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34 Upper Columbia Management Plan

The Upper Columbia Subbasin Management Plan was developed by the Upper Columbia Subbasin Work Team. Detailed information describing the membership and formation of the Subbasin Work Teams and the process used to develop and adopt the management plan can be found in Section 1.2. In general, the components of the management plan, including the subbasin vision, guiding principles, and prioritized biological objectives and strategies were developed in a series of six meetings between June 2003 and March 2004.

The Oversight Committee (OC), Technical Coordination Group, and the Upper Columbia Subbasin Work Team worked collaboratively to establish technically sound objectives and strategies that respond to the limiting factors identified in the subbasin assessment. The management plan was developed in several iterations between the OC and Subbasin Work Teams and the Technical Coordination Group.

Biological objectives were developed using a tiered approach. The Council developed the Columbia River Basin biological goals based on the scientific principles identified in the 2000 Fish and Wildlife Plan. The OC established the province level objectives under the Columbia River Basin level goals by responding to recommendations from the GEI Team, the Technical Coordination Group, and the Subbasin Work Teams. The Subbasin Work Teams developed the subbasin level biological objectives and strategies under the Province objectives, with assistance from the Technical Coordination Group and the GEI Team.

34.1 Summary of Upper Columbia Assessment and Limiting Factors

The vision and biological objectives of the management plan reflect what is learned in the assessment and inventory work. In the Upper Columbia Subbasin, the aquatic and terrestrial assessments and inventories are described in detail in sections 30 to 33 of this document. A brief overview of the key limiting factors that are addressed in this management plan is included below.

34.1.1 Upper Columbia Aquatic Assessment and Limiting Factors

Focal species selected in the Upper Columbia Subbasin include white sturgeon, redband/rainbow trout, kokanee salmon, Chinook, Pacific lamprey, and burbot. In addition, the subbasin plan recognizes westslope cutthroat trout as an important native species that still occur in limited geographic areas. Both Chinook and Pacific lamprey were completely lost from the Subbasin when Grand Coulee Dam was constructed without fish passage. White sturgeon are still present in small numbers, but are no longer able to exist in an anadromous life history form. Burbot are a native species, but little is known about their current status. Redband/rainbow and kokanee are native species that are important for recreational and subsistence fisheries.

Overall, the most important limiting factors for fisheries in the Upper Columbia Subbasin resulted from the construction of Grand Coulee Dam and the subsequent loss of

anadromous fishes and the conversion of rivers into reservoirs. The loss of the anadromous life history in the blocked area had a wide range of impacts on the fish, wildlife, and people of the area. These impacts are described in more detail in sections 2.2 and 1.4.1, but include loss of aquatic productivity, loss of fishing opportunity, increased fishing and hunting pressure on other species, and increased stocking of nonnative species. These limiting factors are addressed in the Upper Columbia Subbasin Management Plan through objectives 2A4, 1A5, 2C1, 2D1, and 1A3.

We used QHA modeling to help us assess the limiting factors in the rivers and streams of the Subbasin. The most significant stream habitat limiting factors for the salmonid focal species are listed in Tables 34.1-1, 34.1-2, 34.1-3. In parentheses is the number of reaches or watersheds within the Upper Columbia Subbasin where that particular habitat attribute is the worst habitat-related limiting factor. The numbers in the Objective column correspond to the subbasin objectives that were developed in this management plan to address this limiting factor. Aquatic objectives for the Upper Columbia Subbasin are described in more detail in section 34.3.

Table 34.1-1. Stream habitat conditions that currently most deviate from the reference for adfluvial rainbow trout, Upper Columbia Subbasin. The number in parenthesis is the number of reaches or watersheds within the Upper Columbia Subbasin where that particular habitat attribute is the worst habitat-related limiting factor. The numbers in the Objective column correspond to the subbasin objective that was developed to address this limiting factor in section 34.3.

Adfluvial Rainbow	
Habitat Condition	Objective
Habitat Diversity (13)	1B2, 1A2, 1B7, 1A3
Obstructions (8)	1B2, 1B1
Fine Sediment (5)	1B2, 1B5, 1B4
Riparian Condition (2)	1B2, 1B6, 1A2
Channel Stability (1)	1B2, 1A2, 1B7
Low Flow (1)	1B2, 1B8
High Temperatures (5)	1B2, 1B3
Oxygen (2)	1B2, 1A4, 1A1
Low Temperature (1)	1B2
Pollutants (1)	1B2, 1B4

Table 34.1-2. Stream habitat conditions that currently most deviate from the reference for resident rainbow trout, Upper Columbia Subbasin. The number in parenthesis is the number of reaches or watersheds within the Upper Columbia Subbasin where that particular habitat attribute is the worst habitat-related limiting factor. The numbers in the Objective column correspond to the subbasin objective that was developed to address this limiting factor in section 34.3.

Resident Redband/Rainbow	
Habitat Condition	Objective
Habitat Diversity (32)	1B2, 1A2, 1B7, 1A3
Riparian Condition (22)	1B2, 1B6, 1A2
Obstructions (21)	1B2, 1B1

Resident Redband/Rainbow	
Habitat Condition	Objective
Channel Stability (8)	1B2, 1A2, 1B7
Fine Sediment (8)	1B2, 1B5, 1B4
Low Flow (7)	1B2, 1B8

Table 34.1-3. Stream habitat conditions that currently most deviate from the reference for kokanee, Upper Columbia Subbasin. The number in parenthesis is the number of reaches or watersheds within the Upper Columbia Subbasin where that particular habitat attribute is the worst habitat-related limiting factor. The numbers in the Objective column correspond to the subbasin objective that was developed to address this limiting factor in section 34.3.

Kokanee	
Habitat Condition	Objective
Oxygen (13)	1B2, 1A4, 1A1
Obstructions (5)	1B2, 1B1
Fine Sediment (1)	1B2, 1B5, 1B4
Pollutants (1)	1B2, 1B4
High and Low Flows (1)	1B2, 1B8

Within the Upper Columbia Subbasin habitat diversity was most often the habitat variable that deviated the greatest from the reference condition for both adfluvial and resident redband/rainbow trout streams. Obstructions were also rated as a significant limiting factor for all the salmonid focal species. For kokanee streams, low oxygen was the most common limiting habitat variable.

Other limiting factors have negatively affected native fish populations within the Upper Columbia Subbasin. Large mainstem fish barriers, changes in timing, quality, and quantity of river flows, increased slack water habitat due to the impoundment of the mainstem Columbia River, and nonnative species introductions have all influenced the fish assemblage of the Upper Columbia Subbasin. Management plan objectives designed to address the impacts of Grand Coulee Dam on the Upper Columbia Subbasin include 1A1, 2D1, 1A2, 1A3, 1A4, and 1B4. Management plan objectives designed to address nonnative fish issues include 2A1, 1A5, 2C1.

