires occurring every 20 years on average. Grasslands and shrub-steppe also had frequent, low intensity fires, averaging about every 25 years. Conifer forests may be subject to low intensity fires, but are more often affected by moderate to high intensity fires. Eastside mixed conifer forests experienced a fire interval of 30 to 100 years. Fire-scarred trees, stumps and logs, and charcoal deposits in soil are frequently observed in forests within the province (Williams et al. 1995). While most fires are believed to have been naturally-occurring, evidence documents the practice of setting fires to grasslands and shrub-steppe habitats by

Native Americans. This practice promoted the growth of culturally important plants such as camas (Agee 1993).

Fire was important in maintaining the structure and plant species composition of grasslands and shrub-steppe, removing accumulated dry plant material, reducing cover of some woody species, and promoting the germination and development of other plant species.

Fire was also important in species composition and structure of ponderosa pine habitats. Frequent underburning removed accumulated dead materials, reduced shrub cover, and maintained the open understory of savannah or woodland habitat. Ponderosa pine has several adaptations to survival in a fire-prone environment, including self-pruning and thick, heat resistant bark.

Lodgepole pine depends on fire for release of seed from its cones and for openings in which to germinate and grow. Fire can rejuvenate early and mid-seral stage lodgepole stands, providing new canopy openings and promoting germination. In the absence of fire, mature lodgepole stands are eventually replaced by shade-tolerant understory conifers.

In eastside mixed conifer and montane mixed conifer stands, fire was less likely to affect the overall distribution of the habitat, but maintained a strong influence on stand age and structure. In these forested habitats, fire was less frequent, but often more severe in intensity. Fire often resulted in the partial or complete removal of large stands of trees, allowing early seral stages to develop in patches across the landscape. Fire contributed to the maintenance of a mosaic of stands of multiple ages within the larger matrix of the forest habitat.

Wetland and riparian habitats were less influenced by fire than other, more xeric habitats. However, fires could sweep through wetlands and riparian habitats surrounded by, or adjacent to, other fire-prone habitats. Marsh areas may be burned by wildfire, particularly during the dry seasons.

4.2.2.2 Wind

In forest habitats of the historic landscape, windthrow was a recurring source of disturbance. This factor was not distributed evenly across the landscape, but tended to be located in specific areas defined by topography and wind patterns (McComb 2001). Windthrow caused small to large canopy openings in forested habitats, allowing early successional species to develop and promoting stand age diversity across the landscape.

4.2.2.3 Debris slides

Landslides were a local disturbance factor along canyons and steep slopes in mountainous terrain. Avalanches were another source of disturbance in steep mountainous habitat. These disturbances tended to be repetitive and promoted the development of early successional and/or slide tolerant vegetation.

4.2.2.4 Insects and Disease

Insect infestations and other diseases are important influences on forest stands in the Intermountain Province currently (Williams et al. 1995) and would have influenced the

historic stand structure as well. Root and stem fungi, mistletoes, and insects may have worked in combination with forest fire or other disturbance events, causing outbreaks when trees were in weakened conditions. The end result of these various pathogens was to cause local and patchy death and decay, including windthrow, within forest stands. Stand structure, and habitat elements such as snags, cavities, and downed wood, were all affected by local insect and disease outbreaks.

4.2.2.5 Human influence

In the historic condition of the Intermountain Province, circa 1850, human influence is assumed to have been minimal at the landscape level, as it predated most European settlement. Native American influence included low level and low density of disturbances associated with hunting and gathering. Human-induced fire was known to occur (Barrett and Arno 1982); the extent of its effects, over and above those of natural wildfire, are difficult to assess. The Oregon Trail, with associated grazing of livestock and hunting with guns, was actively used in the 1840s and 1850s. The effects of this use were relatively intense and localized along the trail near present-day Walla Walla, south of the Intermountain Province; however, its existence likely contributed to European presence within the province.

4.3 Current Focal Habitat Conditions

4.3.1 Current Distribution of Focal Habitats

Table 4.2 and Figure 4.2 present the acres of habitat types in the province under current (1999) conditions. As previously noted, both the historic and current conditions maps are limited in their ability to represent certain habitat types. Caution should be exercised when comparing acreages of wetland, riparian, open water, alpine/subalpine, and other habitats of small or linear mapping units. Habitats that occur in small patches, narrow bands, and at or near the edge of tree canopy, such as wetlands and riparian areas, are not accurately represented via remote-sensing based mapping. Also, due to development of the historic and current maps at different scales, the total acreages for the historic and current conditions do not match exactly.

4.3.1.1 Wetlands

Open water habitats, including rivers, lakes, ponds, and reservoirs, currently comprise about 3.2 percent of the habitats in the Intermountain Province (Table 4.2 and Figure 4.2). Open water habitats have increased in area from the historic condition, due primarily to the creation of river impoundments for hydroelectric, irrigation, and flood control projects. The federal hydropower reservoirs of Albeni Falls, Grand Coulee, and Chief Joseph dams total about 84,543 acres. Grand Coulee Dam is the single largest reservoir in the Intermountain Province, with a surface area of approximately 70,000 acres at full pool. Other water resource developments in the province include Boundary Dam, Box Canyon, and the five hydroelectric developments comprising the Spokane River Project.

Herbaceous wetlands are widely distributed across the province and are often associated with rivers, lakes and streams. The area of these wetlands has been reduced from historic levels due to draining and filling, agriculture, grazing, inundation by reservoirs, altered hydrology through regulation of flows, and by reduction in numbers of beaver (Chappell et al. 2001,

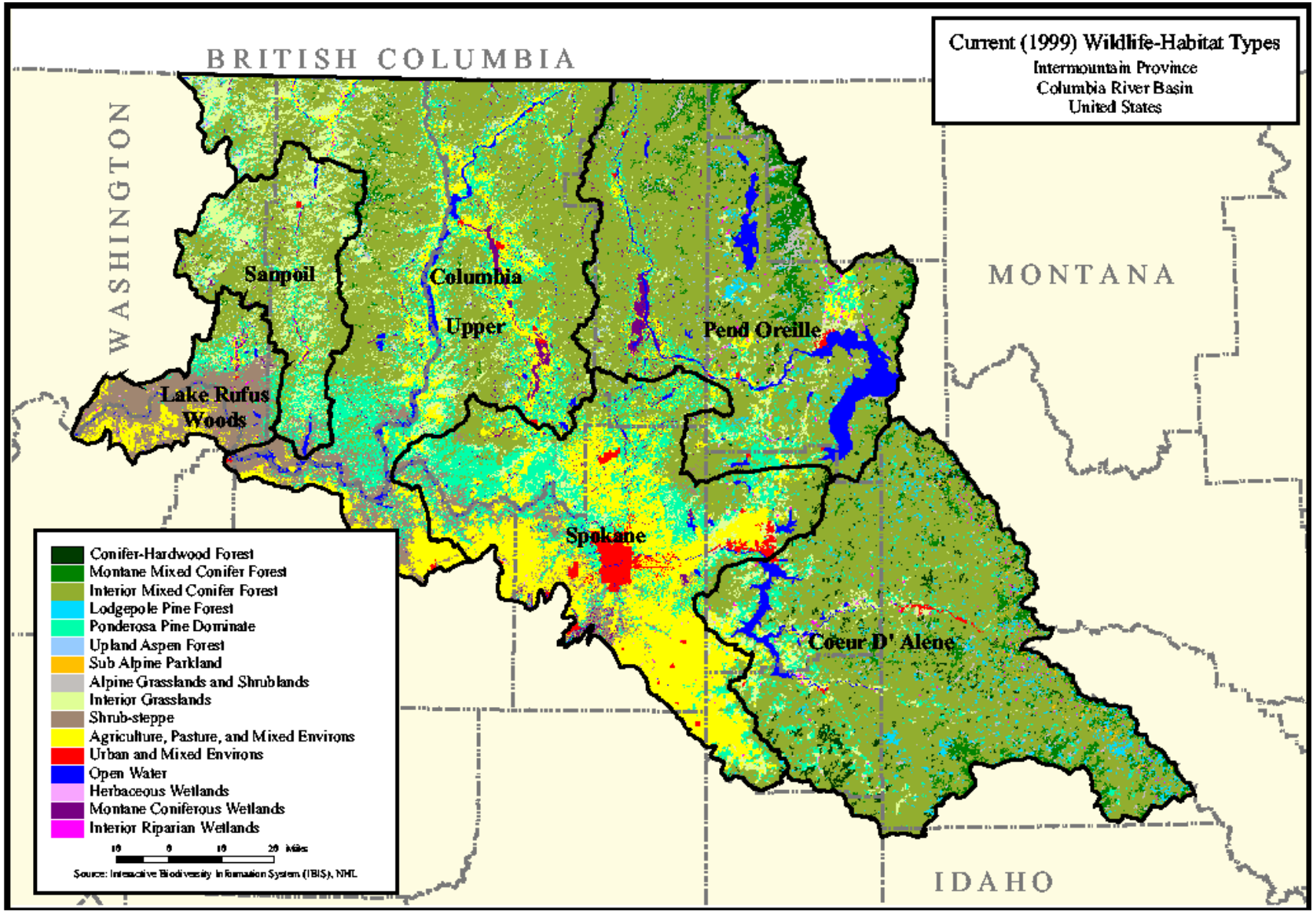

Figure 4.2. Current (1999) wildlife-habitat types

Naiman 1988). Currently, herbaceous wetlands comprise an estimated 0.1 percent of all habitats in the province.

Montane coniferous wetlands are estimated to make up about 1.1 percent of habitats in the Intermountain Province. These forested wetlands have been subject to fewer of the lower elevation practices such as grazing, agriculture, residential and hydroelectric development, and are believed to have declined only slightly in area since historic times (Chappell et al. 2001). Commercial timber harvest and road-building have affected these wetlands through direct impacts of vegetation removal and through secondary effects to site hydrology.

4.3.1.2 Riparian and Riparian Wetlands

Riparian zones, including riparian wetlands, currently total about 0.2 percent of province habitats. Table 4.2 shows a reduction of about 39 percent from the historic condition. Riparian habitats have declined in area due to the effects of agriculture, grazing, timber harvest, and development of hydroelectric, irrigation, and flood control projects. Reduction in beaver populations has likely affected riparian habitats. It should be noted that riparian habitats are under-represented in the historic condition mapping due to mapping scale and source data limitations. Decreases in this habitat type may be greater than shown in this analysis.

The Chief Joseph and Grand Coulee dams inundated over 200 miles of the Columbia River, and portions of many significant tributary streams and rivers. Riparian habitat and wetlands were inundated along many of these river and stream reaches. Loss of riparian habitat and wetlands also occurred due to construction of the federal hydropower project at Albeni Falls. The impoundment influences 23 miles of the Pend Oreille River (ISU 2004) and about 3.4 miles of the Clark Fork River (Entz and Maroney 2001); it also increased the area of Lake Pend Oreille by over 10,000 acres (Entz and Maroney 2001). Other hydroelectric projects located in the province also have influenced riparian habitat conditions, including Boundary Dam, Box Canyon Dam, and the Spokane River Project. The function of remaining riparian and wetland habitats is in many cases lower than the historic condition. Timber harvest and grazing have caused changes in the soil structure and vegetation cover of riparian zones; loss of mature trees and reduction in large-diameter standing dead and downed trees are examples of changes to the habitat elements in riparian zones. Roads, agriculture, and other human developments are often located here because of topography or proximity to water. Another influence on wetlands is the regulation of hydrology within river systems. In regulated rivers, the range of variation of flows has often been reduced and altered seasonally, which in turn may affect both the recruitment and persistence of riparian vegetation, particularly cottonwood and willow (Scott et al. 1997, Braatne and Jamieson 2001).

4.3.1.3 Steppe and Shrub-Steppe

Grasslands in the Intermountain Province are estimated to have decreased in area by 19 percent from the historic condition. Grasslands have been modified through both dryland and irrigated agriculture, grazing, urbanization, and construction of dams for hydroelectric power, irrigation, and flood control. Grasslands have also been reduced in

extent due to the suppression of natural wildfire, which controlled many types of trees and shrubs. A U.S. Biological Services study of endangered habitats (Noss et al. 1995) reported that the Palouse grasslands, located mainly south of the Spokane Subbasin, have decreased to less than one percent of the original habitat; over 94 percent of the grasslands have been converted to cropland, hay or pasture.

Both the Chief Joseph and Grand Coulee projects resulted in inundation of steppe habitat; this habitat is reported in combination with shrub-steppe in the project habitat loss assessments.

The quality of remaining grasslands has decreased since the historic period. Grazing and agriculture have resulted in soil condition changes, the introduction of non-native annual grasses and other weeds, and the resultant loss of native bunchgrasses, forbs, and cryptogam crusts. Fire prevention has allowed invasion of shrubs and conversion to shrub-steppe habitats.

Shrub-steppe habitats have decreased in area 22 percent from the historic condition, primarily due to agriculture and grazing, and to a lesser extent to inundation by impoundments. In a study of the central Columbia Basin of Washington, Dobler et al. (1996) determined that about 40 percent of the original shrub-steppe habitat remains. This study included Douglas, Grant, and Lincoln counties, located in the western portion of the Intermountain Province. West (2000) evaluated the disturbance regimes of shrub-steppe habitats and determined that about 11 percent has been converted to agricultural and developed uses and about 25 percent to annual, non-native grasslands.

The Chief Joseph and Grand Coulee FCRPS projects inundated shrub-steppe habitat in the IMP.

The quality of remaining shrub-steppe habitat is severely reduced from the historic condition. Dobler et al. (1996) noted that remaining shrub-steppe in the central Columbia Basin is highly fragmented and reduced in shrub cover, which lowers its values to wildlife. West (2000) determined that no pristine sagebrush steppe habitat remains; over 60 percent is in moderate to highly disturbed condition.

4.3.1.4 Upland Forests and Woodlands

Westside lowland coniferous forest, a western Washington habitat not displayed in the historic condition, shows an increase of 107,576 acres in the current condition (Table 4.2). This mapped habitat represents Douglas-fir, western hemlock, and other species of relatively mesic sites that have regrown on harvested sites (IBIS 2003).

Eastside mixed conifer forest shows a gain of 38 percent from the historic condition (Table 4.2). Forest management and fire suppression have been primary influences on these stands, promoting shade-tolerant species such as white fir and reducing the occurrence of shade intolerant coniferous habitats such as lodgepole pine (Chappell et al. 2001, USFS 2003a). Urbanization and construction of dams for hydroelectric, flood

control, and irrigation have also reduced the acreage of mixed conifer forests. All three of the FCRPS projects in the Intermountain Province inundated mixed conifer forest.

The quality of mixed conifer forest has shifted from a mix of seral stages to a young-seral stage dominated managed habitat. Late and old seral stages were preferentially harvested and once under management, stands are not permitted to reach late stages. Young seral stages have higher stem density, lower diversity and cover of understory species, and fewer large diameter snags and downed wood, all of which provide essential elements of wildlife habitat.

Lodgepole pine forest has decreased an estimated 80 percent from the historic condition (Table 4.2). These forests have been affected by timber harvest, associated roads, fire suppression, and to a limited extent by grazing and construction of dams. Because this habitat generally occurs at elevations above 3,000 feet, it is unlikely that it was directly affected by inundation of any of the federal dams in the province.

Ponderosa pine habitats show a decrease of 66 percent from the historic period. These habitats have been reduced in area by urbanization, grazing, agriculture, timber harvest, and development of hydroelectric, irrigation, and flood control projects. Both the Chief Joseph and Grand Coulee projects inundated significant areas of ponderosa pine.

The quality of ponderosa pine habitats has been influenced by fire suppression, timber management, grazing, and other human activities (Chappell et al. 2001, USFS 2003a). Fire suppression has resulted in denser understory of grasses, shrubs, and understory conifers in contrast to the natural, savannah condition. Because of the resulting fuel buildup, wildfires often consume larger areas with greater intensity and subsequent soil and/or vegetation damage. Grazing selectively reduces the grass component of the understory, promoting shrubs and conifers. Timber management has resulted in the removal of overstory dominants, promoting younger seral stages, and reduction in abundance and diameter of snags and downed wood.

Upland aspen forest shows an increase of almost 19,000 acres in the current condition (Table 4.2). This is likely a function of the difference in mapping scales between the historic and current maps, as this habitat tends to be in isolated small stands that would have been missed at the mapping scale for historic condition. In general, the trend in upland aspen forest is a reduction in area and age-class distribution, due primarily to fire suppression and conifer encroachment (Chappell et al. 2001). Heavy browsing by livestock can also limit regeneration of aspen stands.

Western juniper and mountain mahogany woodlands are absent in the current condition mapping, a complete loss of the habitat type. In the Intermountain Province, the habitat was located primarily in the Lake Rufus Woods and Upper Columbia Subbasins in areas affected by hydroelectric project development, grazing, and agriculture (IBIS 2003).

4.3.1.5 Non-Focal Habitat Types

Alpine and subalpine habitats are generally above the zones of the primary human influences, and are not believed to have changed substantially in area since the historic period (Chappell et al. 2001). However, composition and density of subalpine forest habitats has been affected by current fire suppression.

Urban habitats make up about one percent of the total habitat cover in the current condition. Agriculture, pasture, and mixed development habitats make up 12 percent.

4.3.2 Federal Special Status Plant Species and Habitats

Plant species with special status under the Federal Endangered Species Act (ESA), known or potentially occurring in the Intermountain Province, are shown in Table 4.3. Three species are listed as threatened under the ESA and one species is a candidate for listing.