34.1.2 Upper Columbia Terrestrial Assessment and Limiting Factors

Wildlife in the Upper Columbia Subbasin are limited by habitat quantity and quality. Construction of the Grand Coulee Project affected over 56,000 acres of lands, the majority of which were located in the Upper Columbia Subbasin. In addition, the project had a number of secondary effects to terrestrial resources, including accelerated rates of industrial, agricultural, and residential development leading to loss of habitat; increased hunting pressure on wildlife; and loss of salmonid nutrients to the ecosystem.

Factors that currently limit terrestrial resources in the Subbasin are dominated by loss of habitat and modification of habitat quality as a result of human land uses. Development, including urban, suburban, and agricultural land uses, has converted a total of 12 percent

of native habitats to other cover types. Road densities are high throughout most of the Subbasin and few large tracts of protected lands are present.

Management plan objectives that address the losses from the construction of and inundation from Grand Coulee Dam are Objective 1A and associated sub-objectives. Management plan objectives that address the operational impacts to terrestrial species and habitats are Objective 1B and associated sub-objectives. Objectives 2A and 2B address secondary impacts of the hydropower system and other subbasin effects to terrestrial resources.

34.2 Subbasin Vision

The vision for the Upper Columbia Subbasin is:

We envision the Upper Columbia Subbasin 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.

In addition to the vision, the Upper Columbia Subbasin Work Team members drafted the following guiding principles:

1. Subbasin planning must be consistent with the Northwest Power Act, Northwest Power and Conservation Council's Fish and Wildlife Program and technical guidance for subbasin planning, while complimenting existing plans, policies, and planning efforts.
2. To the extent possible, acknowledge, consider, and incorporate trans-boundary issues and information.
3. Human interests can be balanced with fish and wildlife needs.
4. All people are stewards for future generations.
5. Fish and wildlife species and habitat should be managed in perpetuity based on best available scientific, ecological, and biological principles, not political agendas (for example, use adaptive management).
6. Subbasin plans will address fish and wildlife use for cultural and subsistence purposes.
7. Public involvement and education is essential for successful plan development and implementation.

34.3 Aquatic Objectives and Strategies

The subbasin objectives and strategies are prioritized. Strategies are listed in priority order. The ranking of the objectives are given in parenthesis after the objective. Objectives and strategies also included in the research, monitoring, and evaluation plan are marked with an asterisk.

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 fish losses related to construction and operation of federally licensed and federally operated hydropower projects.

Subbasin Objective 1A1*: Continue to evaluate hydropower impacts to native and focal species. Implement strategies to reduce impacts. (Priority 7)

Strategy a*: Develop and implement plans to reduce hydropower impacts to native and focal species.

Strategy b: Continue to evaluate plans to reduce hydropower impacts to native and focal species.

Strategy c*: Monitor entrainment.

Strategy d: Reduce entrainment at Grand Coulee Dam where desirable.

Subbasin Objective 1A2: Expand stable littoral zones along Lake Roosevelt by 10 percent of lake surface area (at elevation 1,290 ft). (Priority 13)

Strategy a: Use vegetation enhancements, annual seeding and water retention in backwater areas to increase near-shore fish production, increase shoreline stability, and reduce erosion.

Strategy b: Increase water retention time in reservoirs to increase zooplankton production and reduce entrainment of juveniles.

Strategy c: Develop technical and policy working groups that meet regularly to identify problems and implement solutions.

Strategy d: Modify dam operation.

Subbasin Objective 1A3: Assess and implement a nutrient enrichment program for Lake Roosevelt and tributaries. (Priority 14)

Strategy a: Assess feasibility and potential effectiveness of nutrient enrichment in Lake Roosevelt and tributaries.

Strategy b: Use vegetation enhancements, annual seeding and water retention in backwater areas to increase near-shore fish production, increase shoreline stability, and reduce erosion.

Strategy c: Return nutrients lost through the extirpation of salmon stocks consistent with prudent disease and fish health practices and applicable water quality standards.

Strategy d: Increase water retention time in reservoirs to increase zooplankton production and reduce entrainment of juveniles.

Strategy e: Develop technical and policy working groups that meet regularly to identify problems and implement solutions for the Upper Columbia Subbasin.

Subbasin Objective 1A4: Attain total dissolved gases (TDG) below 110 percent saturation for the mainstem Columbia River. (Priority 16)

Strategy a: Participate in technical and policy working groups (for example, TDG and TMDL groups) to develop changes in hydrosystem operations and/or physical attributes of dams to reduce TDG.

Subbasin Objective 1A5: Restore resident fish species (subspecies, stocks and populations) using artificial production. (Priority 4)

Strategy a: Maintain and improve existing artificial production programs/net pen operations.

Strategy b: Use locally adapted native redband rainbow trout stock, where biologically prudent, to supplement natural populations and for harvest applications where emigration can occur.

Strategy c: Develop artificial production capacity for kokanee salmon that utilizes locally adapted stocks.

Strategy d: Develop technical and policy working groups that meet regularly to identify problems and implement solutions for the Upper Columbia Subbasin.

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.

Subbasin Objective 1B1: Restore connectivity of salmonid habitat as appropriate by 2015. (Priority 10)

Strategy a: Develop and utilize consistent barrier criteria and inventory methodology to be used province-wide by agencies/managers.

Strategy b: Inventory and prioritize all fish passage barriers by 2006.

Strategy c: Remove artificial migration barriers as to allow fish passage where prudent to increase habitat quantity for migratory fish species.

Strategy d*: Develop minimum in-stream flow recommendations for fish bearing streams that meet the biological requirements of salmonid fishes, including focal species.

Strategy e: Develop technical and policy working groups (for example, Lake Roosevelt Fisheries Evaluation Program) that meet regularly to identify problems and implement solutions.

Subbasin Objective 1B2: Begin implementation of habitat strategies for addressing identified limiting factors for all focal species and native fishes by 2005. (Priority 1)

Strategy a: Conduct riparian habitat restoration, reduce fine sediment inputs, and increase channel complexity to address known limiting factors for salmonid species.

Strategy b: Utilize or create, where needed, incentive program for private landowners to implement strategies to achieve this objective.

Strategy c: Minimize negative impacts (competition, predation, introgression) to native species from nonnative species and stocks.

Strategy d: Use appropriate methodologies to remove nuisance species.

Strategy e: Limit livestock in riparian areas and replant native riparian plants where needed.

Strategy f: Remove artificial migration barriers to allow fish passage where prudent to increase habitat quantity for migratory fish species.

Strategy g: Decommission roads wherever possible and develop road abandonment plans for federal, state, and Tribal lands to reduce road densities and meet appropriate water quality standards.

Strategy h: Use vegetation enhancements, annual seeding and water retention in backwater areas to increase near-shore fish production, increase shoreline stability, and reduce erosion.

Strategy i: Increase water retention time in reservoirs to increase zooplankton production.

Strategy j: Develop minimum in-stream flow recommendations for fish-bearing streams that meet the biological requirements of salmonid fishes, including subbasin identified focal species.

Strategy k: Develop technical and policy working groups that meet regularly to identify problems and implement solutions for the Upper Columbia Subbasin.

Subbasin Objective 1B3: Maintain and/or achieve stream temperatures below 18°C for all streams that support salmonid populations. (Priority 12)

Strategy a: Conduct riparian habitat restoration, reduce fine sediment inputs, and increase channel complexity to address known limiting factors for salmonid species.

Strategy b: Develop or utilize programs that put water into streams (placing water rights into trust).

Strategy c: Limit livestock in riparian areas and replant native riparian plants where needed.

Strategy d: Develop technical and policy working groups that meet regularly to identify problems and implement solutions for the Upper Columbia Subbasin.

Strategy e: Restore sinuosity to channelized streams.

Strategy f: Remove small dams as appropriate.

Strategy g: Develop minimum in-stream flow recommendations for fish-bearing streams that meet the biological requirements of salmonid fishes, including subbasin identified focal species.

Subbasin Objective 1B4*: Evaluate heavy metal/organic/inorganic contamination as a limiting factor on native, culturally, and economically important species. (Priority 17)

Strategy a*: Conduct the evaluation.

Strategy b: Implement the assessment recommendations.

Subbasin Objective 1B5: Improve or maintain streambed embeddedness between 20 percent and 30 percent in all streams with known salmonid populations. (Priority 11)

Strategy a: Conduct riparian habitat restoration, reduce fine sediment inputs, and increase channel complexity to address known limiting factors for salmonid species.

Strategy b: Limit livestock in riparian areas and replant native riparian plants where needed.

Strategy c: Decommission roads wherever possible and develop road abandonment plans for federal, state and Tribal lands to reduce road densities and meet appropriate water quality standards.

Strategy d: Develop technical and policy working groups that meet regularly to identify problems and implement solutions.

Subbasin Objective 1B6: Enhance, conserve, and protect riparian habitats to the extent that 80 percent of each stream's riparian areas remain intact and functional. (Priority 9)

Strategy a: Conduct riparian habitat restoration, reduce fine sediment inputs, and increase channel complexity to address known limiting factors for salmonid species.

Strategy b: Limit livestock in riparian areas and replant native riparian plants where needed.

Strategy c: Develop technical and policy working groups that meet regularly to identify problems and implement solutions for the Upper Columbia Subbasin.

Strategy d*: Develop criteria for prioritizing streams and/or stream reaches within the Subbasin for habitat improvements, including prioritization of work with identified native red-band rainbow trout habitat, and/or other focal species strongholds.

Strategy e: Decommission roads wherever possible and develop road abandonment plans for federal, state and Tribal lands to reduce road densities and meet appropriate water quality standards.

Subbasin Objective 1B7: Reduce width to depth ratios to < 10 for all streams within the Subbasin, as appropriate. (Priority 18)

Strategy a: Reduce stream bank disturbances from agriculture and recreational practices.

Strategy b: Conduct riparian habitat restoration, reduce fine sediment inputs, and increase channel complexity to address known limiting factors for salmonid species.

Strategy c: Limit livestock from riparian areas and replant native riparian plants where needed.

Strategy d: Utilize or create, where needed, incentive programs for private landowners to implement strategies to achieve this objective.

Strategy e*: Develop criteria for prioritizing streams and/or stream reaches within the Subbasin for habitat improvements, including prioritization of work with identified native red-band rainbow trout habitat, and/or other focal species strongholds.

Strategy f: Develop technical and policy working groups that meet regularly to identify problems and implement solutions for the Upper Columbia Subbasin.

Strategy g: Decommission roads wherever possible and develop road abandonment plans for federal, state and Tribal lands to reduce road densities and meet appropriate water quality standards.

Subbasin Objective 1B8: Protect, maintain, and enhance flows appropriate for all life stages of focal and native fish species in all intermittent, ephemeral, and perennial streams. (Priority 15)

Strategy a: Implement reclamation, reuse, conservation, storage, and ground and surface water recharge.

Strategy b: Ensure all water rights are defined and enforced.

Strategy c*: Develop minimum in-stream flow and target flow recommendations for fish bearing streams, that meet the biological requirements of salmonid fishes, including subbasin identified focal species

Strategy d: Improve enforcement of environmental regulations.

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 (competition, predation, introgression) to native species from nonnative species and stocks.

Province Level Objective 1C4:

Increase cooperation and coordination among stakeholders throughout the province.

In the Upper Columbia Subbasin, objectives that address the topics listed in Province level objectives 1C1 – 1C4 are covered in Category 2, below.

Province Level Objective 1C5:

Meet and exceed the recovery plan goals for federally-listed threatened and endangered fish species.

Subbasin Objective 1C1: 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. (Priority 5)
(Refer to <http://pacific.fws.gov/bulltrout/recovery.htm>)

Strategy a*: Conduct bull trout distribution and habitat suitability surveys.

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.

In the Upper Columbia Subbasin, objectives that address the topics listed in Province level Objective 1C6 are covered in Category 2, below.

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 (competition, predation, introgression) to native species from nonnative species and stocks.

Province Level Objective 2A4:

Increase cooperation and coordination among stakeholders throughout the province.

The following subbasin objectives address province objectives 2A1 – 2A4:

Subbasin Objective 2A1: Protect the genetic integrity of all focal and native fish species throughout the Subbasin. (Priority 2)

Strategy a*: Determine genetic distribution of native focal species (white sturgeon, rainbow/redband trout, Pacific lamprey, burbot, kokanee), identify limiting factors, and develop strategies for addressing limiting factors by 2006.

Strategy b: Use locally adapted, genetically appropriate native stocks, where biologically prudent, to supplement natural populations and for harvest applications where emigration can occur.

Strategy c: Prevent introgression between hatchery and wild stocks through development and implementation of hatchery genetic management plans.

Strategy d: Develop technical and policy working groups that meet regularly to identify problems and implement solutions for the Upper Columbia Subbasin.

Subbasin Objective 2A2: Maintain, restore, and enhance wild populations of native fish, and subsistence species to provide for harvestable surplus. (Priority 3)

Strategy a: Enhance native and focal species populations through habitat improvements.

Strategy b: Prevent introgression between hatchery and wild stocks through development and implementation of hatchery genetic management plans and follow IHOT guidelines.

Strategy c: Implement marking program to identify hatchery-produced trout from wild fish and for potential selective harvest regulations.

Strategy d: Artificially produce sufficient genetically appropriate native and focal species to fulfill management and harvest needs.

Strategy e: Develop technical and policy working groups that meet regularly to identify problems and implement solutions for the Upper Columbia Subbasin.

Strategy f: Expand Chinook salmon and steelhead range and habitat wherever possible. See footnote 2.

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.

Objectives and strategies for Province Level Objective 2B in the Upper Columbia Subbasin were not developed. Objectives related to habitats, and ecosystem conditions and functions are listed under Objective 1B.