Slender moonwort (*Botrychium lineare*) has been documented on the Colville National Forest (USFS 1999) and is known from a single historical collection in the Upper Priest Lake area (ICDC 2003).

Water howellia (*Howellia aquatilis*) is known from ponds in Spokane County in Washington and the Palouse River drainage in Latah County in Idaho (in the Columbia Plateau Province adjacent to the IMP) (WNHP 2003, ICDC 2003). A Kootenai County population originally reported from the Spirit Lake area in 1892 (Shelly and Moseley 1988) is presently considered extirpated (ICDC 2003).

Spalding's catchfly (*Silene spaldingii*) has been documented in Lincoln and Spokane counties, Washington (WNHP 2003). This species is endemic to moist grasslands of the Palouse prairie region of Washington and adjacent portions of Oregon and Idaho.

Ute ladies' tresses (*Spiranthes diluvialis*) is a rare orchid that has been documented in Okanogan and Chelan counties in Washington (Moseley 1998; Chelan PUD 2000). These sites are located within the Columbia Cascade Province which is adjacent to, and west of, the IMP. The species has also been documented along the Snake River in eastern Idaho (Moseley 1998).

Table 4.3. Federal special status plant species of the Intermountain Province

Scientific Name Common Name	Federal ESA Status[1]	USFS R1/ R6 / BLM Status[2,3]	WA Status[1]	ID Status[3]	Occurrence in IMP
Botrychium lineare Slender moonwort	Candidate	S / S / Type 1	Threatened	Historical occurrence	Documented Idaho / Washington
Howellia aquatilis Water howellia	Threatened	/ S /	Threatened	Critically imperiled	Documented Idaho / Washington
Silene spaldingii Spalding's silene	Threatened	/ S / Type 1	Threatened	Critically imperiled	Documented Washington
Spiranthes diluvialis Ute ladies' tresses	Threatened	/ S / Type 1	Endangered	Critically imperiled	Documented west of IMP in Washington

[1] WNHP 2003
[2] USFS 1999
[3] ICDC 2003

Definitions:

Federal ESA Status:

Endangered – Species in danger of extinction throughout all or a significant portion of its range; protected under ESA.

Threatened – Species likely to become endangered within the foreseeable future throughout all or a significant portion of its range; protected under ESA.

Candidate – Species considered for possible addition to the list of endangered and threatened species.

Species of concern – Species for which the FWS does not have sufficient information to support a listing proposal at this time.

USFS Regions 1 and 6

Sensitive - Taxa identified by the Regional Forester for which viability is a concern, as evidenced by significant current or predicted downward trends in population numbers or density, or significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution.

USDI
Bureau of Land Management

Type 1 - Threatened, Endangered, Proposed, and Candidate species under Federal ESA.

Idaho State Status

Historical - Historical occurrence (formerly part of the native biota with the implied expectation that it might be rediscovered.)

Critically imperiled - Critically imperiled because of extreme rarity or because some factor of its biology makes it especially vulnerable to extinction (typically 5 or fewer occurrences).

Washington State Status:

Endangered – Any taxon in danger of becoming extinct or extirpated from Washington within the foreseeable future if factors contributing to its decline continue.

Threatened – Any taxon likely to become endangered in Washington within the foreseeable future if factors contributing to its population decline or habitat degradation continue.

A large number of other plant species are designated as threatened, endangered, or sensitive in Idaho and Washington, or as sensitive by the U.S. Forest Service. These species are not addressed in this assessment. However, site-specific actions under the Intermountain Province Management Plan will address special status species occurrence

in accordance with state law and U.S. Forest Service policy on National Forest System lands.

Washington State Priority Habitats occurring in the Intermountain Province include steppe, shrub-steppe, old-growth and mature forests, aspen stands, freshwater wetlands and fresh deepwater, riparian, caves, cliffs, talus, snags, and logs. Several of these latter habitats are fine scale features, occurring within broader habitat types on the landscape (referred to as habitat elements by Johnson and O'Neil 2001). Rural natural open space is also a Washington State priority habitat occurring in the province (WDFW 2003b).

4.3.3 Factors Limiting Current Focal Habitats

The factors currently limiting wildlife-habitat types in the Intermountain Province can all be linked to human activities: direct effects of land uses on habitats and indirect effects of land uses that promote other human activities and/or alter natural disturbance processes. Habitats have been modified in structure by grazing and timber harvest, converted to other habitat types by agriculture and other development, and have been altered through modification of natural disturbance events such as flooding and fire.

The Homesteading Act of 1862 brought a rush of settlers to the Columbia Basin (Dobler et al. 1996). By 1900 the acreage of dry land wheat under cultivation had reached its maximum level, where it remains today. Grazing was a natural corollary of homesteading and cropping, and expanded quickly throughout the west. Timber management and urbanization occurred at a slower pace initially, but accelerated during the latter part of the twentieth century. Development of water resource projects for power, irrigation, and flood control began in earnest in the Intermountain Province in the mid-twentieth century, with construction of Grand Coulee, Albeni Falls, and Chief Joseph dams.

4.3.3.1 Changes in Land Use Practices

Four major anthropogenic activities currently shape the IMP: agriculture, timber management, water use, and urbanization. Other secondary areas include: mining, fire suppression, introduction of exotic species, and use of chemicals and pesticides.

Agriculture and Grazing

Dry land and irrigated agriculture resulted in conversion of large areas of grassland, shrub-steppe, and ponderosa pine habitats to vegetative monocultures. Frequent tillage and pesticide application may have affected fertility of soils and survival of sensitive wildlife (Edge 2001). Grazing influenced these same habitat types.

Timber Harvest

Timber harvest affected ponderosa pine, mixed conifer, lodgepole pine, upland aspen, and montane mixed conifer forests throughout the IMP. Conversion of one type of forested habitat to another has occurred, but the largest effects have been on species composition and stand structure. Except in quaking aspen woodlands, younger seral stages, with less structural diversity and fewer wildlife habitat elements, make up a greater proportion of the forested landscape than under the historic condition (Chappell et al. 2001, USFS 2003a).

Water Resource Projects

Construction of dams for hydropower, flood control, and irrigation has caused direct loss of wildlife habitats. Operation of these projects also affects wildlife habitat through reservoir fluctuations and altered flow regimes in rivers up- and downstream of the dams. Salmon, which provided a substantial nutrient source for a wide variety of wildlife species, were blocked from the Intermountain Province by Grand Coulee and Chief Joseph dams. In addition to the three FCRPS projects, Albeni Falls, Grand Coulee, and Chief Joseph, hydroelectric projects within the province include: Meyers Falls on the Colville River, Boundary and Box Canyon on the Pend Oreille River, five dams associated with the Spokane River Project on the Spokane River, and the Upriver and Little Falls projects on the Spokane River. Waneta and Sevenmile projects are located on the lower Pend Oreille River in Canada. Water control structures without hydroelectric generation facilities include the Priest Lake outlet dam.

Marine-derived nutrients and organic matter from Pacific salmon are known to make large contributions to riparian vegetation (Ben-David et al. 1998; Helfield and Naiman 2001; Bartz 2002). The proportion of salmon-derived nitrogen in riparian plants varies by species and by distances up to 200 feet from the channel, but it can be as much as 33 percent of the plant total. In Alaska, Sitka spruce basal area and stem density were greater where salmon are present, and trees grew to large size at a rate three times faster (Helfield and Naiman 2001, Bartz 2002).

Indirect effects on wildlife habitats of hydroelectric project development include the increased pressure on big game and other terrestrial wildlife by subsistence and sport hunters, in the absence of a salmon resource. The availability of water for irrigation and cheap power accelerated the rate of conversion of upland native habitats to irrigated agriculture. With the salmon resource blocked by the dams, other occupations were sought. Development of the timber management and irrigated agriculture industries may have been intensified by the need for income-generating work by displaced salmon fishers. The hydropower projects also supported the expansion of a reservoir-based recreation industry.

The effects of the FCRPS on wildlife habitats and the status of the wildlife mitigation effort are described in Sections 4.4 Historic Wildlife and 4.5 Current Wildlife, below. Refer also to the individual subbasin terrestrial assessments.

Urbanization

The center of urbanization in the Intermountain Province is the Spokane Valley. The cities of Spokane, Spokane Valley, Post Falls, and Coeur d' Alene and surrounding environs comprise the largest population center in the province. Smaller urban areas are scattered throughout the province and include Coulee Dam, Republic, Colville, and Newport, Washington, and Sand Point, Priest River, and Kellogg, Idaho.

Wildlife habitat can be lost, degraded, or fragmented by development, and human presence can create or increase animal harassment (Ferguson et al. 2001).

4.3.3.2 Changes in Natural Disturbance Regimes

Changes in human land use, activities, and population densities resulted in other direct and indirect effects on wildlife habitats (Chappell et al. 2001). Many of the human actions served to modify the rates and effects of naturally-occurring disturbance events.

Wind

Forest stand susceptibility to windthrow has been altered from historic times through management of timber stands and fire suppression. Timber harvest can alter localized wind patterns or open up dense forests where individual trees have not needed to be wind firm, leading to increased windthrow of remaining stands. Localized windfall of overmature trees is an expected component in late and old successional stands; younger seral stages are often more homogeneous, lacking canopy openings that can be wind-created.

Debris Slides

Above the timberline, human activity has had little effect on rates of land and snowslides. Timber lands and road construction on moderate to steep slopes has led, in some instances, to increased rates of slope failure. Fluctuating reservoir water levels frequently result in localized areas of shoreline instability and water turbidity.

Forest Insects and Disease

Little is known about historic insect and disease rates. It is believed that current infestations are often promoted by stand conditions that have been created by fire suppression and timber management activities.

Wildfire

Until recently, modern fire suppression reduced the frequency and extent of wildfires. Human activities have caused more wildfire ignitions during extreme burning weather, and/or prioritized suppression efforts toward society's capital investments rather than wild habitats.

Invasive Species

The range and frequency of human travel since Europeans settled the province has allowed accidental or purposeful introduction of non-native plants and animals. Foreign plants such as cheatgrass and spotted knapweed have harmed native vegetation by changing plant community composition, abundance, structure, and succession (Moseley et al. 1999, Sheley et al. 1999). Foreign animals such as European starling or domestic cat have threatened indigenous fauna by predation, nest competition, transmission of disease or parasites, hybridization, and competition for food or space (Witmer and Lewis 2001).

4.3.3.3 Land Ownership and GAP Analysis

Figure 4.3 and Table 4.4 show the distribution of wildlife-habitat types within land ownership categories in the Intermountain Province. Privately-owned lands comprise about 46 percent of lands in the province. Federal lands make up the second-largest category, with 33 percent of lands. Tribal lands comprise 12 percent and state lands 7

percent of the province. Note that privately-owned lands within tribal reservation boundaries are not depicted on this map.

Figure 4.4 shows the GAP management-protection status for lands in the Intermountain Province. Table 4.5 presents acres of wildlife-habitat types by GAP management-protection status. The majority of the province (58 percent) is in the “no or unknown” protection status category, representing primarily privately-owned lands with no specific habitat protections. Low protection status lands comprise another 39 percent, reflecting primarily the multiple use mandate of the U.S. Forest Service on National Forest System lands, allowing both resource extraction and wildlife habitat protection. This designation includes U.S. Forest Service Roadless Areas. Only one percent of province lands are protected at a medium protection status, and less than one percent is managed under the high protection status, which includes Wilderness Areas. It should be noted that this data is derived from relatively coarse-scale information; additional habitat protections may exist that are not reflected here.

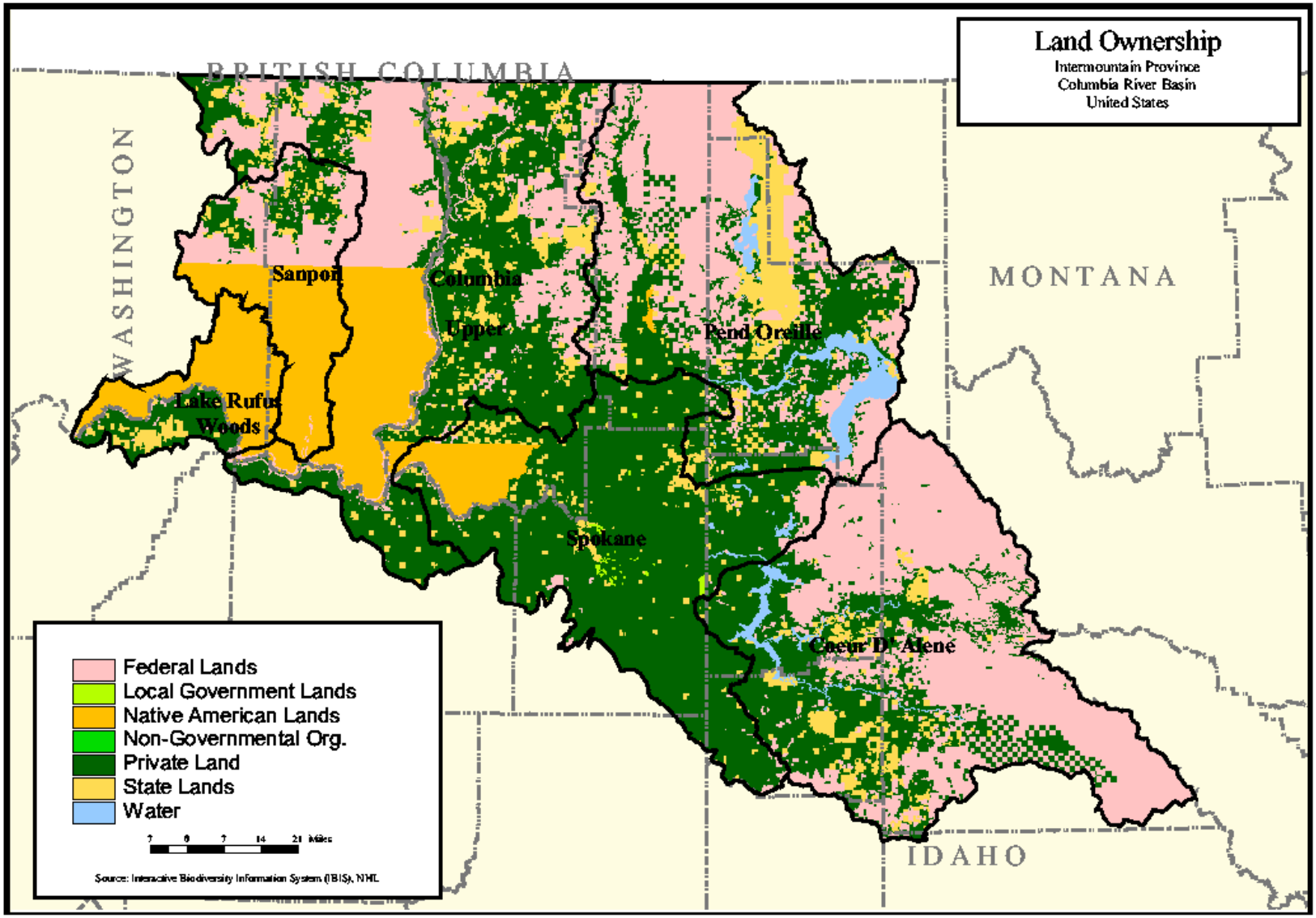

Figure 4.3. Land ownership

Figure 4.3

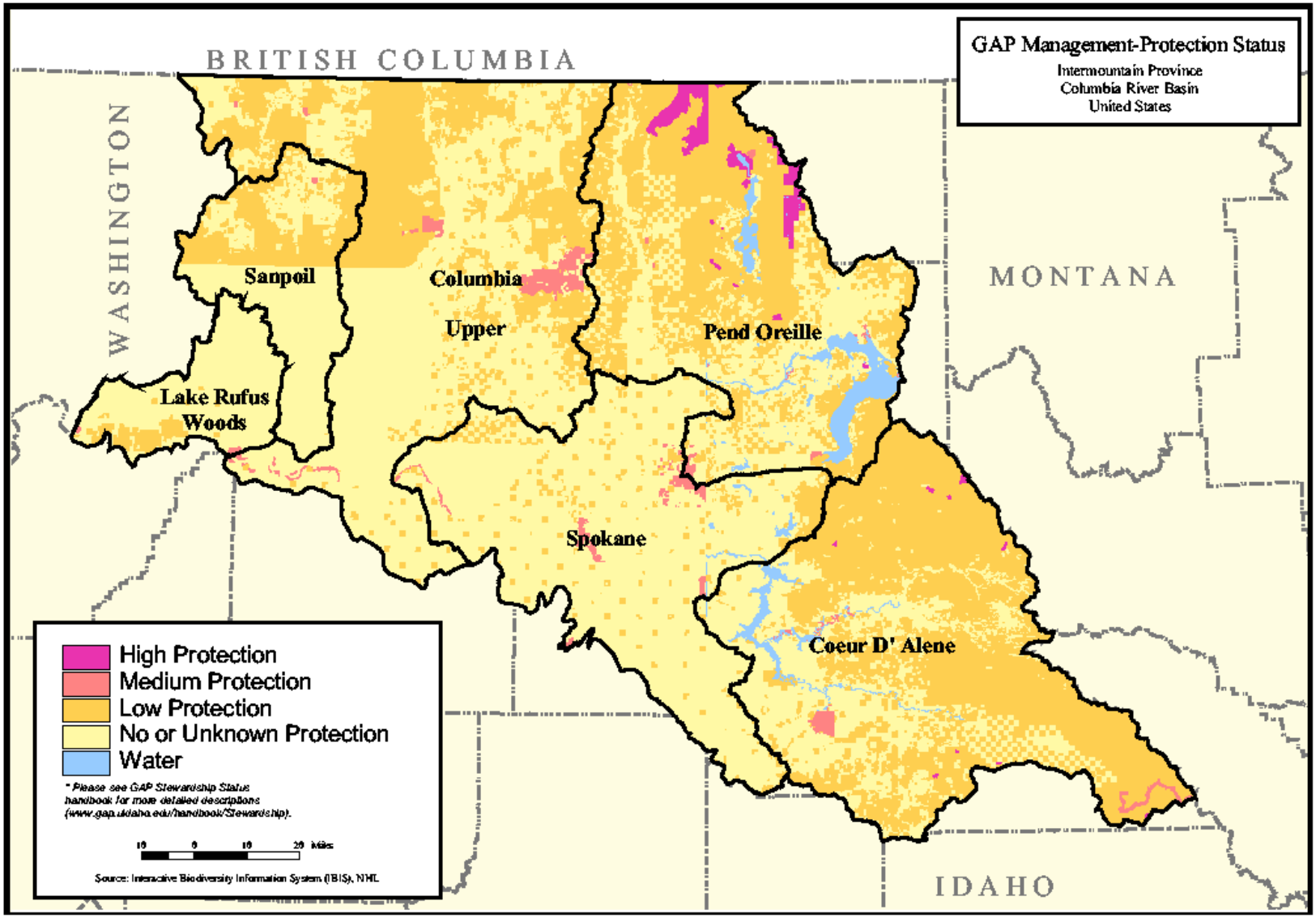

Figure 4.4. GAP Management-protection status

Figure 4.4

Table 4.4. Land ownership in the Intermountain Province by wildlife-habitat type

Wildlife-Habitat Type (acres)	Federal Lands	Native American Lands	State Lands	Local Government Lands	Non-Governmental Organization Lands	Private Lands	Water	Total
Wetlands								
Lakes, Rivers, Ponds, and Reservoirs	11,997	42,854	7,691	172	0	109,940	159,888	332,542
Herbaceous Wetlands	653	626	392	0	0	9,075	134	10,879
Montane Coniferous Wetlands	9,132	15,693	2,824	327	0	86,092	3	114,069
Riparian and Riparian Wetlands								
Interior Riparian Wetlands	9,681	3,594	1,682	0	0	14,078	249	29,283
Steppe and Shrub-Steppe								
Interior Grasslands	136,724	141,201	43,182	136	0	441,305	0	762,548
Shrub-steppe	12,310	212,783	28,304	116	0	243,579	0	497,092
Upland Forest								
Mesic Lowland Conifer-Hardwood Forest	63,091	0	14,542	0	0	29,825	0	107,458
Montane Mixed Conifer Forest	249,323	5,998	41,847	0	0	42,645	0	339,812
Interior Mixed Conifer Forest	2,547,212	418,659	443,728	931	112	1,659,714	0	5,070,355
Lodgepole Pine Forest and Woodlands	114,579	5,443	13,126	1	2	38,936	0	172,086
Ponderosa Pine Forest and Woodlands	96,255	283,961	63,574	2,626	0	696,602	0	1,143,019
Upland Aspen Forest	14,794	7,936	1,733	1	0	26,941	0	51,405
Alpine and Subalpine								
Subalpine Parkland	11,808	23	3	0	0	1,046	0	12,880
Alpine Grasslands and Shrublands	50,133	335	15,761	0	0	20,404	0	86,633
Developed								
Agriculture, Pasture, and Mixed Environs	13,894	68,182	25,303	916	0	1,093,954	0	1,202,250
Urban and Mixed Environs	1,143	250	1,602	1,167	0	90,693	0	94,855
Total Acres	**3,342,729**	**1,207,536**	**705,294**	**6,394**	**113**	**4,604,827**	**160,274**	**10,027,168**

(*Source*: IBIS 2003)

Table 4.5. GAP status of lands in the Intermountain Province by wildlife-habitat type

	GAP Status Class					
Wildlife-Habitat Type (acres)	**High Protection**	**Medium Protection**	**Low Protection**	**No Protection**	**Water**	**Total**
Wetlands						
Lakes, Rivers, Ponds, and Reservoirs	486	5,088	8,911	154,117	166,949	335,551
Herbaceous Wetlands	23	81	1,025	9,621	140	10,890
Montane Coniferous Wetlands	39	961	12,539	100,406	21	113,966
Riparian and Riparian Wetlands						
Interior Riparian Wetlands	132	439	10,805	17,617	304	29,297
Steppe and Shrub-Steppe						
Interior Grasslands	243	3,877	174,769	583,856	0	762,745
Shrub-steppe	0	7,133	29,719	460,320	0	497,172
Upland Forest						
Mesic Lowland Conifer-Hardwood Forest	728	1,882	75,106	29,826	0	107,542
Montane Mixed Conifer Forest	34,834	403	255,211	49,301	0	339,750
Interior Mixed Conifer Forest	36,059	68,946	2,881,909	2,080,915	0	5,067,829
Lodgepole Pine Forest and Woodlands	1,700	458	125,487	44,355	1	172,002
Ponderosa Pine Forest and Woodlands	142	16,774	149,086	977,054	0	1,143,055
Upland Aspen Forest	80	157	16,447	34,688	0	51,371
Alpine and Subalpine						
Subalpine Parkland	134	61	11,620	1,066	0	12,882
Alpine Grasslands and Shrublands	9,734	157	55,776	21,009	0	86,675
Developed						
Agriculture, Pasture, and Mixed Environs	0	4,547	62,617	1,134,461	0	1,201,625
Urban and Mixed Environs	0	848	2,442	91,528	0	94,818
Total Acres	**84,333**	**111,812**	**3,873,469**	**5,790,141**	**167,413**	**10,027,170**

(*Source*: IBIS 2003)

GAP Status Definitions (Source: USGS 2000):
Status 1 – High Protection: An area having permanent protection from conversion of natural land cover and a mandated management plan in operation to maintain a natural state within which disturbance events (of natural type, frequency, intensity, and legacy) are allowed to proceed without interference or are mimicked through management.
Status 2 – Medium Protection: An area having permanent protection from conversion of natural land cover and a mandated management plan in operation to maintain a primarily natural state, but which may receive uses or management practices that degrade the quality of existing natural communities, including suppression of natural disturbance.
Status 3 – Low Protection: An area having permanent protection from conversion of natural land cover for the majority of the area, but subject to extractive uses of either a broad, low-intensity type (*e.g.*, logging) or localized intense type (*e.g.*, mining). It also confers protection to federally listed endangered and threatened species throughout the area.
Status 4 – No or Unknown Protection: There are no known public or private institutional mandates or legally recognized easements or deed restrictions held by the managing entity to prevent conversion of natural habitat types to anthropogenic habitat types. The area generally allows conversion to unnatural land cover throughout.

4.4 Historic Wildlife

Habitat mapping of the historic condition (Figure 4.1) provides an estimate of habitat occurrence and distribution across the Intermountain Province, and from habitat presence, wildlife species occurrence can be inferred. The historical population sizes of the various wildlife species are much more difficult to estimate with any degree of accuracy. For the purposes of this assessment, it is assumed that historical wildlife populations were at relative equilibrium with their environment, which at that time included some anthropogenic influences. Due to a lack of available data on historical population sizes on most of the 400 plus wildlife species that occurred in the province, this section focuses on species that have been extirpated from the province since the c. 1850 historic reference period. Information on population trends for priority wildlife species, including species at risk of extirpation and those reintroduced to the province, is provided in Section 4.5 Current Wildlife.

4.4.1 Extirpated Species

4.4.1.1 Bison

Bison (*Bos bison*) are believed to have been present historically in Idaho and eastern Washington based on archaeological and historic evidence (Iten et al. 2001). Although records indicate that bison were widespread in Idaho, Oregon, and Nevada, they are not believed to have been abundant. Records indicate a limited number of occurrences at sites within the Intermountain Province. Bison were extirpated from Oregon and Washington prior to the time of construction of the FCRPS projects. Private game ranching has increased the numbers of bison in recent years, but reintroduction to the wild has not occurred in Idaho or Washington.

4.4.1.2 Pronghorn Antelope

The pronghorn antelope (*Antilocapra americana*) was extirpated in Washington prior to most European settlement, although archeological and ethnographic records substantiate their sparse existence up to the early 1800s (Iten et al. 2001). Fencing, habitat loss, competition with domestic livestock, unregulated hunting, climate change, introduced disease, and an influx of predators are thought to have contributed to the decline. Beginning in 1938, re-introductions were attempted but none survived to self-sustaining levels and all have disappeared now.

4.4.1.3 Trumpeter Swan

Trumpeter swans (*Cygnus buccinator*) were once abundant and widespread in North America, breeding from Alaska south to Oregon and eastward. Commercial trade, sport hunting, and habitat destruction reduced their numbers to near extinction by 1920, and fewer than 70 swans were known to exist worldwide by 1932. As populations neared extinction, the species' traditional migration patterns and knowledge of important winter and spring habitats were lost to the gene pool, and have not yet been re-learned. In Washington, no nesting was confirmed until 1967-1969, and these successful instances were from birds introduced at Turnbull National Wildlife Refuge in Spokane County in 1963 (Johnson and O'Neil 2001).. In British Columbia, relative few pairs are currently known to breed, and only in the northern portion. Current limiting factors are illegal shooting, collisions with utility lines, predators, lead poisoning, human disturbance during breeding, and degradation or loss of wetland habitat (USFWS 2003a, Testy 1993).

4.4.1.4 Yellow-Billed Cuckoo

Based on historic accounts, yellow-billed cuckoo (*Coccyzus americanus)* was common very locally in Washington, generally uncommon and local in scattered drainages of the arid and semiarid portions of Idaho (for example, Coeur d' Alene in 1895), and probably uncommon and very local in British Columbia (USFWS 2000a; Laymon 2000). In Washington, the last confirmed breeding records of this neotropical migrant bird were in the 1930s, and the species may now be extirpated from the state. In Idaho, this bird is a rare breeder, mostly in the southern portion. In British Columbia, the species disappeared in the 1920s. Loss and degradation of deciduous riparian habitats in the western United States appears to be a primary factor in these declines. Overgrazing, displacement of favorable vegetation by alien plants, river water management, logging, and pesticides are the primary causes.

4.5 Current Wildlife

There are approximately 413 terrestrial vertebrate wildlife species that are known or suspected to occur within the IMP and 90 percent of them reproduce there (Table 4.6). Migratory birds with documented occurrence but less than 5 documented breeding records in the state comprise the remaining 10 percent.

Table 4.6. Number of wildlife species in the Intermountain Province

	Idaho		Washington		Province Total	
	Occur	Breed	Occur	Breed	Occur	Breed
Amphibians	13	13	14	14	17	17
Birds	273	224	273	223	276	233
Mammals	89	89	101	100	101	101
Reptiles	16	16	18	18	18	18
Total	391	342	406	355	412	369

(*Source*: IBIS 2003)

Of the 413 species that occur, 118 were selected as focal wildlife species for the Intermountain Province because they meet one or more of the following criteria:

- Federally-listed or candidate for listing as endangered or threatened;
- State classified as endangered or threatened;
- Habitat Evaluation Procedures (HEP) analysis species that lost habitat from FCRPS projects in the Intermountain Province;
- Important game, economic, subsistence, or cultural species;
- Ecological indicator or functional specialist species.

Focal wildlife species are defined as target species for efficiently guiding the management and monitoring the health of environments, habitats, and landscape elements in an entire ecological community (IBIS 2003). Appendix C provides a list of the 118 focal wildlife species for the Intermountain Province. These species were used in the province-level IBIS analysis of terrestrial resources. Species used in the HEP analyses of

the Albeni Falls, Grand Coulee, and Chief Joseph projects are discussed in more detail in Section 4.5.2.

4.5.1 Focal Species by Habitat Type

Johnson and O'Neil (2001) provide information on the degree to which a wildlife species is tied to a specific habitat type. Three degrees of association between wildlife and habitats are identified: closely associated, generally associated, and present. A "closely associated" species is widely known to depend on a habitat for part or all of its life history requirements. A "generally associated" species exhibits a high degree of adaptability and may be supported by a number of habitats. A "present" species demonstrates occasional use of a habitat. Close ties to one or more focal habitats show a strong dependence on the habitat for species persistence. Table 4.7 summarizes the focal habitats to which the 118 focal wildlife species of the Intermountain Province are closely related. Refer to Appendix D for a listing of focal wildlife species closely and generally associated with focal habitats.

Table 4.7. Focal wildlife species closely associated with focal habitats (breeding)

Habitat	Amphib.	Bird	Mammal	Reptile	Total
Cliff/Rock Outcrop	0	2	0	0	2
Wetland	7	17	7	0	31
Lake, river, pond, and reservoir	7	7	4	0	18
Herbaceous	6	11	4	0	21
Montane coniferous	4	0	2	0	6
Riparian – Eastside (Interior)	5	15	10	0	30
Steppe/Shrub-Steppe	0	13	6	0	19
Westside grassland	0	3	0	0	3
Eastside (interior) grassland	0	9	4	0	13
Shrub-steppe	0	10	5	0	15
Upland Forest	0	15	9	0	24
Western juniper/Mtn. mahogany	0	1	1	0	2
Westside lowland conifer-hardwood	0	7	4	0	11
Montane mixed conifer	0	2	5	0	7
Eastside (interior) mixed conifer	0	7	8	0	15
Lodgepole pine	0	4	3	0	7
Ponderosa pine	0	7	1	0	8
Upland aspen	0	0	0	0	0
Total Focal Species	7	69	39	3	118

(*Source*: Adapted from Johnson and O'Neil 2001)

Wetlands are essential breeding habitat to 31 focal wildlife species, and supportive during breeding to another 29 focal wildlife (Appendix D). Three of the 31 species – northern leopard frog, American white pelican, and sandhill crane – are state classified as endangered or threatened. Five of the 31 species – Canada goose, mallard, redhead, mink, and muskrat – are Habitat Evaluation Procedures (HEP) species for existing FCRPS projects in the Intermountain Province.

Riparian habitats are essential for breeding to 30 focal wildlife species, and supportive during breeding to another 39 focal wildlife (Appendix D). Two of the 30 – northern leopard frog, and pygmy nuthatch – are state classified as threatened or endangered. Nine

of the 30 are HEP species evaluated in existing FCRPS projects of the Intermountain Province. Those HEP species are: mallard, mourning dove, ring-necked pheasant, ruffed grouse, spotted sandpiper, yellow warbler, mink, muskrat, and white-tailed deer.

Grasslands are essential breeding habitat to 14 focal wildlife species, and supportive during breeding to another 27 focal wildlife (Appendix D). Four of the 14 – ferruginous hawk, sage grouse, sharp-tailed grouse, and upland sandpiper – are state classified as threatened or endangered. Three of the 14 – sage grouse, sharp-tailed grouse, and ring-necked pheasant – are HEP species evaluated in existing FCRPS projects of the Intermountain Province.

Shrub-steppe habitats are essential for breeding to 15 focal wildlife species, and supportive during breeding to another 28 focal wildlife (Appendix D). Three of the 15 – ferruginous hawk, sage grouse, and sharp-tailed grouse – are state classified as threatened or endangered. Two of the 15 – sage grouse and sharp-tailed grouse – are HEP species evaluated in existing FCRPS projects of the Intermountain Province.

Upland forests are essential breeding habitats to 24 focal wildlife species, and supportive during breeding to another 51 focal wildlife (Appendix D). None of the 24 are HEP species evaluated in existing FCRPS projects of the Intermountain Province.

Cliff or rock outcrop habitats are essential for breeding to two focal wildlife species: golden eagle and peregrine falcon (Appendix D). The peregrine falcon is classified as endangered by the State of Idaho. Another 22 focal wildlife are supported during breeding by these habitats. Neither of the two essential habitat species was evaluated as a HEP species at existing FCRPS projects of the Intermountain Province.

4.5.2 Key Wildlife Species of the Intermountain Province

Key wildlife species for the Intermountain Province were selected as a subset of the province-wide focal species. Key species include federally-listed species, Washington and Idaho state-listed species, HEP species, and priority species identified by each Subbasin. The following Sections present information about key wildlife species and describe the links between the key species, focal habitats of the province, and effects of the federal hydropower system. Listed species of wildlife are described in terms of population status and distribution across the province; limiting factors and management direction are summarized at the province level. HEP and other priority wildlife species vary from Subbasin to Subbasin, dependent upon the particular HEP evaluation relating to the Subbasin and other management and stakeholder priorities. Occurrence data, where available, for these species is presented in the Subbasin chapters.

4.5.2.1 Federally-Listed Wildlife Species

Two terrestrial vertebrate species possibly occurring in the province are listed as endangered under the Federal Endangered Species Act (ESA); four species are listed as threatened (Table 4.8).

Table 4.8. Federally threatened and endangered wildlife species of the Intermountain Province

Common Name	Scientific Name	ESA Status
Bald eagle	*Haliaeetus leucocephalus*	Threatened
Canada lynx	*Lynx canadensis*	Threatened
Gray wolf	*Canis lupus*	Threatened
Grizzly bear	*Ursus arctos*	Threatened
Woodland caribou	*Rangifer tarandus*	Endangered
Pygmy rabbit	*Brachylagus idahoensis*	Endangered

(*Source*: USFWS 2003b, WDFW 2003b, IDFG 2003)

Bald Eagle

Population Status and Trend

The bald eagle is federally-listed as threatened and state classified as endangered in Idaho and threatened in Washington. It can be found in all forested parts of Idaho and Washington throughout the year. In the dry shrub-steppe habitat of Washington's Columbia Basin, nesting rarely occurs away from large rivers with large trees (Stinson et al. 2001). Seventy percent of the bald eagle tree nests located near rivers in Washington are within 600 feet of the shoreline. During winter, reservoirs and major tributaries of the Columbia River in eastern Washington become significant bald eagle habitats where birds hunt waterfowl and night-roost in groups of three or more birds. Because the bald eagle hunts fish and waterfowl at water bodies and nests, roosts, or perches in nearby large trees, it is generally associated with riparian and upland forests.