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.

The following subbasin objective addresses province objectives 2C1 – 2C2:

Subbasin Objective 2C1: Artificially produce enough fish to supplement consistent harvest to meet state and tribal management objectives. (Priority 6)

Strategy a: Artificially produce sufficient fish to fulfill management and harvest needs.

Strategy b: Preserve and enhance net pen operations.

Strategy c: Enhance white sturgeon populations through habitat improvements and artificial production, in concert with the Upper Columbia White Sturgeon Recovery Plan.

Strategy d: Use genetically appropriate native stocks when possible.

Strategy e: Minimize negative impacts to native species from nonnative species and stocks.

Strategy f: Develop technical and policy working groups that meet regularly to identify problems and implement solutions for the Upper Columbia Subbasin.

Columbia River Basin Level Goal 2D:

Reintroduce anadromous fish into blocked areas where feasible¹.

Province Level Objective 2D1:

Develop an anadromous fish re-introduction feasibility analysis by 2006 for Chief Joseph and by 2015 for Grand Coulee².

Subbasin Objective 2D1*: Evaluate feasibility of anadromous fish re-introduction by 2015, and begin implementation. (Priority 8)

Strategy a*: Conduct the study.

Strategy b: Expand Chinook salmon and steelhead range and habitat wherever possible.

Province Level Objective 2D2:

Develop an implementation plan within five years of feasibility determination for each facility.

¹ OC notes that “where feasible” is actual language from Council’s Program.

² 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 Upper Columbia 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.

34.3.1 Prioritization of Aquatic Objectives

A detailed discussion of the methods used to prioritize the objectives and strategies is found in Section 1.2. In Upper Columbia Subbasin, the members of the Subbasin Work Team contributed to the development of ranking criteria which were based largely on the criteria in the Council's 2000 Fish and Wildlife Program. The ranking criteria were finalized by the IMP OC, but each Work Team was offered the option of adding additional Subbasin specific criteria to the ranking. They recommended that a new subbasin specific criteria be added for the terrestrial that would increase the priority of objectives that are mandated by the Northwest Power Act. Following discussion, the work team decided to add the following subbasin specific criteria:

- Terrestrial subbasin specific criteria – Is the objective/strategy mandated by the Northwest Power Act?

The Work Team rated the criteria for each objective from one to ten. An average ranking was calculated for each respondent for each objective, and then an overall Work Team average was calculated. Strategies were rated high, medium and low. These categories were converted to numeric values: 3, 2, and 1 respectively. The average ranking for each strategy was calculated for each respondent and for the Work Team as a whole.

The Work Team discussed the preliminary prioritization results for the objectives and strategies at the sixth Work Team meeting, and based on a consensus decision agreed to the final prioritization of the objectives and strategies.

The final prioritization of the aquatic objectives for the Upper Columbia Subbasin is displayed in Table 34.3-1.

Table 34.3-1. Ranking of objectives in the Upper Columbia Subbasin, with the limiting factor(s) that the objective was designed to address

Objectives in Priority Order	Strategies in Priority Order	Limiting Factor(s) Addressed
<p>(1) Begin implementation of habitat strategies for addressing identified limiting factors for all focal species and native fishes by 2005. Subbasin Objective 1B2</p>	<p>Strategy a: Conduct riparian habitat restoration, reduce fine sediment inputs, and increase channel complexity to address known limiting factors for salmonid species.</p> <p>Strategy b: Utilize or create, where needed, incentive program for private landowners to implement strategies to achieve this objective.</p> <p>Strategy c: Minimize negative impacts (e.g., competition, predation, introgression) to native species from nonnative species and stocks.</p> <p>Strategy d: Use appropriate methodologies to remove nuisance species.</p> <p>Strategy e: Limit livestock in riparian areas and replant native riparian plants where needed.</p> <p>Strategy f: Remove artificial migration barriers to allow fish passage where prudent to increase habitat quantity for migratory fish species.</p> <p>Strategy g: Decommission roads wherever possible and develop road abandonment plans for federal, state, and Tribal lands to reduce road densities and meet appropriate water quality standards.</p> <p>Strategy h: Use vegetation enhancements, annual seeding and water retention in backwater areas to increase near-shore fish production, increase shoreline stability, and reduce erosion.</p> <p>Strategy i: Increase water retention time in reservoirs to increase zooplankton production.</p> <p>Strategy j: Develop minimum in-stream flow recommendations for fish bearing streams, that meet the biological requirements of salmonid fishes, including subbasin identified focal species.</p> <p>Strategy k: Develop technical and policy working groups that meet regularly to identify problems and implement solutions for the Upper Columbia Subbasin.</p>	<p>Riparian habitat, water quality, nutrients, sediment</p>
<p>(2) Protect the genetic integrity of all focal and native fish species throughout the Subbasin. Subbasin Objective 2A1</p>	<p>Strategy a*: Determine genetic distribution of native focal species (white sturgeon,</p>	<p>Nonnative species, loss of anadromous life history</p>

Objectives in Priority Order	Strategies in Priority Order	Limiting Factor(s) Addressed
	<p>rainbow/redband trout, Pacific lamprey, burbot, kokanee), identify limiting factors, and develop strategies for addressing limiting factors by 2006.</p> <p>Strategy b: Use locally adapted, genetically appropriate native, stocks, where biologically prudent, to supplement natural populations and for harvest applications where emigration can occur.</p> <p>Strategy c: Prevent introgression between hatchery and wild stocks through development and implementation of hatchery genetic management plans.</p> <p>Strategy d: Develop technical and policy working groups that meet regularly to identify problems and implement solutions for the Upper Columbia Subbasin.</p>	
<p>(3) Maintain, restore, and enhance wild populations of native fish, and subsistence species, to provide for harvestable surplus. Subbasin Objective 2A2</p>	<p>Strategy a: Enhance native and focal species populations through habitat improvements.</p> <p>Strategy b: Prevent introgression between hatchery and wild stocks through development and implementation of hatchery genetic management plans and follow IHOT guidelines.</p> <p>Strategy c: Implement marking program to identify hatchery-produced trout from wild fish and for potential selective harvest regulations.</p> <p>Strategy d: Artificially produce sufficient genetically appropriate native and focal species to fulfill management and harvest needs.</p> <p>Strategy e: Develop technical and policy working groups that meet regularly to identify problems and implement solutions for the Upper Columbia Subbasin.</p> <p>Strategy f: Expand Chinook salmon and steelhead range and habitat wherever possible.</p>	<p>Loss of anadromous life history, loss of lotic habitat, habitat degradation</p>
<p>(4) Restore resident fish species (subspecies, stocks and populations) using artificial production. Subbasin Objective 1A5</p>	<p>Strategy a: Maintain and improve existing artificial production programs/net pen operations.</p> <p>Strategy b: Use locally adapted native redband rainbow trout stock, where biologically prudent, to supplement natural populations and for harvest applications where emigration can occur.</p> <p>Strategy c: Develop artificial production capacity</p>	<p>Loss of anadromous life history, loss of lotic habitat, habitat degradation</p>