Historical populations along the Columbia River in eastern Washington are estimated to have included approximately 86 nests, based on an average of 0.10 nests per river mile (Stinson et al. 2001). The current population includes about 70 nests. Populations within the state are recovering and have exceeded most target levels established by the Pacific States Bald Eagle Recovery Plan (USFWS 1986; Stinson et al. 2001). On Lake Roosevelt, the number of nesting territories increased from two in 1988 to 24 in 2000, and productivity during 1994-2000 averaged 1.69 young per occupied territory (Murphy 2000). The bald eagle is present in all Subbasins of the Intermountain Province; Subbasin-specific information is presented in the following Sections.

Nest sites in Washington are state-protected under the Bald Eagle Protection Rule (WAC 232-12-292) and WDFW management guidelines. Current management is directed toward preparation of bald eagle management plans when land use activities are proposed at or adjacent to nesting territories or communal roosts (Watson and Rodrick 2002).

The bald eagle provides two key ecological functions: it controls terrestrial vertebrate populations through predation or displacement, and is a primary creator of aerial structures possibly used by other organisms (Johnson and O'Neil 2001).

The bald eagle has a strong and consistent relationship (*i.e.* direct consumer at specific stages in its life history or at specific seasons) with the smolt/immature/adult, spawning, or carcass stages of salmonid life history. Grand Coulee and Chief Joseph dams blocked access to over 550 miles of the Columbia watershed for salmon spawning (Creveling and

Renfrow 1986, Kuehn and Berger 1992). The Albeni Falls hydropower project caused the loss of 4,508 HUs as bald eagle breeding habitat and 4,365 HUs wintering habitat, of which at least 301 HUs (7 percent) and 314 HUs (7 percent), respectively, have since been replaced (Martin et al. 1988, BPA 2002). Although hatcheries produce fish for human harvest, they generally have not replaced the carcasses that once provided food for eagles. Species benefiting from mitigation for bald eagle are numerous and include white pelican, Columbia River Tiger beetle, gulls, terns, shorebirds, mallards, and common loon (CCT 2004a).

Limiting Factors

The greatest threats to nesting or wintering bald eagles are human activities that (1) permanently alter habitat (for example, loss of nest trees, roost trees, perch trees, or screening buffers, especially if long-term replacement is not planned), (2) disturb eagles to the point of reproductive failure or reduced vigor (for example, discernible human noise or presence), and (3) introduce chemical or elemental contaminants. Because private lands near shorelines are prized for residential development, it is potentially troublesome that approximately two-thirds of Washington's bald eagle nesting territories are located on private land.

Canada Lynx

Population Status and Trend

The Canada lynx is a federal and state of Washington threatened species. There is little historical information about its numbers in Washington, but the species may have been more abundant in the late 1800s and declined after the turn of the century (Elton and Nicholson 1942). Trapping and other modern data identify the lynx as occurring in Ferry, Pend Oreille, and Stevens counties (Stinson 2001). The lynx is also present in Idaho's Kootenai and Benewah counties (IDFG 2001). The Canada lynx is closely associated with high elevation forests, especially those dominated by lodgepole pine, subalpine fir, or Engelmann spruce. The lynx's key ecological function is consumer (predator) of herbivorous vertebrates, primarily snowshoe hare.

The Pend Oreille, San Poil, and Upper Columbia Subbasins overlap at least one of the six Lynx Management Zones (LMZs) or subsequent Lynx Analysis Units established by the Washington Department of Fish and Wildlife (Stinson 2001). Even though LMZs do not encompass all areas potentially used by lynx, habitat management within these zones is expected to hold the greatest promise for supporting lynx populations. The state of Washington's recovery strategy is to (1) survey and monitor for lynx, (2) manage habitat to improve conditions for lynx over time, (3) protect lynx by minimizing human-caused mortality, (4) undertake research to improve lynx recovery, (5) maintain a lynx data and information system, (6) develop public information and education materials and programs, and (7) coordinate/cooperate recovery activities with landowners and other public agencies.

Canada lynx habitat was not directly affected by construction of the FCRPS projects in the Intermountain Province. Indirect effects of the projects which have affected high elevation forests include increased timber harvest, road development, and increased hunting and recreation pressure.

Limiting Factors

Lynx are affected by (1) prey availability — especially snowshoe hare — that is influenced by cyclic populations and habitat loss from timber harvest or insect infestation, (2) roading which facilitates other carnivores and humans to reach formerly remote areas during winter, and (3) susceptibility to trapping, especially for kittens and yearlings. Ruggiero et al. (2000) estimate that a density of 0.5 snowshoe hares per hectare (0.2 hares/acre) is minimum for lynx persistence.

Gray Wolf

Population Status and Trend

The gray wolf is federally-listed as threatened, plus state-listed as endangered in Kootenai, Shoshone, Bonner, and Boundary counties of Idaho and all counties of Washington. Elsewhere in Idaho, the state considers the species an experimental non-essential population.

According to Hall and Kelson (1959), the gray wolf historically occurred throughout all of Idaho and the eastern quarter of Washington. Currently, the wolf is reported from all Subbasins within the province (WDFW 2003b, IDFG 2001). The closest known wolf pack, a non-breeding pair named the Marble Mountain pack, is on the central border between Benewah and Shoshone counties of Idaho and away from any IMP Subbasin (Mack and Holyan 2003). The wolf has a general association with riparian, steppe/shrub-steppe, and upland forest habitats.

The federal recovery plan sets a threshold for possible delisting when at least 10 wolf pairs breed in three or more consecutive years in each of three recovery areas: Central Idaho, Northwest Montana, and Greater Yellowstone (USFWS 1987). None of the six Subbasins in the Intermountain Province occur within a wolf recovery area, but the Coeur d' Alene Subbasin does border on the Central Idaho Recovery Area. Idaho is on record as wanting the federal government to remove wolves from the state due to severe impacts upon the human populace (Idaho Legislative Wolf Oversight Committee 2002). In the four listed counties, state efforts at management, control, monitoring, and ESA listing vary by whether the number of central Idaho wolf packs is above or below 15.

This carnivore contributes at least four key ecological functions: (1) consumer or predator of herbivorous vertebrates, (2) controller of terrestrial vertebrate populations through predation or displacement, (3) creator of large burrows used by other wildlife, and (4) creator of feeding opportunities for other carnivores and scavengers. The wolf has a recurrent relationship (routine but occasional direct consumer, often in local areas and providing 5 to 50 percent of diet) with the carcass and fry/fingerling/parr stages of salmonid life history (IBIS 2003).

Gray wolf is not thought to have been directly affected by construction of the federal hydropower system. Indirectly, development and other human land uses related to the source of low cost energy, may have affected the quality of gray wolf habitat in the province.

Limiting Factors

The gray wolf is limited by (1) human-induced mortality from livestock and human development conflicts, hunting, poisoning, or trapping, plus (2) canine parvovirus and distemper, especially among juveniles (USFWS 1987).

Grizzly Bear

Population Status and Trend

The grizzly bear is federally-listed as threatened, plus state classified as threatened in Idaho and endangered in Washington. Its historic range in North America extended from the mid-plains westward to the California coast and included the states of Idaho and Washington. At the time of the Lewis and Clark expedition, grizzlies flourished along rivers and streams (Wright 1909). Currently, the grizzly is known in all Subbasins except Lake Rufus Woods and is generally associated with upland forest habitats.

There are seven federal Grizzly Bear Recovery Plan Zones (USFWS 1993a). Most of the Pend Oreille Subbasin is within the Selkirk Recovery Zone, and it also borders the Cabinet/Yaak Recovery Zone. The Coeur d' Alene Subbasin borders the Bitterroot Recovery Zone. The other Subbasins in the Intermountain Province are outside any recovery zone. Federal recovery efforts in the Selkirk Recovery Zone include (1) population monitoring, (2) coordinated protection enforcement, (3) selective pest control, (4) reduction in human disturbance or habitat loss from timbering, livestock grazing, energy/mineral development, recreation, or land use zoning, and (5) public awareness.

The grizzly provides at least six key ecological functions: (1) consumer or predator of herbivorous vertebrates, (2) consumer of carrion, (3) creator of large burrows used by other wildlife, (4) controller of terrestrial vertebrate populations via predation or displacement, (5) disperser of seeds/fruits via ingestion or caching, and (6) creator of feeding opportunities for other carnivores or scavengers. The bear has a strong and consistent relationship (direct consumer at specific stages in its life history or at specific seasons) with the spawning and carcass stages of salmonid life history (IBIS 2003).

The status of the grizzly bear population in the Intermountain Province at the time of construction of the FCRPS projects is not well known. Grizzlies may have been present in low numbers in portions of the Upper Columbia, Pend Oreille, and Coeur d' Alene Subbasins. Construction of the Grand Coulee Project blocked an estimated 1,140 miles of salmon spawning areas, reaching as far upstream as Metaline Falls (Scholz et al. 1995). The loss of salmon as a food source, as well as the secondary effects of the projects, including increased timber harvest, road development, hunting and recreation, may have affected grizzly bears and their habitats within the province.

Limiting Factors

The primary limiting factors for recovery are accidental or purposeful human-caused mortality, and loss of remaining habitat.

Woodland Caribou

Population Status and Trend

The woodland caribou is listed as endangered by the federal government and states of Idaho and Washington. Prior to 1900, this animal was distributed throughout much of Canada and the northern conterminous United States. The species occurred in Idaho as far south as the Salmon River (Evans 1960). Presently, the last remaining woodland caribou population in the U.S. is restricted to the Selkirk Mountains of northeastern Washington, northern Idaho, and southeastern British Columbia. In 1983, that population dwindled to 26 individuals centered in British Columbia's Stagleap Provincial Park. The Selkirk Mountains woodland caribou subpopulation was augmented in 1996-1998 with 43 caribou from British Columbia placed into Washington and in British Columbia, immediately north of the border (Almack 2001). Since 1996, caribou have occurred in Washington as far south as Molybdenite Mountain. In the Intermountain Province, woodland caribou are found only in the Pend Oreille Subbasin (IDFG 2001; WDFW 2003b). The caribou has a general association with wetland, riparian, and upland forest habitats, especially mature or old trees with abundant lichens.

The woodland caribou provides at least four key ecological functions: (1) consumer of grasses, forbs, and woody leaves, (2) transporter of viable seeds, spores, plants, or animals, (3) disperser of lichens, and (4) fragmenter of woody debris.

Recovery efforts are focused on maintaining two existing woodland caribou herds in the Selkirk Ecosystem, establishing a third herd in Washington, and managing at least 443,000 acres of suitable and potential habitat (USFWS 1993b). Managing human access, educating hunters, enforcing protective laws, and augmenting the population are also planned. Audet and Allen (1996) recommended the following augmentation sites, shown in priority order: Pass Creek, Mankato Mountain, and Upper Sullivan Creek.

Woodland caribou and their habitat were not directly affected by the FCRPS projects within the Intermountain Province. Indirect effects of project development, including increased timber harvest, road construction, hunting and recreation, may have affected caribou habitat.

Limiting Factors

Factors that limit recovery are (1) excessive mortality — particularly for calves during their first few months — due to weather, predation, abandonment, poaching via road access, or accidents, and (2) habitat fragmentation or loss, especially the continued availability of arboreal lichens.

Pygmy Rabbit

Population Status and Trend

This tiniest of North American rabbits is listed as endangered by the federal government and the State of Washington. Paleontological studies suggest the pygmy rabbit disappeared from portions of its former range in the Great Basin over the past 7,000 years due to climatic conditions that affected the sagebrush plant communities it is dependent on. Washington populations are disjunct from the core of the species' range. Modern

records show that the rabbit occurred in five Washington counties: Adams, Benton, Douglas, Grant, and Lincoln (WDFW 1995). Today, the Washington population is confined to one isolated pocket of suitable habitat at Sagebrush Flat in Douglas County, where active burrows have dropped precariously since 1995 (Hays 2001). In Idaho, the species is found in sagebrush areas of the central and southern part of the state (IDFG 2001). The pygmy rabbit is not known to occur at this time in any Subbasin of the Intermountain Province, although the existing population in Douglas County, Washington, is only about 15 miles distant from the Lake Rufus Wood Subbasin. This mammal is uniquely dependent upon dense sagebrush for food and relatively deep, loose soil in which to dig its underground burrow.

The pygmy rabbit furnishes at least four key ecological functions: consumer of fecal material, prey for primary or secondary predators, creator of large burrows used by other wildlife species, and enhancer of soil structure and aeration via digging. Washington management is directed at (1) population surveys and monitoring, (2) captive rearing since 2001, (3) release site evaluation, (4) land acquisition or protection incentives, (5) habitat connectivity, (6) predator control, (7) food supplementation, and (8) genetic enhancement (Hays 2001, WDFW 1995).

Pygmy rabbit was not selected for evaluation of the construction effects of FCRPS project in the Intermountain Province. However, both the Chief Joseph and Grand Coulee projects inundated substantial quantities of shrub-steppe habitat, some of which may have provided potentially suitable habitat for pygmy rabbit (Kuehn and Berger 1992, Creveling and Renfrow 1986). Indirectly, the projects contributed to development and agriculture in the province, resulting in additional conversion of shrub-steppe habitats.

Limiting Factors

The primary limiting factor is the availability of suitable habitat due to agricultural conversion, and to wildfire which has destroyed known rabbit sites. Low numbers, when combined with disconnected and down-sized habitat parcels, make the rabbit extremely vulnerable to environmental and genetic influences that would otherwise be insignificant for long-term survival.

4.5.2.2 Idaho and Washington Threatened and Endangered Species

Fifteen species are classified by the states of Idaho or Washington as endangered or threatened (Table 4.9), including the six federally-listed species.

Table 4.9. State classified threatened and endangered wildlife species of the Intermountain Province

Common Name	Scientific Name	Idaho Status	Washington Status
American white pelican	*Pelecanus erythrorhynchos*	-	Endangered
Bald eagle	*Haliaeetus leucocephalus*	Endangered	Threatened
Canada lynx	*Lynx canadensis*	-	Threatened
Ferruginous hawk	*Buteo regalis*	-	Threatened
Fisher	*Martes pennanti*	-	Endangered
Gray wolf	*Canis lupus*	Endangered	Endangered
Grizzly bear	*Ursus arctos*	Threatened	Endangered

Common Name	Scientific Name	Idaho Status	Washington Status
Northern leopard frog	*Rana pipiens*	-	Endangered
Peregrine falcon	*Falco peregrinus*	Endangered	-
Pygmy rabbit	*Brachylagus idahoensis*	-	Endangered
Sage grouse	*Centrocercus urophasianus*	-	Threatened
Sandhill crane	*Grus canadensis*	-	Endangered
Sharp-tailed grouse	*Tympanuchus phasianellus*	-	Threatened
Upland sandpiper	*Bartramia longicauda*	-	Endangered
Woodland caribou	*Rangifer tarandus*	Endangered	Endangered

(*Source*: IBIS 2003; IDFG 2003; WDFW 2003b)

American White Pelican

Population Status and Trend

The American white pelican is classified as endangered in Washington. Historically, the species occurred and presumably bred at water bodies in eastern Washington such as Sprague Lake and Moses Lake (Dawson and Bowles 1909). In addition, a significant number of non-breeding birds stayed throughout the year. Presently, a single breeding colony exists in the state at the McNary National Wildlife Refuge, downstream of Pasco, Washington (Ackerman 1994, 1997). As many as 2,000 non-breeding pelicans have come to the potholes region of the Columbia Basin (Ackerman 1994, 1997, Doran et al. 1999, Smith et al. 1997). Wintering concentrations of 40 to 300 individuals use the Columbia River from the Walla Walla River confluence to Priest Rapids. Areas within Washington may play an important role in sustaining non-breeding summer residents and birds dispersing from breeding areas in adjacent states and Canada. The species has a close association with lake, river, pond, or reservoir wetlands for breeding or loafing. Pelicans are known to travel 31 to 50 miles between nesting and feeding sites.

For approximately ten years, pelicans have been observed spring through fall at the mouth of the Okanogan River, west of the Lake Rufus Woods Subbasin. Occasional use of Lake Rufus Woods by white pelicans has been observed during this time period (personal communication, R. Fischer, USACE, December 3, 2003).

Doran et al. (1999) include the southern portion of the Spokane and Upper Columbia Subbasins within the species range. However, the only documented record in the Washington Priority Habitats and Species database occurred in June 2000 when 10 foraging individuals were sighted on the Pend Oreille River north of Newport in the Pend Oreille Subbasin (WDFW 2003b). The Washington State GAP Analysis found no evidence of current breeding within the province (Smith et al. 1997). WDFW notes that non-breeding pelicans may be under-represented in the WDFW database; they are fairly common in the Intermountain Province with wide dispersal immediately after breeding season (personal communication, Howard Ferguson, WDFW, April 2, 2004).

The American white pelican has a recurrent relationship (i.e. routine but occasional direct consumer, often in local areas and providing 5 to 50 percent of diet) with the fry/fingerling/parr stages of salmonid life history. The bird performs at least three key ecological functions: (1) consumer or predator of herbivorous fish, (2) creator of

structures possibly used by other organisms, and (3) carrier, transmitter, or reservoir of diseases that affect other wildlife species.

The State of Washington focuses on protecting from disturbance or contaminants all breeding colonies and feeding or loafing areas used by breeding or non-breeding birds.

Limiting Factors.

The main factors limiting breeding and non-breeding success of American white pelican are: (1) habitat destruction, (2) conversion of wetlands and lakes to other purposes (for example, irrigation, hydro-generated electricity, or waterfowl production), and (3) human disturbance at nesting sites (USFWS 1984). Other potential factors are decreased or fluctuating food availability, shooting, mammalian (especially coyote) predation at breeding sites, pesticide contamination via the food chain, and powerline collisions.

Bald eagle

Refer to preceding section on federally-listed species.

Canada lynx

Refer to preceding section on federally-listed species.

Ferruginous hawk

Population Status and Trend

The ferruginous hawk is classified as threatened in Washington. Historically, it is presumed the species was a regular breeder in suitable habitat. Currently, the species is an uncommon breeder and rare winter visitor east of the Cascade Mountains in Washington. No recent sightings of this raptor are known within the Intermountain Province (WDFW 2003b, Smith et al. 1997). The ferruginous hawk is closely associated with steppe/shrub-steppe habitats of uncultivated lands. The bird contributes at least two key ecological functions: primary predator or carnivore of terrestrial invertebrates and herbivorous vertebrates, and creator of aerial structures possibly used by other wildlife species.

The State of Washington's management recommendations include: (1) protection of at least half of all native shrub-steppe habitats within a pair's home range, (2) avoidance of human intrusion during nesting, (3) maintenance of potential nest sites via excluding tree-damaging agents, culturing new trees as recruits, or erecting artificial platforms, and (4) restricted or alternative rodent control in hawk foraging areas (Richardson et al. 1999).

Ferruginous hawk was not used as a HEP evaluation species for loss assessments of the FCRPS projects in the province. However, the Chief Joseph loss assessment (Kuehn and Berger 1992) named sage grouse as an indicator species for sagebrush and rockland dependent wildlife, and the ferruginous hawk was described as a beneficiary of sage grouse Habitat Units to be provided as mitigation for inundating shrub-steppe habitat. The Grand Coulee loss assessment (Creveling and Renfrow 1986) also named sage grouse as a surrogate for sagebrush dependent wildlife. Approximately 554 and 7,432 sage grouse HUs have been replaced to date for Chief Joseph and Grand Coulee, respectively. Indirectly, land converted to agriculture as a result of these two dams presumably affected both prey and habitat for ferruginous hawk.

Limiting Factors

Two primary factors limit the ferruginous hawk. One is loss of uncultivated lands used for nesting and hunting prey — populations are known to decline consistently once cultivated land exceeds 30 percent of the area (Schmutz 1987, 1989). The other factor is human disturbance, even if mild, during nest building and incubation, which causes egg mortality, fewer fledglings, increased sensitivity to disturbance (for example, birds flushing at further distances), and nest site abandonment for years afterward (White and Thurow 1985).

Fisher

Population Status and Trend

The fisher is classified as endangered in Washington and will become a candidate for federal listing in the near future (USFWS 2004). The species historically occurred throughout much of the forested areas in Washington, Idaho, and British Columbia, though it was probably not abundant. In Washington, it is currently very rare and possibly extirpated in the Columbia River and Okanogan eco-regions. One confirmed occurrence at Calispel Peak (Stevens County) in 1994 was from an animal reintroduced in Montana. In Idaho, reintroductions at three north-central sites in the 1960's were successful, and there is now a breeding population in the Clearwater River drainage.

The fisher is known from all Intermountain Province Subbasins except Lake Rufus Woods and San Poil (WDFW 2003b, IDFG 2001). The animal is closely associated with upland forest habitats — especially those with large-diameter conifer or mixed conifer-deciduous trees and snags, high canopy closure, multiple canopies, shrubs, and down logs. It also has a general association with wetland habitats.

The fisher provides several key ecological functions, including: (1) consumer or predator of herbivorous vertebrates and eggs, (2) consumer of carrion, (3) controller of terrestrial vertebrates via predation or displacement, and (4) disperser of viable seeds/fruits through ingestion or caching (Johnson and O'Neil 2001). The fisher has a rare relationship (*i.e.* often less than one percent of diet and during shortage of usual foods) with the carcass stage of salmonid life history (IBIS 2003).

Management for the species has included (1) reintroductions in Idaho and British Columbia, (2) trapping cessation/restriction in Washington and Idaho, and (3) habitat assessment in the Olympic and Cascade mountains of Washington.

Fisher was not evaluated in the HEP loss assessments for FCRPS projects in the province. Upland forest and riparian habitats used by the fisher may have been directly and indirectly affected by development of the federal projects.

Limiting Factors

Limiting factors include incidental trapping, vehicle collisions, shooting, predation, intraspecific fighting, disease, infections, starvation, poisoning, accidents, debilitation from porcupine quills, genetic drift/inbreeding, plus habitat loss/fragmentation caused by

forest management, human development, wildfires, windstorms, and volcanic eruption (Lewis and Stinson 1998).

Gray Wolf
Refer to preceding section on federally-listed species.

Grizzly Bear
Refer to preceding section on federally-listed species.

Northern Leopard Frog
Population Status and Trend

This amphibian is classified as endangered in Washington. It is one of the most widely distributed frogs in North America, and most certainly occurred in Washington, Idaho, and British Columbia. Museum records for Washington since the 1880s show its presence in 18 general areas covering eight counties, of which Pend Oreille County and Spokane County were two (McAllister et al. 1999). Currently, two areas in the Crab Creek drainage of Grant County, (McAllister et al. 1999), and one area of the Pend Oreille River on the Kalispel Indian Reservation in Pend Oreille County (personal communication, R. Entz, Wildlife Biologist, Kalispel Tribe, April 10, 2004), are known to be occupied in the state, but the population size is not known. Populations also exist in the northern portion of Idaho's panhandle. For the Intermountain Province, only the Pend Oreille Subbasin contains the northern leopard frog (IDFG 2001, McAllister et al. 1999). Wetland and riparian habitats are favored, especially where there is an abundance of vegetation to provide cover.

The northern leopard frog performs at least four key ecological functions: (1) consumer of live or decomposing aquatic vegetation, (2) consumer of terrestrial invertebrates or aquatic macroinvertebrates, (3) prey for primary or secondary predators, and (4) transferer of substances for nutrient cycling. Management focus in Washington is to: (1) survey for occupied habitat; (2) research on habitat relationships, pesticide/herbicide/foreign-species effects, decline factors, and genetic variability; (3) control competing bullfrogs and non-native fish, and (4) inform people about management needs.

Leopard frog was not selected for evaluation in the HEP loss assessments of FCRPS projects in the province. Wetland habitats that may have supported the species have been indirectly affected as a result of project development, through increased rates of residential and urban development, agriculture, and timber harvest.

Limiting Factors

Although little is known about limiting factors within Washington, several influences are suspected. They include (1) changed hydrology due to land alteration, irrigation, human occupancy, or drought, (2) introduction of competing or predatory bullfrogs and non-native fish, (3) chemical contaminants such as pesticides (even rotenone), herbicides, and fertilizers, and (4) ultraviolet-B radiation. It is suspected that several factors in combination create weakened vigor for surviving the normal stresses of frog life.

Peregrine Falcon

Population Status and Trend

The peregrine falcon is classified as endangered in Idaho. Historically, this falcon was uncommon in Washington and no nest sites were known east of the Cascade Mountains (Dawson and Bowles 1909). In modern times, populations at the national and state levels increased after the late 1970s because chlorinated hydrocarbon pesticides were banned and other protections were initiated. Their population numbers and distribution are still limited in Washington due to the lingering effects of pesticides and the lack of suitable nesting sites (Hays and Milner 1999). The peregrine is known to occur in Idaho's Kootenai County (IDFG 2001). Within the Intermountain Province, the peregrine has been reported in the Coeur d' Alene, Spokane, and Upper Columbia Subbasins (WDFW 2003b). The falcon is closely associated with cliffs or rock outcrops for nesting, and generally associated with riparian, shrub-steppe, or upland forest habitats for hunting prey.

The peregrine falcon provides at least two key ecological functions: primary consumer/predator of herbivorous vertebrates, and secondary predator. The bird has an indirect relationship (*i.e.* secondary consumer) with the carcass and fry/fingerling/parr stages of salmonid life history (IBIS 2003).

Management in Washington is focused on (1) developing a statewide management plan and individual site management plans for eyries in non-forested settings, (2) avoiding breeding season disturbance at eyries, and (3) supporting alternatives to pesticide use where peregrines are known to breed or hunt (Hayes and Buchanan 2002, Hays and Milner 1999).

Peregrine falcon was not selected as an evaluation species for the FCRPS projects in the Intermountain Province. However, cliff and rock outcrop habitats along the Columbia River and tributaries were inundated by both the Chief Joseph and Grand Coulee projects.

Limiting Factors

Three factors are thought to limit recovery of the peregrine: (1) chemical contamination from banned chlorinated hydrocarbon pesticides that are ingested by migratory prey while those species are in foreign countries, (2) disturbance from humans during peregrine nesting, and (3) availability of suitable nesting sites.

Pygmy Rabbit

Refer to preceding section on federally-listed species.

Sage Grouse

Population Status and Trend

The sage grouse is classified as threatened in the State of Washington. The species historically inhabited the shrub-steppe and meadow steppe of the Columbia Basin in eastern Washington. In modern times, populations of sage grouse declined to only eight percent of the species' former range. At present, there are two isolated sage grouse populations located in Douglas and Yakima counties, and the statewide breeding population is estimated to be 1,017 birds. Within the Intermountain Province, the sage

grouse has been reported from the Upper Columbia Subbasin only. All of the 14 sage grouse WDFW management units for recovery are located outside and south of the province (WDFW 2003b, Stinson et al. 2003). The bird is closely associated with steppe/shrub-steppe habitats.

The sage grouse provides several key ecological functions, including: (1) consumer of plant leaves, flowers, or fruits; (2) predator of terrestrial invertebrates; (3) prey for primary or secondary predators; and (4) carrier, transmitter, or reservoir of diseases that affect other wildlife species.

The State of Washington draft recovery plan focuses on (1) population monitoring and protection, (2) habitat acquisition, protection, and restoration, (3) research, and (4) interagency coordination and partnerships (Stinson et al. 2003).

Construction of the Grand Coulee hydropower project resulted in a loss of 14,000 acres of shrub-steppe vegetation and 2,746 sage grouse Habitat Units (Creveling and Renfrow 986). The Chief Joseph project caused a loss of 1,681 acres of shrub-steppe and 1,179 sage grouse HUs (Kuehn and Berger 1992). To date, replacement of 7,432 HUs and 554 HUs, respectively, has been achieved for sage grouse.

Limiting Factors

Several factors limit sage grouse populations or prevent habitat from being re-occupied. These include the quality of habitat present, the quantity of breeding and wintering habitat, isolation from occupied habitat, and the general health of existing sage grouse populations (Stinson et al. 2003). Predation from birds of prey and carnivorous mammals causes a significant proportion of loss to adult and young birds. An emerging threat may be West Nile virus, which caused a significant number of sage grouse deaths in other western states. Wildfire, conversion of shrub-steppe to cropland or other human development, military training disturbance, livestock grazing, and invasion by exotic plant are specific harmful impacts upon habitat.

Sandhill Crane

Population Status and Trend

This wading bird is state-listed as endangered in Washington. Historical data suggests the sandhill crane formerly bred in wetlands on both sides of the Cascade Mountains (Smith et al. 1997). East of the Cascades, nesting occurred at Columbia National Wildlife Refuge plus Coulee City (Grant County), Fort Colville (Stevens County), Calispell Lake (Pend Oreille County), and Spokane Bridge (Spokane County). Currently, only two nesting areas are known in Washington, and both are far outside of the Intermountain Province. A third breeding area — or a non-nesting summer site — may exist at Adkins Lake in Douglas County. Most sandhill cranes overfly the state on their way from wintering sites in central California to breeding areas in British Columbia. During migration, sandhill cranes have been reported in Lincoln, Okanogan, Pend Oreille, Spokane, and Stevens counties (Littlefield and Ivey 2001). The species is not known to nest in any Subbasin of the province. The sandhill crane is closely associated with wetland habitats.

This bird provides several key ecological functions, including: (1) consumer of aquatic vegetation, seeds, or fruits, (2) predator on terrestrial invertebrates or aquatic macro-invertebrates, (3) disperser of insects, other invertebrates, or vascular plants, and (4) carrier, transmitter, or reservoir of diseases that affect other wildlife and humans.

The State of Washington's recovery plan calls for (1) monitoring populations, (2) inventorying, assessing, and protecting habitat, (3) reducing mortality, (4) reducing disturbance factors, (5) managing breeding territories, staging areas, and wintering areas, (6) maintaining information, (7) informing the public, (8) research to aid recovery, and (9) cooperation with government, private landowners, NGOs, and funding sources.

Sandhill crane was not selected as a HEP evaluation species for FCRPS projects in the Intermountain Province. Indirect effects of project development on wetland habitats used by the species may have occurred through residential and urban development and agriculture.

Limiting Factors

Predation from common raven, mink, raccoon and coyote is the primary cause of egg and chick mortality (Littlefield and Ivey 2001). Collision with utility wires is a major mortality factor, especially for young fledglings and at staging and wintering areas. Loss of habitat from dewatering of wetlands, sprinkler or pivot irrigation instead of meadow flooding, construction of buildings, and conversion to row crops has displaced breeding pairs.

Sharp-tailed Grouse

Population Status and Trend

The sharp-tailed grouse, Columbian subspecies, is state-listed as threatened in Washington. A petition for federal listing was rejected based on the persistence of relatively stable populations in southeastern Idaho, northcentral Utah, and northwestern Colorado. Historically, Columbian sharp-tailed grouse ranged from the Canada border at Oroville south to the Oregon border, west to the eastern Cascades foothills, and east to the Idaho border in Whitman County. They were plentiful in eastern Washington, inhabiting most of the prairies in the Columbia plateau and the stream valleys emptying into the Columbia River. The species uses shrub-steppe, steppe, and meadow steppe habitats for breeding and deciduous shrub communities across eastern Washington (Schroeder and Tirhi 2003).

Populations of sharp-tailed grouse in Washington have declined dramatically over time. Schroeder (2002) reports that the 1970s population was estimated at 5,366 individuals; presently, there are an estimated 618 individuals in Washington. This is a decline of 88.5 percent in little more than twenty years. The range of the species has declined to less than three percent of the historic range, apparently due to loss of quantity and quality of native shrub-steppe habitats (Schroeder 2002).

The remaining Washington population of sharp-tailed grouse is divided between eight small, severely fragmented subpopulations in Douglas, Lincoln, and Okanogan counties (Schroeder 2002). The IMP contains two of the eight Washington subpopulations. The

largest Washington subpopulation is on the Colville Indian Reservation, contains approximately 200 birds, and is not considered to be self-sustaining at this time (personal communication, M. Berger, Wildlife Biologist, Colville Confederated Tribes, October 21, 2003).

Approximately half of the Upper Columbia Subbasin was historic range for the sharp-tailed grouse, but only two subpopulations now exist. A portion of the San Poil Subbasin was historic range, but part of only one subpopulation remains. A small portion of the Lake Rufus Woods Subbasin was historic range, but part of only one subpopulation has survived. All of the Spokane Subbasin, and the southern part of Pend Oreille Subbasin, were historic ranges, but no sharp-tailed grouse remain.

The sharp-tailed grouse contributes many key ecological functions, including: (1) consumer of plant leaves, flowers, seeds, or fruits; (2) predator of terrestrial invertebrates; (3) prey for primary or secondary predators; (4) disperser of plant seeds/fruits through ingestion or caching; and (5) carrier, transmitter, or reservoir of diseases that affect other wildlife species (IBIS 2003).

Washington Department of Fish and Wildlife management emphasizes protection of remaining native shrub-steppe habitats in Douglas, Lincoln, and Okanogan counties. Specific vegetation protection measures are prescribed for lek sites and two km buffers surrounding them, and for deciduous shrub habitats used for wintering. These recommendations also include a number of techniques to protect the quality of native habitats, including controls on grazing, burning, herbicide and insecticide use, noxious weeds, and human disturbance (Schroeder and Tirhi 2003). Sharp-tailed grouse management areas are designated by WDFW in portions of Douglas, Okanogan, Lincoln, Chelan, and Grant counties (Schroeder and Tirhi 2003).

Construction and reservoir inundation for the Grand Coulee Project caused a loss of 32,723 sharp-tailed grouse Habitat Units (HUs), and the Chief Joseph project lost 2,290 HUs (Creveling and Renfrow 1986, Kuehn and Berger 1992). The species was chosen for evaluation in the HEP study due to its use of native shrub-steppe and to represent species including mule deer, yellow warbler, downy woodpecker, northern oriole, burrowing owl, short-eared owl, Washington ground squirrel, upland sandpiper, golden eagle, badger, coyote, and cougar. To date, mitigation for the two projects has resulted in acquisition of lands providing 16,854 sharp-tailed grouse HUs (45 percent) and 14 HUs (less than one percent), respectively.