Objectives in Priority Order	Strategies in Priority Order	Limiting Factor(s) Addressed
	for kokanee salmon that utilizes locally adapted stocks. Strategy d: Develop technical and policy working groups that meet regularly to identify problems and implement solutions for the Upper Columbia Subbasin	
(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	Strategy a*: Conduct bull trout distribution and habitat suitability surveys.	Lack of information
(6) Artificially produce enough fish to supplement consistent harvest to meet state and tribal management objectives. Subbasin Objective 2C1	Strategy a: Artificially produce sufficient fish to fulfill management and harvest needs. Strategy b: Preserve and enhance net pen operations. Strategy c: Enhance white sturgeon populations through habitat improvements and artificial production, in concert with the Upper Columbia White Sturgeon Recovery Plan. Strategy d: Use genetically appropriate native stocks when possible. Strategy e: Minimize negative impacts to native species from nonnative species and stocks Strategy f: Develop technical and policy working groups that meet regularly to identify problems and implement solutions for the Upper Columbia Subbasin.	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*	Strategy a*: Develop and implement plans to reduce hydropower impacts to native and focal species. Strategy b: Continue to evaluate plans to reduce hydropower impacts to native and focal species. Strategy c*: Monitor entrainment. Strategy d: Reduce entrainment at Grand Coulee Dam where desirable.	Lack of information, loss of lotic habitat, water quality degradation
(8) Evaluate feasibility of anadromous fish re-introduction by 2015, and begin implementation. Subbasin Objective 2D1*	Strategy a*: Conduct the study. Strategy b: Expand Chinook salmon and steelhead range and habitat wherever possible.	Loss of anadromous life history
(9) Enhance, conserve, and protect riparian habitats to the extent that 80	Strategy a: Conduct riparian habitat restoration,	Riparian habitat degradation

Objectives in Priority Order	Strategies in Priority Order	Limiting Factor(s) Addressed
<p>percent of each stream's riparian areas remain intact and functional. Subbasin Objective 1B6</p>	<p>reduce fine sediment inputs, and increase channel complexity to address known limiting factors for salmonid species. Strategy b: Limit livestock in riparian areas and replant native riparian plants where needed. Strategy c: Develop technical and policy working groups that meet regularly to identify problems and implement solutions for the Upper Columbia Subbasin. Strategy d*: Develop criteria for prioritizing streams and/or stream reaches within the Subbasin for habitat improvements, including prioritization of work with identified native red-band rainbow trout habitat, and/or other focal species strongholds. Strategy e: Decommission roads wherever possible and develop road abandonment plans for federal, state and Tribal lands to reduce road densities and meet appropriate water quality standards.</p>	
<p>(10) Restore connectivity of salmonid habitat as appropriate by 2015. Subbasin Objective 1B1</p>	<p>Strategy a: Develop and utilize consistent barrier criteria and inventory methodology to be used province wide by agencies/managers. Strategy b: Inventory and prioritize all fish passage barriers by 2006. Strategy c: Remove artificial migration barriers as to allow fish passage where prudent to increase habitat quantity for migratory fish species. Strategy d*: Develop minimum in-stream flow recommendations for fish bearing streams that meet the biological requirements of salmonid fishes, including focal species. Strategy e: Develop technical and policy working groups (for example, Lake Roosevelt Fisheries Evaluation Program) that meet regularly to identify problems and implement solutions.</p>	Fish passage barriers
<p>(11) Improve or maintain streambed embeddedness between 20% and 30% in all streams with known salmonid populations. Subbasin Objective 1B5</p>	<p>Strategy a: Conduct riparian habitat restoration, reduce fine sediment inputs, and increase channel complexity to address known limiting factors for salmonid species. Strategy b: Limit livestock in riparian areas and</p>	Sedimentation

Objectives in Priority Order	Strategies in Priority Order	Limiting Factor(s) Addressed
	replant native riparian plants where needed. Strategy c: Decommission roads wherever possible and develop road abandonment plans for federal, state and Tribal lands to reduce road densities and meet appropriate water quality standards. Strategy d: Develop technical and policy working groups that meet regularly to identify problems and implement solutions.	
(12) Maintain and/or achieve stream temperatures below 18°C for all streams that support salmonid populations. Subbasin Objective 1B3	Strategy a: Conduct riparian habitat restoration, reduce fine sediment inputs, and increase channel complexity to address known limiting factors for salmonid species. Strategy b: Develop or utilize programs that put water into streams (i.e., placing water rights into trust). Strategy c: Limit livestock in riparian areas and replant native riparian plants where needed. Strategy d: Develop technical and policy working groups that meet regularly to identify problems and implement solutions for the Upper Columbia Subbasin. Strategy e: Restore sinuosity to channelized streams. Strategy f: Remove small dams as appropriate. Strategy g: Develop minimum in-stream flow recommendations for fish bearing streams that meet the biological requirements of salmonid fishes, including subbasin identified focal species.	Water temperature
(13) Expand stable littoral zones along Lake Roosevelt by 10% of lake surface area (at elevation 1,290 ft) Subbasin Objective 1A2	Strategy a: Use vegetation enhancements, annual seeding and water retention in backwater areas to increase near-shore fish production, increase shoreline stability, and reduce erosion. Strategy b: Increase water retention time in reservoirs to increase zooplankton production and reduce entrainment of juveniles. Strategy c: Develop technical and policy working groups that meet regularly to identify problems and implement solutions. Strategy d: Modify dam operation.	Productivity, rearing habitat in Lake Roosevelt

Objectives in Priority Order	Strategies in Priority Order	Limiting Factor(s) Addressed
<p>(14) Assess and implement nutrient enrichment program for Lake Roosevelt and tributaries. Subbasin Objective 1A3</p>	<p>Strategy a: Assess feasibility and potential effectiveness of nutrient enrichment in Lake Roosevelt and tributaries.</p> <p>Strategy b: Use vegetation enhancements, annual seeding and water retention in backwater areas to increase near-shore fish production, increase shoreline stability, and reduce erosion.</p> <p>Strategy c: Return nutrients lost through the extirpation of salmon stocks consistent with prudent disease and fish health practices and applicable water quality standards.</p> <p>Strategy d: Increase water retention time in reservoirs to increase zooplankton production and reduce entrainment of juveniles.</p> <p>Strategy e: Develop technical and policy working groups that meet regularly to identify problems and implement solutions for the Upper Columbia Subbasin.</p>	<p>Loss of anadromous life history, nutrients</p>
<p>(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</p>	<p>Strategy a: Implement reclamation, reuse, conservation, storage, and ground and surface water recharge.</p> <p>Strategy b: Ensure all water rights are defined and enforced.</p> <p>Strategy c*: Develop minimum in-stream flow and target flow recommendations for fish-bearing streams, that meet the biological requirements of salmonid fishes, including subbasin identified focal species.</p> <p>Strategy d: Improve enforcement of environmental regulations.</p>	<p>In-stream flows</p>
<p>(16) Attain total dissolved gases (TDG) below 110% saturation for the mainstem Columbia River. Subbasin Objective 1A4</p>	<p>Strategy a: Participate in technical and policy working groups (for example, TDG and TMDL groups) to develop changes in hydrosystem operations and/or physical attributes of dams to reduce TDG.</p>	<p>Water quality degradation</p>
<p>(17) Evaluate heavy metal/organic/inorganic contamination as a limiting factor on native, culturally, and economically important species. Subbasin Objective 1B4*</p>	<p>Strategy a*: Conduct the evaluation.</p> <p>Strategy b: Implement the assessment recommendations.</p>	<p>Water quality degradation, sedimentation</p>
<p>(18) Reduce width to depth ratios to < 10 for all streams within the Subbasin, as appropriate. Subbasin Objective 1B7</p>	<p>Strategy a: Reduce stream bank disturbances from agriculture and recreational practices.</p>	<p>Stream channel instability</p>

Objectives in Priority Order	Strategies in Priority Order	Limiting Factor(s) Addressed
	<p>Strategy b: Conduct riparian habitat restoration, reduce fine sediment inputs, and increase channel complexity to address known limiting factors for salmonid species.</p> <p>Strategy c: Limit livestock from riparian areas and replant native riparian plants where needed.</p> <p>Strategy d: Utilize or create, where needed, incentive programs for private landowners to implement strategies to achieve this objective.</p> <p>Strategy e*: Develop criteria for prioritizing streams and/or stream reaches within the Subbasin for habitat improvements, including prioritization of work with identified native red-band rainbow trout habitat, and/or other focal species strongholds.</p> <p>Strategy f: Develop technical and policy working groups that meet regularly to identify problems and implement solutions for the Upper Columbia Subbasin.</p> <p>Strategy g: Decommission roads wherever possible and develop road abandonment plans for federal, state and Tribal lands to reduce road densities and meet appropriate water quality standards.</p>	

* = Objectives and strategies that are included in the RM&E plan.

34.3.1 Discussion of Aquatic Prioritization

The Upper Columbia Subbasin Work Team ranked the aquatic objectives with the idea that the more broad and general objectives would be ranked as top priority, with more specific objectives ranked lower. The top priority objective is a broad, overarching objective to address habitat limiting factors. As described above, the Upper Columbia Subbasin has experienced a wide array of habitat problems in the mainstem Columbia River (Lake Roosevelt) and tributary streams. This objective would cover a variety of habitat improvement projects that may be needed in the Upper Columbia Subbasin. This priority is in alignment with the Council's 2000 Fish and Wildlife Program which is "a habitat-based program, rebuilding healthy, naturally producing fish and wildlife populations by protecting, mitigating, and restoring habitats and the biological systems within them, including anadromous fish migration corridors."

The second priority for the Upper Columbia Subbasin is to protect the genetic integrity of all focal and native fish species in the Subbasin. The Subbasin Work Team felt knowing the genetic make-up of the native and focal species was key to undertaking appropriate fisheries management in the Subbasin. Some areas of the Subbasin have completed their genetic surveys and are ready to begin other types of projects. However, for those parts of the Subbasin where the fish population genetics remains relatively unknown, this is an important research need.

The third priority is another broad, overarching objective to maintain, restore, and enhance wild populations of native fish and subsistence species to provide a harvestable surplus. This objective was ranked highly because it is general enough to allow for a wide array of beneficial projects to be implemented to meet the objective. The emphasis on native fish follows the guidance in the Council's 2000 Fish and Wildlife Plan, which says that, "Even in degraded or altered environments, native species in native habitats provide the best starting point and direction for needed biological conditions in most cases. Where a species native to that particular habitat cannot be restored, then another species native to the Columbia River Basin should be used. Any proposal to produce or release nonnative species must overcome this strong presumption in favor of native species and habitats and be designed to avoid adverse impacts on native species."

The fourth priority is the restoration of resident fish using artificial production. The sixth priority is to artificially produce enough fish to supplement consistent harvest. These objectives are a necessity in this Subbasin because of the large-scale habitat destruction that has taken place, particularly as a result of Grand Coulee Dam. The Council's 2000 Fish and Wildlife Program acknowledges that, "there is an obligation to provide fish and wildlife mitigation where habitat has been permanently lost due to hydroelectric development. Artificial production of fish may be used to replace capacity, bolster productivity, and alleviate harvest pressure on weak, naturally spawning resident and anadromous fish populations." In addition, the Council's program states, "Harvest can provide significant cultural and economic benefits to the region, and the program should seek to increase harvest opportunities consistent with sound biological management practices."

The fifth priority entails bull trout surveys. Bull trout are important because they are a federally-listed threatened species, but they are rare in the Upper Columbia Subbasin. It is unlikely that this Subbasin will be a significant contributor to bull trout recovery in the Columbia River basin as a whole. However, studies are needed to determine if re-introduction of bull trout is useful or feasible.

Evaluating the feasibility of anadromous fish re-introduction was ranked in the middle of the list (eighth). While this is an important objective, it was recognized by the Work Team that anadromous fish first need to be passed over Chief Joseph Dam. Fish passage at Grand Coulee Dam may not be immediately feasible, but should be pursued.

Objectives that ranked 8 to 18 address specific limiting factors. They are ranked in order of importance in this subbasin.

34.4 Terrestrial Objectives and Strategies

The subbasin objectives and strategies are prioritized. Strategies are listed in priority order. The ranking of the objectives are given in parenthesis after the objective. Objectives and strategies also included in the research, monitoring, and evaluation plan are marked with an asterisk.

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.

Provincial 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.

Upper Columbia 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). (Priority 1)

All of the following objectives that are associated with Subbasin Objective 1A are of equally high 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.

Strategies for 1A1 through 1A9, in priority order:

Strategy a: Maintain wildlife habitat values (Habitat Units) on existing and newly acquired mitigation lands for the life of the project through adequate long-term Operations and Maintenance (O&M) funding.

Strategy b: Protect habitat through fee title acquisition, conservation easements, lease, or management plans that address road closure, livestock, soil, vegetation and unwanted species, fire and fuels, nonnative wildlife, etc.

Strategy c*: Evaluate effectiveness of mitigation by monitoring and evaluating species and habitat responses to mitigation actions.

Provincial 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.

Subbasin Objective 1B*: Quantitatively assess operational impacts of the Grand Coulee Project on terrestrial resources by year 2008.

Objective 1B1*: Quantitatively assess operational impacts of the Grand Coulee Project on terrestrial resources by year 2008. (Priority 2)

Strategy a*: Have an impartial third party contractor conduct the assessment, including but not limited to: fluctuation zone, loss of nutrients in watershed from loss of salmon, recreational effects to terrestrial resources, BPA transmission lines, connectivity, and erosion, etc.