Limiting Factors

The primary factors affecting sharp-tailed grouse survival are: habitat loss or alteration (conversion to agriculture, conversion to livestock pasture, and overgrazing by livestock), and geographic isolation of small subpopulations (genetic quality and recruitment) (Hays et al. 1998). It is not clear if remaining Washington populations are declining due to isolation or a combination of other factors. Predation from diurnal raptors and nocturnal mammals can cause substantial nesting failures (for example, 37 percent of nests in one study by Bergerud 1988), which is especially significant in small populations. In large

contiguous populations, habitat with good cover for nesting and wintering would allow grouse to increase despite predation.

Upland Sandpiper

Population Status and Trend

The upland sandpiper was classified as an endangered species in Washington in 1982 (WAC 232-12-014). Relatively little is known about its historic status in the state. The species was first reported in 1905, but no further presence was found until 1928. The bird was very local and a rare breeder in eastern Spokane County (Smith et al. 1997). It is not known to have reproduced there since 1993 (Iten et al. 2001). Individual sightings have since been made in the months of August or September, but the dates may indicate migrating birds rather than breeders (WDFW 2003b). However, during 2002 and 2003 birds were observed west of Spokane from the end of May up to the middle of June (personal communication, H. Ferguson, WDFW, April 13, 2004). No breeding was documented. The upland sandpiper may be extirpated in Washington.

Populations of upland sandpiper in Washington and Idaho are considered disjunct and peripheral to the species main range, which covers a broad area but may be restricted to small local areas of suitable habitat. The species is closely associated with steppe/shrub-steppe habitats, especially wet meadows or grasslands (Buchanan 2002). Within the Intermountain Province, this shorebird is documented from only the Spokane Subbasin, as noted above, and the Coeur d' Alene Subbasin in 1993 (IDFG 2003).

The upland sandpiper provides at least four key ecological functions: (1) primary predator of terrestrial invertebrates, (2) prey for wildlife predators, (3) disperser of insects or other invertebrates, and (4) disperser of plant seeds or fruits through ingestion or caching.

Dechant et al. (2001) report that the key to upland sandpiper management is providing grasslands of various heights with few shrubs. The bird requires short vegetation (less than 12 inches tall) for foraging, taller vegetation (4-25 inches) for nesting, and short-to-medium vegetation (less than 6 inches tall) for brood cover. These authors also recommend (1) maintaining contiguous suitable habitat in blocks larger than 245 acres, (2) avoiding burning, mowing, or plowing during the nesting season, (3) providing display perches such as fence posts or rock piles, and (4) preventing encroaching woody vegetation.

Native grassland or meadow habitats that may have provided suitable breeding habitat for upland sandpiper were converted to agricultural crops as an indirect effect of the FCRPS projects.

Limiting Factors

While market hunting likely caused earlier population decline, the biggest current threat to upland sandpiper is habitat loss and alteration. Urban development, conversion of native grasslands to agriculture, uncontrolled livestock grazing, invasion by exotic plants, and pesticide use are modern factors.

Woodland Caribou
Refer to preceding Section on federally-listed species.

4.5.2.3 Habitat Evaluation Procedures (HEP) Wildlife Species for Federal Hydropower Loss Assessments

Eighteen wildlife species were selected to represent wildlife that lost habitat as a result of construction of the Chief Joseph, Grand Coulee, and Albeni Falls federal hydropower projects in the Intermountain Province (Table 4.10). The Habitat Evaluation Procedures (HEP) methodology was used to evaluate the loss of habitat in terms of habitat units (HUs), which incorporate both area and quality of habitat. Losses of two habitat types – riparian forest and riparian shrub – were also evaluated by the HEP for the Grand Coulee Project.

Table 4.10. HEP evaluation species and habitats for federal hydrosystem projects in the Intermountain Province **(Number specifies Habitat Units lost)**

Common Name	Scientific Name	Chief Joseph	Grand Coulee	Albeni Falls
Bald eagle	*Haliaeetus leucocephalus*			4,508 (breeding) 4,365 (wintering)
Black-capped chickadee	*Parus atricapillus*			2,286
Bobcat	*Lynx rufus*	401		
Canada goose	*Branta canadensis*	213	74 (nesting)	4,699
Lewis' woodpecker	*Melanerpes lewis*	286		
Mallard	*Anas platyrhynchos*			5,985
Mink	*Mustela vison*	920		
Mourning dove	*Zenaida macroura*		9,316	
Mule deer	*Odocoileus hemionus*	1,992	27,133	
Muskrat	*Ondatra zibethicus*			1,756
Redhead	*Aythya americana*			3,379
Ring-necked pheasant	*Phasianus colchicus*	239		
Ruffed grouse	*Bonasa umbellus*		16,502	
Sage grouse	*Centrocercus urophasianus*	1,179	2,746	
Sharp-tailed grouse	*Tympanuchus phasianellus Columbianus*	2,290	32,723	
Spotted sandpiper	*Actitis macularia*	1,255		
White-tailed deer	*Odocoileus virginianus ochrourus*		21,632	1,680
Yellow warbler	*Dendroica petechia*	58		
Riparian forest habitat	-		1,632	
Riparian shrub habitat	-		27	
Total		**8,833**	**111,785**	**28,658**

(*Sources*: Kuehn and Berger 1992; Creveling and Renfrow 1986; Martin et al. 1988.)

Bald eagle. Bald eagle was selected for evaluation in the Albeni Falls HEP study (Martin et al. 1988) because of its status as a federally-listed and state threatened species and its association with forested wetlands. Both wintering and breeding season models were evaluated. Bald eagle was selected as an important indicator species for river-edge riparian habitat in the Grand Coulee HEP (Creveling and Renfrow 1986); the HEP analyzed riparian forest habitat rather than a bald eagle habitat suitability model. Refer also to preceding discussion of federally-listed species.

Black-capped chickadee. The black-capped chickadee was selected as an indicator of deciduous forested wetlands with snags and was evaluated in the Albeni Falls HEP study (Martin et al. 1988). The species is common at lower elevation wetlands where hardwood trees occur. Breeding is confirmed within the Pend Oreille, San Poil, Spokane, and Upper Columbia Subbasins, and probably occurs in the other two Subbasins as well (Smith et al. 1997).

Bobcat. Bobcat was selected to represent wildlife species, both predator and prey, that use rock and rockland habitats. Species benefiting from mitigation for bobcat include yellow-bellied marmot, pika, bushy-tailed woodrat, cottontail rabbit, quail, golden eagle, and rattlesnake. An unpublished HEP model was evaluated for the Chief Joseph HEP study (Kuehn and Berger 1992).

Canada goose. Canada goose was selected for the HEP loss assessments for all three of the FCRPS projects in the province. A breeding season model was used to display the effects of loss of emergent wetland habitats for the Albeni Falls Project (Martin et al. 1988). In both the Grand Coulee and Chief Joseph studies, Canada goose was used to represent small riverine islands and/or sandbar habitats that provided secure breeding sites (Creveling and Renfrow 1986, Kuehn and Berger 1992). Other wildlife that use the island habitat were represented by the Canada goose in the Grand Coulee evaluation, including aquatic mammals, mourning doves, gulls and terns, shorebirds, and waterfowl. Canada goose is an important game species that is present in all Subbasins of the Intermountain Province.

Lewis' woodpecker. Lewis' woodpecker was evaluated in the Chief Joseph HEP study as an indicator of wildlife requiring trees of suitable diameter and decay class to provide cavities for nesting (Kuehn and Berger 1992). Species benefiting from mitigation for Lewis' woodpecker include ruffed grouse, white-tailed deer, sharp-shinned hawk, Cooper's hawk, northern goshawk, pileated woodpecker, black-backed woodpecker, sapsucker, white-headed woodpecker, western bluebird, boreal and flammulated owl, and small mammals (CCT 2004a). Ponderosa pine habitats were evaluated for their value to Lewis' woodpecker. The Washington GAP Analysis Project (Smith et al. 1997) confirms breeding in the San Poil Subbasin, with possible breeding in the Pend Oreille, Spokane, and Upper Columbia Subbasins.

Mallard. The effects of the Albeni Falls Project on mallard duck breeding habitat was evaluated by Martin et al. 1988. A breeding model was developed specifically for the Pend Oreille Lake emergent wetland habitats. This species also represents other waterfowl species that occur in the area. Mallard is an important game species and is present in all Subbasins of the province.

Mink. Mink was evaluated in the Chief Joseph HEP study as a representative carnivorous furbearer that uses shoreline and adjacent shallow water habitats (Kuehn and Berger 1992). Other species that may benefit from habitat improvements for mink include beaver, long-eared owl, northern flicker, pallid bat, western pipistrelle bat, long-eared bat, lesser goldfinch, ash-throated flycatcher, yellow-billed cuckoo, great egret, black-

crowned night heron, Sylvan hairstreak and Viceroy butterflies, river otter, water shrew, and black bear (CCT 2004a). Mink has cultural significance and is a game species.

The species was also selected as a Subbasin priority species for its close association with herbaceous wetland and riparian habitats, and for its economic value as a furbearer. The mink has a recurrent relationship (*i.e.* routine but occasional direct consumer, often in local areas and providing 5 – 50 percent of diet) with the carcass and fry/fingerling/parr stages of salmonid life history (IBIS 2003). It also is a critical functional link species using aquatic structures created by other organisms.

Mourning dove. Mourning dove was used in the Grand Coulee HEP study to represent wildlife using riparian and agricultural lands, particularly orchards and open ground (Creveling and Renfrow 1986). Other species that may benefit from activities that enhance mourning dove habitat include pheasant, quail, cottontail rabbit, western kingbird, meadowlark, northern harrier, Swainson's hawk, and meadow vole (CCT 2004a). Mourning dove is a culturally significant species and a game species. Breeding bird surveys from 1966 to 1998 show a statistically significant population decline of two to three percent per year in the Northern Rocky Mountains and Columbia Plateau planning regions (Altman 2000a, 2000b). Statewide in Washington, hunting harvest of mourning dove since the 1970s has declined by two-thirds (WDFW 2001). The species is present in all Subbasins of the province.

Mule deer and white-tailed deer. Mule deer was used in both the Grand Coulee and Chief Joseph HEP assessments to represent wildlife dependent upon shrub-steppe and river breaks (Creveling and Renfrow 1986, Kuehn and Berger 1992). Mixed forest, ponderosa pine savannah, and rockland habitats were also evaluated for mule deer in the Chief Joseph study. Mule deer are a culturally significant species. Species benefiting from mitigation for mule deer may include sharp-tailed grouse, downy woodpecker, northern oriole, burrowing owl, short-eared owl, Washington ground squirrel, upland sandpiper, golden eagle, badger, coyote, and cougar (CCT 2004a).

White-tailed deer were selected for the Grand Coulee HEP to represent wildlife dependent upon seral forest habitat with abundant shrubs and openings. Both mule and white-tailed deer are important game species.

Muskrat. Muskrat was selected to represent wildlife using slough/riverine and deep-water emergent wetland types within the Lake Pend Oreille study area of the Albeni Falls HEP (Martin et al. 1988). Muskrat is a game species.

Redhead. Redhead winter habitat consisting of shallow open water areas with abundant macrophytes was evaluated in the Albeni Falls loss assessment (Martin et al. 1988). Redhead also represented other waterfowl species with similar winter foraging habits. Redhead is a game species in both Washington and Idaho. Redhead provides a critical functional link through parasitizing the nests of other species during breeding (IBIS 2003). The species probably breeds along major river valleys in northeastern Washington as high up as the interior Douglas-fir zone, but is peripheral at best above the ponderosa

pine zone. Breeding is probable or at least possible in all Washington Subbasins of the province, although Smith et al. (1997) reports no confirmed breeding in these Subbasins.

Ring-necked pheasant. Ring-necked pheasant is an upland game species that uses agricultural lands in forage or grain production. The effects to this species were evaluated in the Chief Joseph HEP study (Kuehn and Berger 1992).

Ruffed grouse. Ruffed grouse was evaluated in the Grand Coulee Dam HEP assessment as a representative species of forested habitat with a hardwood tree component (Creveling and Renfrow 1986). Ruffed grouse is an important upland game species and is closely associated with riparian habitats, and generally associated with upland aspend (Johnson and O'Neil 2001). Breeding bird surveys during 1966-1998 show a statistically significant population decline of about seven percent per year for the Northern Rocky Mountain planning region (Altman 2000a). The Washington GAP Analysis Project confirms breeding in the Pend Oreille, San Poil, and Spokane Subbasins (Smith et al. 1997). Breeding occurs in the other Washington Subbasins, as well as in Idaho.

Sage grouse. Refer to preceding discussion under Idaho and Washington Threatened and Endangered Species.

Sharp-tailed grouse. Refer to preceding discussion under Idaho and Washington Threatened and Endangered Species.

Spotted Sandpiper. Spotted sandpiper is representative of shorebirds that use sparsely vegetated islands, sand/gravel bars, mudflats, and shorelines. The species was evaluated in the Chief Joseph HEP study (Kuehn and Berger 1992). Other species that may benefit from spotted sandpiper mitigation include osprey, snipe, bats, western toad, rubber boa, rattlesnake, raccoon, coyote, river otter, killdeer, bank swallow, merganser, coot, water shrew, common garter snake, northern leopard frog, and striped skunk (CCT 2004a). Populations of spotted sandpiper in the Columbia Plateau physiographic region show statistically significant declines (Sauer et al. 1999).

Yellow warbler. Yellow warbler was selected for evaluation in the Chief Joseph HEP study for its strong association with riparian shrub habitat and adjacent wetlands with open water (Kuehn and Berger 1992). Other species that may benefit from yellow warbler mitigation include hairy woodpecker, great blue heron, white-tailed deer, elk, turkey, red-tailed hawk, spotted frog, beaver, muskrat, raccoon, red-winged blackbird, long-toed salamander, meadow vole, tree frog, bats, and winter wren (CCT 2004a).

The species was also selected as Subbasin priority species for its close association with riparian habitat, especially the sub-canopy foliage in riparian woodlands. Breeding bird surveys in the Northern Rocky Mountains planning region show a statistically significant long-term (1966-98) population decline of about one percent per year (Altman 2000a). Over the same time period, the Columbia Plateau planning region showed a population increase of about two percent per year that was not, however, statistically significant (Altman 2000b). Other species indicated by the yellow warbler include warbling vireo, black-headed grosbeak, Swainson's thrush, and Wilson's warbler. Limiting factors are

(1) habitat loss or alteration from agriculture, (2) poorly-managed livestock grazing, (3) channelization for flood control or irrigation, and (4) parasitism by the brown-headed cowbird.

4.5.2.4 Other Priority Species

American beaver. Beaver was selected as a priority species for the San Poil, Upper Columbia, and Spokane Subbasins due to its close association with forested wetland and riparian habitats. Beaver provide critical functional links through impounding water by creating diversions or dams, by creating primary aquatic structures, and as primary consumers of bark, cambium, or tree boles (IBIS 2003). Harvest data is recorded by WDFW in the Trappers Report of Catch in the annual Game Harvest Reports (refer to Appendix G). Since 2000, when State Initiative 713 was passed, banning the use of leg or body gripping traps, little trapping of beaver has occurred in Washington.

American marten. American marten was selected as a priority wildlife species for the Pend Oreille Subbasin. Marten is closely associated with upland forests including montane mixed conifer, eastside mixed conifer, and lodgepole pine. It also uses montane coniferous wetlands. Marten is a game species in Washington and Idaho.

Bat guild. The bat guild was selected as a priority guild for the Coeur d' Alene and Pend Oreille Subbasins. Little detailed information exists regarding the distribution and occurrence of bats in the province, but up to 15 species may be present and their habitat associations and life histories are diverse.

Bighorn sheep. Bighorn sheep was selected as a priority species in the Upper Columbia Subbasin for their relationship with cliff and rock outcrop habitats. Extirpated from the province prior to construction of the FCRPS, bighorn sheep were reintroduced into the Kettle River drainage near Curlew in 1971 and the population has persisted to date. Additional translocations to Lincoln County occurred in the 1990s (personal communication with S. Zender, WDFW, December 22, 2003).

Black bear. Black bear was selected as a priority species for the Coeur d' Alene Subbasin. The species is associated with a variety of forested, riparian, and wetland habitats. Black bear is a culturally significant species and an important game species. Critical functional links are provided by black bear through primary cavity excavation in live trees or snags and through primary consumption of bark, cambium, or boles (IBIS 2003).

Cavity nester guild. The cavity nester guild was selected as a priority guild for the Coeur d' Alene and Pend Oreille Subbasins. Many of these species depend on primary excavators, such as the pileated woodpecker, to create suitable cavities in decaying trees. These species are indicative of forested habitats providing a range of sizes of cavities for reproduction and roosting. Nearly all cavity-nesting birds contribute a valuable ecological function by consuming forest insects, thereby contributing to the control of insect populations.

Columbia spotted frog. The Columbia spotted frog was selected as a priority species for the Spokane and Upper Columbia Subbasins because of its close association with wetland and riparian habitats. It is a candidate for state listing as threatened/endangered in Washington. Management in Washington is directed at protecting native wetland vegetation, avoiding the introduction of non-native species, controlling runoff, and using alternatives to pesticides.

Limiting factors are: (1) habitat alteration/fragmentation, (2) predation by introduced species such as game fish and bullfrogs, and (3) toxic chemicals such as pesticides, fire retardant, and petroleum products that enter the aquatic system. Habitat changes such as land conversion, water channeling, and livestock grazing can cause harm to the spotted frog's life stage requirements for stable water temperature and elevation, or for overhead cover. Water level fluctuation is particularly detrimental because egg-laying often occurs in shallow water where even short-term exposure to air can cause freezing or desiccation.