Objective 1B2: Develop mitigation plan by year 2010 and implement initial mitigation by year 2015. (Priority 3)

Strategy a: Develop the mitigation plan.

Strategy b: Implement the mitigation plan.

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.

Provincial 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.

Objective 2A1: Maintain bald eagle at or above present levels (2004) in the Upper Columbia Subbasin. (Priority 5)

Strategy a: Maintain secure bald eagle breeding and wintering habitats.

Strategy b*: Identify and map current or potential winter perching and foraging habitat.

Strategy c*: Continue or increase monitoring of nesting and wintering bald eagles.

Objective 2A2: Increase sharp-tailed grouse populations within the Intermountain Province 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, San Poil, and Spokane subbasins.) (Priority 4)

Strategy a*: Assess and determine limiting factors on sharp-tailed grouse populations within the IMP and associated subbasins by 2006.

Strategy b: Develop, prioritize, and implement projects and/or research to address identified sharp-tailed grouse limiting factors.

Strategy c*: Assess and, if deemed needed, limit/restrict nonnative invasive species interaction/competition and habitat degradation.

Objective 2A3: Increase blue-grouse populations by 20 percent in the Upper Columbia and adjacent subbasins/provinces by year 2010. (Priority 9)

Strategy a*: Assess and determine specific factors limiting/affecting blue-grouse populations in the Upper Columbia Subbasin and adjacent subbasins/provinces by year 2006.

Strategy b: Develop, prioritize, and implement projects and/or research to address identified blue-grouse limiting factors by year 2008.

Strategy c: Utilize fire, fire sequence, forest management, or other techniques to enhance, restore, or maintain large blocks of mature, closed canopy ponderosa pine and western larch.

Objective 2A4: Maintain or increase golden eagle populations to at, or above, 2004 levels. (Priority 8)

Strategy a*: Determine limiting factors for golden eagles by 2006.

Strategy b: Develop, prioritize, and implement projects and/or research to address identified limiting factors for golden eagles by 2007.

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.

Province Level 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.

Province Level 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.

Objective 2B1*: 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) 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. (Priority 7)

Strategy a: Protect, restore, and provide connectivity of riparian habitat and cottonwood galleries.

Strategy b: Utilize prescribed fire, forest management, or other applicable techniques to enhance, restore, and/or maintain large blocks of mature stands of Ponderosa pine and western larch.

Strategy c: Eliminate or reduce undesirable invasive vegetation.

Strategy d: Provide incentive program for private landowners to actively manage specific habitats to accomplish Objective 2B1.

Strategy e: Acquire land through purchase or utilize conservation easements to protect key habitats.

Strategy f: Limit livestock in riparian areas and replant native riparian plants where needed.

Strategy g: Ensure protection of rock/cliff/talus/cave habitat through conservation easement, management plans, etc.

Strategy h: Maintain forest shrubs, forbs, grasses, and saplings to provide foraging habitat in spring, summer and fall on key habitat areas.

Strategy i: Develop technical and policy working groups that meet regularly to identify problems and implement solutions for the Upper Columbia Subbasin.

Objective 2B2: Increase quantity and quality of mule deer habitats, particularly winter and spring ranges. (Priority 6)

Strategy a: Secure, protect, and enhance winter and spring ranges.

Strategy b: Restore grasses and forbs where noxious weeds have impacted mule deer habitat.

Strategy c: Manage forests for a variety of successional stages to meet mule deer habitat needs on a site-specific basis; use fire and forest management to increase quality and quantity of shrubs and mature forest cover.

Strategy d: Identify specific factors limiting/affecting mule deer populations in the Upper Columbia Subbasin.

Strategy e: Increase the area of aspen stands.

Strategy f: Manage motorized traffic in critical mule deer spring and winter ranges.

Strategy g: Improve enforcement of applicable regulations.

34.4.1 Prioritization of Terrestrial Objectives and Strategies

A detailed discussion of the methods used to prioritize the objectives and strategies is found in Section 1.2. In Upper Columbia Subbasin, the members of the Subbasin Work Team contributed to the development of ranking criteria which were based largely on the criteria in the Council's 2000 Fish and Wildlife Program. The ranking criteria were finalized by the IMP OC, but each Work Team was offered the option of adding additional subbasin specific criteria to the ranking. They recommended that a new subbasin specific criterion be added for the terrestrial that would increase the priority of objectives that are mandated by the Northwest Power Act. Following discussion, the Work Team decided to add the following subbasin specific criteria:

- Terrestrial subbasin specific criteria – Is the objective/strategy mandated by the Northwest Power Act?

The Work Team rated the criteria for each objective from one to ten. An average ranking

was calculated for each respondent for each objective, and then an overall Work Team average was calculated. Strategies were rated high, medium and low. These categories were converted to numeric values: 3, 2, and 1 respectively. The average ranking for each strategy was calculated for each respondent and for the Work Team as a whole.

The Work Team discussed the preliminary prioritization results for the objectives and strategies at the sixth Work Team meeting, and based on a consensus decision agreed to the final prioritization of the objectives and strategies.

The final prioritization of the terrestrial objectives and strategies for the Upper Columbia Subbasin is displayed in Table 34.4-1.

Table 34.4-1. Ranking of terrestrial objectives and strategies in the Upper Columbia Subbasin, with the limiting factor(s) that the objective was designed to address.

Objectives in priority order	Strategies	Limiting Factor(s) Addressed
Provincial Priority 1 – Mitigate for construction and inundation losses		
<p>(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</p> <p>Sub-objectives listed below are all of equal priority.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>Objective 1A4: Protect, enhance, or restore riparian forest Habitat Units to address habitat losses resulting from construction of the Grand Coulee Project.</p> <p>Objective 1A5: Protect, enhance, or restore riparian shrub Habitat Units to address habitat losses resulting from construction of the Grand Coulee Project</p> <p>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.</p> <p>Objective 1A7: Protect, enhance, or restore sage grouse Habitat Units to address shrub-steppe habitat losses resulting</p>	<p>Strategy a: Maintain wildlife habitat values (Habitat Units) on existing and newly acquired mitigation lands for the life of the project through adequate long-term Operations and Maintenance (O&M) funding.</p> <p>Strategy b: Protect habitat through fee title acquisition, conservation easements, lease, or management plans that address road closure, livestock, soil, vegetation and unwanted species, fire and fuels, nonnative wildlife, etc.</p> <p>Strategy c*: Evaluate effectiveness of mitigation by monitoring and evaluating species and habitat responses to mitigation actions.</p>	<p>Terrestrial resource losses incurred from construction and inundation of the Grand Coulee Project</p>