Golden eagle. This raptor was selected as a priority species for the Lake Rufus Woods, Upper Columbia, San Poil, and Spokane Subbasins due to its close association with cliffs and rock outcrops for nesting. It is a candidate for state listing as threatened/endangered in Washington. Washington's management emphasis is on (1) maintaining prey species habitats, (2) controlling rodenticide, insecticide, and herbicide use in foraging areas, (3) controlling recreational or other disturbances during nesting (Watson and Whalen 2003), and (4) managing other limiting factors such as lead shoot, electrocution hazards, and shooting.

The golden eagle has a recurrent relationship (routine but occasional direct consumer, often in local areas and providing 5-50 percent of diet) with the carcass and fry/fingerling/parr stages of salmonid life history (IBIS 2003). Limiting factors are: (1) habitat loss or alteration, (2) fluctuating populations of prey, (3) disturbance at nest sites, (4) lead poisoning and other prey contaminants, (5) powerline electrocution, (6) collision with wind turbines, and (7) shooting.

Great blue heron. The great blue heron was selected as a priority species in the Pend Oreille Subbasin for its close association with riparian forests for breeding and emergent wetlands for foraging. Great blue heron is a critical functional link species creating feeding, roosting, denning, or nesting opportunities for other organisms in open water, herbaceous, riparian, and westside lowland coniferous forests (IBIS 2003). The species occurs in all Subbasins of the province.

Harlequin duck. Harlequin duck is an indicator of mature riparian forests adjacent to fast-moving streams. The species was selected by both the Coeur d' Alene and Pend Oreille Subbasins as an indicator of mid- to late-successional forest riparian zones. Harlequin duck is listed as a game species in both Washington and Idaho. The Washington GAP Analysis Project (Smith et al. 1997) reports possible evidence of breeding only in the Pend Oreille Subbasin.

Long-eared owl. The long-eared owl was noted in the Grand Coulee HEP study as an indicator of wildlife species requiring grasslands and open agricultural lands adjacent to

woody riparian habitat. They are also a good indicator of the small mammal prey base. This species is a priority wildlife for the San Poil, Upper Columbia, and Spokane Subbasins. Smith et al. (1997) confirm breeding in the Washington portion of the Spokane Subbasin.

Long-toed salamander. The Pend Oreille Subbasin selected this species as an indicator of wetland and riparian habitats. Long-toed salamander provides a critical functional link as a secondary consumer of freshwater or marine zooplankton (IBIS 2003).

Migratory bird guild. The migratory bird guild was selected as a priority guild in the Coeur d' Alene and Pend Oreille Subbasins. Species in this guild breed within the province, but migrate south to winter at warmer latitudes in the United States, Mexico, or Central America. Migratory birds are of concern due to recent declines in breeding populations of many species. Currently, 75 species are defined as priority or focal species by Washington Partners in Flight and 58 species are defined similarly by Idaho Partners in Flight (IBIS 2003). Many of these species perform an important ecological function by feeding primarily on insects, thereby contributing to control of insect populations.

Moose. Moose was selected as a priority species in the Pend Oreille Subbasin. Moose is an important game species that primarily utilizes montane coniferous forests and montane wetlands.

Northern flicker. Northern flicker was selected by the San Poil Subbasin as a priority species. Flicker was noted in the Grand Coulee HEP study as a habitat indicator species of wildlife requiring riparian woodlands with trees of large diameter suitable for cavity nests. The species is presumed to breed in all Subbasins of the province.

Northern goshawk. The northern goshawk was selected as a priority species by the Pend Oreille and Coeur d' Alene Subbasins. Goshawks are closely associated with ponderosa pine, lodgepole, and eastside mixed conifer forests. The species is presumed to breed in all Subbasins of the province.

Osprey. Osprey was selected as a priority species for the Pend Oreille Subbasin. Ospreys are dependent upon riverine and lake/reservoir systems providing suitable fish species as prey, and require large trees or snags for nesting. The species is a confirmed breeder in all Subbasins of the province.

Pileated woodpecker. The pileated woodpecker was selected as a priority species by the Pend Oreille, Upper Columbia, and San Poil Subbasins. Pileated woodpecker represents species that use mature and old-growth upland forest, montane coniferous wetland, and wooded riparian habitats of the province. It is a candidate for state listing as threatened/endangered in Washington. Breeding bird surveys show a statistically significant long-term (1966-98) population increase of about four percent per year across the Northern Rocky Mountains planning region (Altman 2000a). The Washington GAP Analysis Project has confirmed breeding in Pend Oreille, Spokane, and Upper Columbia Subbasins; breeding is possible in the other Washington Subbasins. In the Idaho Subbasins, it is presumed that breeding occurs.

The pileated woodpecker wasn't specifically included as a Grand Coulee HEP assessment species, but that project's loss of 1,632 riparian forest HUs and loss of forested habitats on the other FCRPS projects may have affected the species. The pileated woodpecker provides a key ecological function by creating tree cavities large enough to be used by other focal wildlife in the province (for example, black-capped chickadee, northern flicker, common merganser, American marten, long-legged myotis, and northern flying squirrel), and game animals with no special status (for example, wood duck, Barrow's goldeneye, and bufflehead). It is relatively easier to inventory/monitor pileated woodpecker than most other species that benefit from its presence.

Rocky Mountain elk. Rocky Mountain elk were identified as a priority species for the Pend Oreille and Coeur d' Alene Subbasins. Elk is an important game species and is a culturally significant wildlife species. Critical functional links are provided by elk as creators of ponds or wetlands through wallowing activity and as grazers of grasses and forbs, with potential to alter vegetative structure and composition (IBIS 2003).

Sage sparrow. This bird is a Spokane Subbasin priority species whose distribution is closely tied to shrub-steppe habitats, especially large patches of contiguous sagebrush. It is a candidate for state listing as threatened/endangered in Washington. Breeding bird surveys from 1966 to 1998 show a statistically non-significant population decline of about one percent per year in the Columbia Plateau planning region (Altman 2000b). From 1980-98, the population increased about three percent per year that also is not statistically significant. Other species indicated by the sage sparrow include Brewer's sparrow, sage thrasher, sage grouse, loggerhead shrike, lark sparrow, vesper sparrow, and western meadowlark. Limiting factors are habitat loss and fragmentation from land conversion or wildfire, and parasitism by the brown-headed cowbird. Smith et al. (1997) found no confirmed evidence of breeding by sage sparrow in the Washington portion of the Subbasin.

Snowshoe hare. The snowshoe hare was selected as a Spokane Subbasin priority species for its key ecological function as primary prey to the Canada lynx, and for its close association with upland forest habitats — especially those with a densely-treed understory. Snowshoe hare provide a critical functional link as a consumer of fecal material (IBIS 2003). The species is listed as a game species in both Washington and Idaho.

Waterfowl guild. The Coeur d' Alene and Pend Oreille Subbasins selected the waterfowl guild as a priority guild. Waterfowl are important game and cultural species, and are closely tied to emergent wetlands and open water habitats in the province. There are approximately 39 species in this guild, including loons, grebes, cormorants, mergansers, ducks, geese, and swans.

White-headed woodpecker. This woodpecker was selected as a priority species by the Pend Oreille, Spokane, and Upper Columbia Subbasins. The species is closely associated with upland forest habitats in the Subbasin, especially large patches of old-growth ponderosa pine or mixed conifer. It is a candidate for state-listing as

threatened/endangered in Washington. Altman (2000a) reports there is an insufficient number of breeding bird surveys to determine population trend in the Northern Rocky Mountains planning region, but anecdotes suggest local and regional extirpations of populations. The Washington GAP Analysis Project confirmed breeding only in the San Poil and Upper Columbia Subbasins (Smith et al. 1997).

The presence of white-headed woodpecker can indicate other species such as flammulated owl, Lewis' woodpecker, white-breasted nuthatch, Williamson's sapsucker, northern goshawk, Hammond's flycatcher, hairy woodpecker and brown creeper. Limiting factors for the species are (1) timber and fuelwood cutting of large-diameter live/dead trees suitable for nesting, seed (food) production, and ground foraging, (2) habitat fragmentation, and (3) fire suppression which allows encroachment by atypical tree species.

Wolverine. The Pend Oreille and Coeur d' Alene Subbasins selected the wolverine as a priority species. This species is associated with montane coniferous forest habitats. It is a candidate for listing in both Idaho and Washington states.

4.6 Ecological Relationships

4.6.1 Wildlife Structural Condition Assessment

Structural conditions are the vegetation structure and successional category of a wildlife habitat in a specific location. Forest structural conditions characterize tree size (dbh), aerial canopy cover, and number of canopy layers. Shrubland structural conditions describe shrub height, aerial cover, and age class. Grassland structural conditions denote only grass or forb aerial cover.

Johnson and O'Neil (2001) specify three degrees of association between wildlife and structural conditions: closely associated, generally associated, and present. A "closely associated" species is widely known to depend on a habitat or structural condition for part or all of its life history requirements. A "generally associated" species exhibits a high degree of adaptability and may be supported by a number of habitats or structural conditions. A "present" species demonstrates occasional use of a habitat or structural condition.

Table 4.11 presents the tally of focal species by structural condition class for forested stands. The forest structural conditions having the greatest number of closely associated focal wildlife during breeding — nine species — are "grass/forb with open or closed canopy cover", and "shrub-seedling with open canopy cover". When considering focal wildlife that are either closely associated or generally associated during breeding, the greatest number of focal species — 30 species — occurs in the "medium tree – single-story – open canopy cover" structural condition.

Table 4.11. Relationship between number of focal wildlife species and forest structural condition used during breeding

Forest Structural Condition*	Close Association	General Association	Present
Giant Tree – Multi-story	3	14	0
Large Tree – Multi-story – Closed canopy cover	2	17	0
Large Tree – Multi-story – Moderate canopy cover	3	18	0
Large Tree – Multi-story – Open canopy cover	5	21	0
Large Tree – Single-story – Closed canopy cover	0	19	0
Large Tree – Single-story – Moderate canopy cover	0	21	0
Large Tree – Single-story – Open canopy cover	0	27	2
Medium Tree − Multi-story – Closed canopy cover	1	18	0
Medium Tree − Multi-story – Moderate canopy cover	2	18	0
Medium Tree − Multi-story – Open canopy cover	2	22	1
Medium Tree − Single-story – Closed canopy cover	0	17	2
Medium Tree − Single-story – Moderate canopy cover	0	21	0
Medium Tree − Single-story – Open canopy cover	4	26	2
Small Tree – Multi-story – Closed canopy cover	1	14	1
Small Tree – Multi-story – Moderate canopy cover	2	16	1
Small Tree – Multi-story – Open canopy cover	4	20	1
Small Tree – Single-story – Closed canopy cover	0	15	2
Small Tree – Single-story – Moderate canopy cover	1	20	3
Small Tree – Single-story – Open canopy cover	4	22	2
Sapling/Pole – Closed canopy cover	2	14	0
Sapling/Pole – Moderate canopy cover	4	17	1
Sapling/Pole – Open canopy cover	6	21	3
Shrub/seedling – Closed canopy cover	3	20	2
Shrub/Seedling – Open canopy cover	9	14	3
Grass/Forb – Closed canopy cover	9	14	1
Grass/Forb – Open canopy cover	9	17	0

(*Source*: IBIS 2003)

* Attribute values for Forest Structural Conditions

Size (inches dbh)		**Canopy layers (strata)**		**Canopy cover (percent)**	
Giant tree	= ≥30	Multi-story	= >2 strata	Closed	= 70-100
Large tree	= 20-29	Single story	= 1 stratum	Moderate	= 40-69
Medium tree	= 15-19			Open	= 10-39
Small tree	= 10-14				
Sapling/pole	= 1-9				
Shrub/seedling	= <1				
Grass/Forb	= no trees				

Grasslands are essential habitat to at least nine focal wildlife species, and supportive habitat for another 15 focal wildlife (Table 4.12). Four of the nine species – woodland caribou, sage grouse, sharp-tailed grouse, and upland sandpiper – are state classified as endangered or threatened. Seven of the nine species – sage grouse, sharp-tailed grouse, mourning dove, ring-necked pheasant, spotted sandpiper, mule deer, and white-tailed deer – are Habitat Evaluation Procedure (HEP) species for federal hydro-system projects in the Intermountain Province.

Shrublands with shrubbery 1.6-6.5 feet tall, 10-69 percent aerial canopy cover, and 0-25 percent crown decadence are essential habitat to 10 focal wildlife species, and supportive habitat for another 20 focal wildlife (Table 4.12). Of the 10 species, one (pygmy rabbit) is federally-listed as endangered, and three species (pygmy rabbit, sage

grouse, and sharp-tailed grouse) are state classified as endangered or threatened. Eight of the 10 species – sage grouse, sharp-tailed grouse, mourning dove, ring-necked pheasant, spotted sandpiper, mule deer, white-tailed deer, and bobcat – are Habitat Evaluation Procedures (HEP) species for FCRPS projects in the Intermountain Province.

Table 4.12. Relationship between number of focal wildlife species and grassland or shrubland structural condition used during breeding

Grassland/Shrubland Structural Condition*	Close Association	General Association	Present
Grass/Forb – Closed	9	15	2
Grass/Forb – Open	10	15	1
Low Shrub – Closed Shrub Overstory – Old	1	11	1
Low Shrub – Closed Shrub Overstory – Mature	1	12	0
Low Shrub – Closed Shrub Overstory – Seedling/Young	0	12	0
Low Shrub – Open Shrub Overstory – Old	2	17	1
Low Shrub – Open Shrub Overstory – Mature	4	15	1
Low Shrub – Open Shrub Overstory – Seedling/Young	4	14	1
Medium Shrub – Closed Shrub Overstory – Old	4	10	2
Medium Shrub – Closed Shrub Overstory – Mature	4	12	1
Medium Shrub – Closed Shrub Overstory – Seedling/Young	1	16	0
Medium Shrub – Open Shrub Overstory – Old	5	22	1
Medium Shrub – Open Shrub Overstory – Mature	10	20	0
Medium Shrub – Open Shrub Overstory – Seedling/Young	10	20	0
Tall Shrub – Closed Shrub Overstory – Old	3	13	1
Tall Shrub – Closed Shrub Overstory – Mature	3	14	0
Tall Shrub – Closed Shrub Overstory – Seedling/Young	1	16	0
Tall Shrub – Open Shrub Overstory – Old	4	18	1
Tall Shrub – Open Shrub Overstory – Mature	7	15	1
Tall Shrub – Open Shrub Overstory – Seedling/Young	5	19	0

(*Source*: IBIS 2003; Johnson and O'Neil 2001)

* Attribute values for Grassland/Shrubland Structural Conditions

Shrub height (feet)
Tall = >6.5-16.5
Medium = 1.6-6.5
Low = <1.6

Canopy cover (percent)
Closed = 70-100
Open = 10-69

Age class (percent decadence)
Old = 26-100
Mature = ≤25
Seedling/Young= minor

4.6.2 Key Environmental Correlate Assessment

Key environmental correlates (KECs) are specific substrates, habitat elements, and attributes of species' environments that are not represented by overall (macro) habitats and vegetation structural conditions. KECs can include vegetation habitat elements, non-vegetation terrestrial elements, aquatic bodies, substrates, and human elements. Specific examples of KECs include snags, down wood, vegetation strata, rock and soil types, hedgerows and roads. Although KECs are key to species occurrence and population

success, there is little data available within the IBIS system to allow specific evaluation of historic versus current KEC levels, and corresponding population densities or trends.

Human land uses have affected many of the biotic habitat elements, such as the composition of herb, shrub, and tree strata in forested stands. Presumably, in the historical condition, anthropogenic habitat elements, such as roads and structures were few in number. Information on KECs can be compiled at the local level from sources such as vegetation surveys, stand exam data, riparian transects, aerial photography, and stream surveys. This type of information is essential for the evaluation of habitat quality for individual wildlife species. The HEP models used to evaluate the construction and inundation effects of the federal hydropower projects (Creveling and Renfrow 1986, Kuehn and Berger 1992, Martin et al. 1988) rely in part on habitat variables that represent KEC categories. KEC information has been collected at many sites as part of watershed assessment and natural resource planning (for example, refer to USFS 2003). However, this type of information is not available at the scale of the Intermountain Province, or individual subbasins. Therefore, a comparison of historic and current condition KECs is not provided.

4.6.3 Key Ecological Function Assessment

Key ecological functions (KEFs) describe the major ecological roles played by a species. Specific examples include primary excavation of tree cavities or ground burrows, herbivore dispersal of seeds/spores, and nutrient cycling. KEFs are noted for each species based on a classification system of 85 KEF categories (Johnson and O'Neil 2001). Little data exists to quantify the rates or amounts of KEFs. Eight selected KEF categories represent, collectively, the greatest diversity of species across a province or Subbasin; browser; grazer; fungivore; facilitator in nutrient cycling; creator of feeding, roosting, denning, or nesting opportunities; primary creator of structures; primary cavity excavator; and improver or degrader of soil structure/aeration. In the descriptions immediately following, focal wildlife species having close association to wetland or riparian habitats are identified in bold type.

Browsers (woody leaf or stem consumer) and grazers (grass or forb consumer) can change plant community composition or structure. Wild turkey, **snowshoe hare**, white-tailed jackrabbit, **American beaver**, Rocky Mountain elk, mule deer, **white-tailed deer**, and **moose** are focal wildlife browsers that perform this function (Table 4.13). The **Canada goose**, **American wigeon**, **sandhill crane**, white-tailed jackrabbit, **northern bog lemming**, black bear, woodland caribou, mountain goat, and California bighorn sheep are grazers that can also change plant communities.