Objectives in priority order	Strategies	Limiting Factor(s) Addressed
<p>from construction of the Grand Coulee Project.</p> <p>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.</p> <p>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.</p>		
Provincial Priority 2 – Quantify and mitigate for operational impacts		
<p>(2) Quantitatively assess operational impacts of the Grand Coulee Project on terrestrial resources by year 2008. Objective 1B1*</p>	<p>Strategy a*: Have an impartial third party contractor conduct the assessment, including but not limited to: fluctuation zone, loss of nutrients in watershed from loss of salmon, recreational effects to terrestrial resources, BPA transmission lines, connectivity, and erosion, etc.</p>	<p>Lack of data on operational impacts</p>
<p>(3) Develop mitigation plan by year 2010 and implement initial mitigation by year 2015. Objective 1B2</p>	<p>Strategy a: Develop the mitigation plan.</p> <p>Strategy b: Implement the mitigation plan.</p>	<p>Need to mitigate operational impacts</p>
Provincial Priority 3 – Mitigate for secondary effects of FCRPS and other subbasin effects		
<p>(4) Increase sharp-tailed grouse populations within the Intermountain Province 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, San Poil, and Spokane subbasins.) Objective 2A2</p>	<p>Strategy a*: Assess and determine limiting factors on sharp-tailed grouse populations within the IMP and associated subbasins by 2006.</p> <p>Strategy b: Develop, prioritize, and implement projects and/or research to address identified sharp-tailed grouse limiting factors.</p> <p>Strategy c*: Assess and, if deemed needed, limit/restrict nonnative invasive species interaction/competition and habitat degradation.</p>	<p>Secondary effects of FCRPS and other subbasin effects to sharp-tailed grouse populations</p>
<p>(5) Maintain bald eagle at or above present levels (2004) in the Upper Columbia Subbasin. Objective 2A1</p>	<p>Strategy a: Maintain secure bald eagle breeding and wintering habitats.</p> <p>Strategy b*: Identify and map current or potential winter perching and foraging habitat.</p>	<p>Secondary effects of FCRPS and other subbasin effects to bald eagles</p>

Objectives in priority order	Strategies	Limiting Factor(s) Addressed
	<p>Strategy c*: Continue or increase monitoring of nesting and wintering bald eagles.</p>	
<p>(6) Increase quantity and quality of mule deer habitats, particularly winter and spring ranges. Objective 2C2</p>	<p>Strategy a: Secure, protect, and enhance winter and spring ranges.</p> <p>Strategy b: Restore grasses and forbs where noxious weeds have impacted mule deer habitat.</p> <p>Strategy c: Manage forests for a variety of successional stages to meet mule deer habitat needs on a site-specific basis; use fire and forest management to increase quality and quantity of shrubs and mature forest cover.</p> <p>Strategy d: Identify specific factors limiting/affecting mule deer populations in the Upper Columbia Subbasin.</p> <p>Strategy e: Increase the area of aspen stands.</p> <p>Strategy f: Manage motorized traffic in critical mule deer spring and winter ranges.</p> <p>Strategy g: Improve enforcement of applicable regulations.</p>	<p>Secondary effects of FCRPS and other subbasin effects to mule deer habitats</p>
<p>(7) 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) 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*</p>	<p>Strategy a: Protect, restore, and provide connectivity of riparian habitat and cottonwood galleries.</p> <p>Strategy b: Utilize prescribed fire, forest management, or other applicable techniques to enhance, restore, and/or maintain large blocks of mature stands of Ponderosa pine and western larch.</p> <p>Strategy c: Eliminate or reduce undesirable invasive vegetation.</p>	<p>Secondary effects of FCRPS and other subbasin effects to priority habitats</p>

Objectives in priority order	Strategies	Limiting Factor(s) Addressed
	<p>Strategy d: Provide incentive program for private landowners to actively manage specific habitats to accomplish objective 2B1.</p> <p>Strategy e: Acquire land through purchase or utilize conservation easements to protect key habitats.</p> <p>Strategy f: Limit livestock in riparian areas and replant native riparian plants where needed.</p> <p>Strategy g: Ensure protection of rock/cliff/talus/cave habitat through conservation easement, management plans, etc.</p> <p>Strategy h: Maintain forest shrubs, forbs, grasses, and saplings to provide foraging habitat in spring, summer and fall on key habitat areas.</p> <p>Strategy i: Develop technical and policy working groups that meet regularly to identify problems and implement solutions for the Upper Columbia Subbasin.</p>	
<p>(8) Maintain or increase golden eagle populations to at, or above, 2004 levels. Objective 2A4</p>	<p>Strategy a*: Determine limiting factors for golden eagles by 2006.</p> <p>Strategy b: Develop, prioritize, and implement projects and/or research to address identified limiting factors for golden eagles by 2007.</p>	<p>Secondary effects of FCRPS and other subbasin effects to golden eagles</p>
<p>(9) Increase blue-grouse populations by 20% in the Upper Columbia and adjacent subbasins/provinces by year 2010. Objective 2A3</p>	<p>Strategy a*: Assess and determine specific factors limiting/affecting blue-grouse populations in the Upper Columbia Subbasin and adjacent subbasins/provinces by year 2006.</p> <p>Strategy b: Develop, prioritize, and implement projects and/or research to address identified</p>	<p>Secondary effects of FCRPS and other subbasin effects to blue grouse populations</p>

Objectives in priority order	Strategies	Limiting Factor(s) Addressed
	<p>blue-grouse limiting factors by year 2008.</p> <p>Strategy c: Utilize fire, fire sequence, forest management, or other techniques to enhance, restore, or maintain large blocks of mature, closed canopy ponderosa pine and western larch.</p>	

* = Objectives and strategies that are included in the RM&E plan.

34.4.2 Discussion of Terrestrial Prioritization

The ranking of the terrestrial objectives directly reflects the priorities established in the Council's 2000 Fish and Wildlife Program. The overall top priority terrestrial objective for the Upper Columbia Subbasin is to fully mitigate for terrestrial resource losses incurred from construction and inundation of the Grand Coulee Project per the requirements of the Northwest Power Act. Within this objective, there are nine sub-objectives that have not been prioritized. All the sub-objectives are considered to be of equal importance.

The next level of priority is quantifying and mitigating for the operational impacts of the FCRPS per the requirements of the Northwest Power Act. In the Upper Columbia Subbasin, no assessment of operational impacts has been conducted. Therefore, this is the first priority in this category of objectives. Once the impacts have been identified, the next priority will be to develop a mitigation plan by 2010 and to implement the mitigation plan by 2015.

The third priority in the IMP is to mitigate for secondary effects of the hydrosystem development in combination with other subbasin effects to terrestrial resources. In this category of objectives, the Upper Columbia Subbasin Work Team ranked increasing sharp-tailed grouse as the highest priority. Bald eagles, as a federally-listed threatened species, are the next priority. Mitigating for secondary losses and subbasin effects to mule deer habitat is the next priority as there are considerable concerns about mule deer in this Subbasin. Mitigating for secondary losses to priority habitats, golden eagles and blue grouse populations are the next priority.