Fungivores (fungus eater) disseminate beneficial fungi to other parts of the ecosystem. Focal wildlife that produce this function are northern flying squirrel, Rocky Mountain elk, and mule deer.

Facilitators in nutrient cycling help transfer substances that contain carbon, nitrogen, and many other elements. Fifteen focal wildlife accomplish this: **long-toed salamander**, **Coeur d' Alene salamander**, **western toad**, **northern leopard frog**, **wood frog**,

double-crested cormorant, **great blue heron**, **ring-billed gull**, **American beaver**, **long-legged myotis**, **western small-footed myotis**, and five other bat species.

Creators of feeding, roosting, denning, or nesting opportunities, creators of structures, and primary cavity excavators provide life needs to secondary animal users that may number from one to many. **Great blue heron**, gray wolf, grizzly bear, and cougar are focal wildlife species that create feeding, roosting, denning, or nesting opportunities. **Western grebe**, **American white pelican**, **osprey**, bald eagle, northern goshawk, Swainson's hawk, ferruginous hawk, golden eagle, American crow, northern flying squirrel, **American beaver**, and **muskrat** are other focal species that specifically create structures. Focal wildlife that are primary cavity excavators in snags or live trees include six woodpeckers (Lewis', downy, white-headed, three-toed, black-backed, and pileated), black-capped chickadee, pygmy nuthatch, and black bear.

Soil improving animals help structure or aeration typically by digging, while degraders harm soils typically by trampling. Ten species of focal wildlife contribute this service: **long-toed salamander**, **Coeur d' Alene salamander**, **western toad**, **wood frog**, pygmy rabbit, **snowshoe hare**, white-tailed jackrabbit, Washington ground squirrel, **American beaver**, and American badger.

Table 4.13. Number of focal wildlife species that provide selected Key Ecological Functions (kefs) in the Intermountain Province

Key Ecological Function	Amphib.	Bird	Mamm.	Reptile	Total
Browser	0	1	7	0	8
Grazer	0	3	11	0	14
Fungivore	0	0	3	0	3
Facilitator in nutrient cycling	5	3	8	0	16
Creator of feeding, roosting, denning, or nesting opportunities	0	1	3	0	4
Primary creator of structures	0	10	3	0	13
Primary cavity excavator	0	8	1	0	9
Improver of soil structure/aeration	4	0	6	0	10

(*Source*: Johnson and O'Neil 2001)

Functional keystone species are those whose removal would most alter the structure, composition, or function of a community. Critical functional link species are the sole species in a community that perform a specific ecological function to the community. Removal of these species would indicate loss of that function in the community. Reduction or extirpation of populations of functional keystone species and critical functional link species may have unexpected or unknown effects in the community, changing biotic processes and community functioning.

Functional keystone species with little functional redundancy among the118 focal wildlife include: (1) northern flying squirrel, Rocky Mountain elk, and mule deer for their role as fungivores, and (2) great blue heron, gray wolf, grizzly bear, and cougar as creators of feeding, roosting, denning, or nesting opportunities.

Of 118 focal wildlife, 11 are critical functional link species, defined as the sole species to perform a specific key ecological function. The critical functional link species in the Intermountain Province are: long-toed salamander, redhead, great blue heron, black tern, American beaver, snowshoe hare, mink, black bear, grizzly bear, Rocky Mountain elk, and woodland caribou. Appendix E lists the species, the habitats they are associated with, and the key ecological function provided by each species. The pileated woodpecker could also be considered a critical functional link species because it creates large-diameter tree cavities for secondary users such as the wood duck or American marten.

4.6.4 Focal Species Associated with Salmonids

More than 95 percent of the body mass in Pacific salmon is accumulated from the marine environment (Groot and Margolis 1991). This material is transported to and deposited in freshwater habitats where salmon spawn and die. The deposition of nutrients by spawning salmon is estimated to now be only about seven percent of historic levels in watersheds of Washington, Idaho, and Oregon (Gresh et al. 2000). These nutrients are incorporated into the food web via direct consumption of salmon eggs and flesh by fish and invertebrates, and chemical or biological uptake of dissolved materials released from fish metabolism and carcass decomposition (Naiman et al. 2002).

There are 33 focal wildlife species that feed upon salmonids in the Intermountain Province (Table 4.14).

Table 4.14. Number of wildlife species that feed upon salmonids in the Intermountain Province

	Focal Species	All Occurring Species
Amphibians	0	1 (6 % of 17 total)
Birds	19	65 (23 % of 277 total)
Mammals	14	25 (25 % of 101 total)
Reptiles	0	3 (17 % of 18 total)
Total	33	94 (23 % of 413 total)

(*Source*: IBIS 2003)

Seven focal wildlife species have a strong and consistent link to salmonids: bald eagle, American black bear, common merganser, grizzly bear, harlequin duck, osprey, and northern river otter. The link occurs at one or more of the following salmonid life stages:

- Egg or alevin (common merganser and harlequin duck)
- Fry, fingerling, or parr (common merganser, osprey, and northern river otter)
- Smolt, immature adult, or adult (bald eagle, common merganser, harlequin duck, and osprey)
- Spawning adult (bald eagle, black bear, grizzly bear, osprey, and northern river otter)
- Carcass (bald eagle, black bear, grizzly bear, and northern river otter)

Bald eagles take in salmon nutrients immediately before making long migrations. The northern river otter, mink, many species of gull, and other animals utilize these nutrients just before the winter season with its limited food availability. The timing of lactation in mink is known to vary regionally along the Pacific coast, coinciding with the arrival of

salmon (Ben-David et al. 1997). The indirect effects of declining salmon populations on these and other animals are suspected to be profound in terms of survivorship, fecundity, ability to compete, and other life history requirements (Naiman et al. 2002).

4.6.5 Focal Wildlife Species Associated with Aquatic KECs

Association with aquatic habitat correlates indicates an ecological tie between terrestrial wildlife and aquatic habitat. Table 4.15 presents the aquatic KECs that are associated with ten or more focal species of the IMP. Fifty-eight wildlife species are associated with river and stream KECs. Open water, oxbows, and lower perennial aquatic habitats are associated with the greatest numbers of species. Fifty-seven species are associated with vegetated wetlands and forty-four with lakes, ponds, and reservoirs. Changes to aquatic habitats and their habitat correlates can lead to effects on a multitude of wildlife species, in addition to aquatic species such as fish and macroinvertebrates.

Table 4.15. Number of focal wildlife species associated with Key Environmental Correlates in aquatic habitats*

Key Environmental Correlate	Number of Focal Wildlife Species
Water depth	16
Free water derived from any source	18
Rivers and Streams	58
Oxbows	29
Upper perennial	11
Lower perennial	26
Open water	34
Shoreline	20
Emergent vegetation	10
Pools	16
Runs and glides	11
Seeps and springs	24
Ephemeral Pools	24
Sand Bars	14
Gravel Bars	14
Lakes/Ponds/Reservoirs	44
Open water	35
Shoreline	20
Submergent vegetation	13
Emergent vegetation	18
Wetlands/Marshes/Wet Meadows/Bogs/Swamps	57
Riverine	41
Forest	23
Nonforest	13
Islands	13
Seasonal Flooding	21

(*Source*: IBIS 2003) * Only KECs having ≥ 10 associated focal species are listed.

4.7 Terrestrial Resource Mitigation and Enhancement Priorities

4.7.1 Status of Wildlife Mitigation for Federal Hydrosystem Projects

4.7.1.1 Construction Loss Mitigation

The Northwest Power Act of 1980 required that measures be implemented to protect, mitigate, and enhance wildlife affected by the development and operation of FCRPS. Habitat loss assessments for project construction and reservoir inundation were

conducted (Kuehn and Berger 1992, Creveling and Renfrow 1986, Martin et al. 1988). Each assessment reported the number of acres of habitat types that were affected (Table 4.16). Habitat Evaluation Procedures (HEP) studies were performed to determine the value of the lost habitats to various indicator species of wildlife. As described in Section 4.5.2 above, the HEP evaluation species were selected based on their use of specific habitat types and structural elements, and to represent other wildlife species that use those habitats. HEP studies provide results in terms of Habitat Units, which are units of value based on both quality and quantity of habitat. Progress made to date toward implementing the recommended mitigation strategies is summarized below in terms of Habitat Units by species (Table 4.17).

Completion of the FCRPS construction loss mitigation is the highest priority for terrestrial resources in the Intermountain Province (IMP Terrestrial Resources Ad-Hoc Technical Team meeting, May 5, 2003). The riverine, riparian, and wetland areas affected were habitat types with unusually high value to wildlife. Other habitats, such as shrub-steppe, are in relatively low quantity and/or quality in the province.

The projects were constructed in the 1940s and 1950s. Initial mitigation acquisitions occurred after implementation of the Northwest Power Act and completion of the loss assessment studies in the late 1980s and early 1990s. The construction losses continue to affect wildlife each year that they remain unmitigated. The loss estimates presented in the HEP studies do not take into consideration the value of the lost habitats that would have accrued over time from the date of the initial impacts, referred to as "annualization." At this time, the loss estimates are recognized as un-annualized construction losses, and alternative crediting methods continue to be investigated by the Columbia Fish and Wildlife Authority Wildlife Crediting Subcommittee.

From the latest data available, construction loss mitigation for the Albeni Falls Project is estimated at 15.1 percent complete, Grand Coulee is 50.7 percent complete, and Chief Joseph is 16 percent complete. These numbers are updated periodically as new parcels are acquired and as initial HEP evaluations are performed to define the quality of acquired lands. Habitat Units by species were not available at the time of publication for recently acquired parcels for the Albeni Falls Mitigation Project.

Table 4.16. Acres of habitat types affected by federal hydrosystem project construction and inundation

Project	Habitat Type	Acres of Habitat Inundated
Albeni Falls		
	Herbaceous wetland	4,376
	Deciduous forested wetland	2,314
	Shallow open water	**655**
Total		**7,345**
Grand Coulee		
	Islands	1
	Riparian lands	2,000

Project	Habitat Type	Acres of Habitat Inundated
	Shrub-steppe uplands	14,000
	Forested uplands	25,000
	Agricultural lands	15,000
	Barren lands	13,000
Total		**70,000**[1]
Chief Joseph		
	Riverine	2,910
	Shrub-steppe	1,681
	Sand/gravel/cobble	1,184
	Riparian/Macrophyllus draws	658
	Agriculture	366
	Rockland	330
	Ponderosa pine savannah	346
	Island/sandbar	238
	Rock	256
	Mixed forest	106
	Palustrine (ponds/slackwater)	9
Total		**8,084**

(*Sources*: Creveling and Renfrow 1986; Kuehn and Berger 1992; Martin et al. 1988)

[1] This figure includes the rivers' shorelines between the high and low water levels. USBR revised its figure for lands inundated by FDR Reservoir to include only lands above the mean high water level. This revised figure is approximately 56,000 acres (Creveling and Renfrow 1986).

Table 4.17. Status of mitigation for construction and inundation wildlife habitat losses

Project	Species	Habitat Units lost	Habitat Units acquired	Percent complete
Albeni Falls[1]				
	Bald eagle (breeding)	4,508		
	Bald eagle (wintering)	4,365		
	Black-capped chickadee	2,286		
	Canada goose	4,699		
	Mallard	5,985		
	Muskrat	1,756		
	Redhead duck	3,379		
	White-tailed deer	1,680		
Total all loss species		**28,658**	**4,329**	**15.1%**
Grand Coulee[2]	**Species**	**Habitat Units lost**	**Habitat Units acquired**	**Percent complete**
	Canada goose (nesting)	74	-	0.0%
	Mourning dove	9,316	1,001	10.7%
	Mule deer	27,133	19,056	70.2%
	Ruffed grouse	16,502	2,908	17.6%
	Sage grouse	2,746	7,432	100.0%
	Sharp-tailed grouse	32,723	16,854	51.5%

Project	Species	Habitat Units lost	Habitat Units acquired	Percent complete
	White-tailed deer	21,632	9,064	41.9%
	Riparian forest	1,632	234	14.3%
	Riparian shrub	27	131	100.0%
Total all loss species/habitats		**111,785**	**56,680**	**50.7%**
	Species	**Habitat Units lost**	**Habitat Units acquired**	**Percent complete**
Chief Joseph[2]				
	Bobcat	401	132	32.9%
	Canada goose	213	10	4.7%
	Lewis' woodpecker	286	141	49.3%
	Mink	920	137	14.9%
	Mule deer	1,992	409	20.5%
	Ring-necked pheasant	239	-	0.0%
	Sage grouse	1,179	554	47.0%
	Sharp-tailed grouse	2,290	14	0.6%
	Spotted sandpiper	1,255	10	0.8%
	Yellow warbler	58	26	44.8%
Total all loss species		**8,833**	**1,433**	**16.2%**

([1] *Sources*: BPA 2002 and KT 2003; HUs by species not available for all parcels)
([2] *Sources*: BPA 2002 and WDFW 2004b)

Table 4.18 presents the mitigation priorities for habitats and target species in the Upper Columbia River basin, as established in the Council's 1995 Plan and adopted into the 2000 Fish and Wildlife Program. The Upper Columbia River Basin, as defined in the Council's 1995 Wildlife Plan, incorporates both the Intermountain Province and the Mountain Columbia Province. While the Intermountain Province did not establish priorities within the species and habitat types affected by the construction losses, these 2000 Fish and Wildlife Program mitigation priorities could be used in combination with the priorities established in the HEP loss assessments to prioritize projects.

Table 4.18. 2000 Columbia River Basin Fish and Wildlife Program Upper Columbia River Wildlife Mitigation Priorities

Habitat Types - Target Species	Priority
Riparian / River	High
Bald eagle (breeding)	
Black-capped chickadee	
Peregrine falcon	
Shrub-Steppe	High
Sharp-tailed grouse	
Pygmy rabbit	
Sage grouse	
Mule deer	
Wetlands	High
Mallard	
Redhead	

Habitat Types - Target Species	Priority
Islands	Medium
White pelican	
Agricultural Lands	Low
Swainson's hawk	
Ring-necked pheasant	

(*Source*: Council 2000)

4.6.2 Operational Impacts

Operational impact assessments have not yet been conducted for terrestrial resources at any of the three federal dams in the IMP. Assessment and mitigation of operational impacts is the second highest terrestrial resources mitigation priority for the province.

Important factors in the operational loss assessments for federal hydropower system developments in the province include the following:

1) The effects of project operation and reservoir fluctuation on reservoir and river/stream shoreline habitats (Lake Pend Oreille, 226 miles of shoreline; Lake Roosevelt, 530 miles of shoreline; Lake Rufus Woods, 106 miles of shoreline):
    - Direct effects of water fluctuation on wildlife populations, including inundation/desiccation of breeding sites,
    - Effects of water fluctuation on wildlife habitats, particularly wetland extent, type, and species composition,
    - Effects of water fluctuation on shoreline erosion and associated effects to fish and wildlife habitats,
    - Effects to ecosystem of loss of littoral zone vegetation and changes to aquatic bed vegetation, and
    - Effects of change from riverine to reservoir system on ecosystem productivity.
2) Wildlife mortality due to electrical towers and lines.
3) Potential effects to terrestrial resources resulting from transmission line right-of-way maintenance.
4) Ongoing effects of loss of salmonid nutrient base supporting a wide variety of wildlife species and key ecological functions that connect terrestrial with aquatic systems.
5) Ongoing human disturbance of wildlife and wildlife habitat due to project related recreation.

4.7.3 Secondary Effects of Hydroelectric Project Development

Secondary effects of development and operation of the hydroelectric projects include:

1) Overall increase in development and urbanization, due to industry and inexpensive power, and resulting conversion and modification of native wildlife habitats.
2) Increase of irrigated agriculture, particularly in the Lake Rufus Woods Subbasin, due to relatively inexpensive power and water supply.

3) Increased reliance on agriculture and timber industry for employment opportunities, in absence of salmon resource, with associated decrease in habitat quality due to habitat conversion, timber management, and road construction and use.
4) Increased hunting pressure on big game by subsistence and sport hunters in the absence of salmon resource.
5) Increased recreation pressure, both at reservoirs and in surrounding lands as population base increases, hunting pressures increase.
6) Increased number of roads and associated disturbances, barriers to movement, increased mortality, and fragmentation.

These secondary effects of hydropower development, while difficult to quantify, can be far-reaching. Mitigation for these effects in the Intermountain Province is sought as the third tier of priority for terrestrial resources mitigation. Due to the magnitude of the construction mitigation remaining outstanding, it is anticipated that completion of the construction mitigation and assessment and mitigation of operational effects will be the primary terrestrial mitigation activities during the first 10-year plan period. In some cases, the objectives and strategies for the secondary effects mitigation were developed to a less detailed level by the work teams, with the understanding that these would be revised and refined during subsequent planning periods. The secondary effects mitigation will address a broader array of habitats and species than the construction loss assessments. Protection of existing high value habitats and restoration of habitats is viewed as a primary goal.

4.8 Subbasin Assessments

The individual terrestrial resource assessments for the six IMP subbasins are provided in sections 8 (Coeur d'Alene), 16 (Pend Oreille), 24 (Spokane), 32 (Upper Columbia), 40 (San Poil), and 48 (Lake Rufus Woods). The subbasin assessments rely on the IBIS and GAP data to provide estimates of current habitat conditions; however, the historic habitat condition is provided only at the Province level (Section 4), due to the high degree of inaccuracy of these data sets for the historic time period. Information on the management and status of wildlife analysis species, particularly federal and state threatened and endangered species is provided for the Province in Section 4. The subbasin wildlife assessments do not repeat the general status and management information, but provide subbasin-specific information on species occurrence, management programs, and limiting factors.