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NWPCC Review Draft

Flathead River Subbasin Executive Summary

A report prepared for the Northwest Power and Conservation Council

A Summary of Flathead River Subbasin Assessment, Inventory, and Management Plan

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Reservation of Rights

A number of governments and agencies participated in the development of this Flathead Subbasin Plan, Part I (Assessment Volume), Part II (Inventory Volume), and Part III (Management Plan Volume), its appendices, and electronically linked references and information (hereafter Plan). The primary purpose of the Plan is to help direct Northwest Power Planning Council funding of projects that respond to impacts from the development and operation of the Columbia River hydropower system.

Nothing in this Plan, or the participation in its development, is intended to, and shall not be interpreted to, compromise, influence, or preclude any government or agency from carrying out any past, present, or future duty or responsibility which it bears or may bear under any authority.

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This Plan is the result of a group effort. Nothing in it or the participation in its development should be interpreted as constituting unqualified acceptance or endorsement of the Plan, its appendices, or any electronically linked reference or information by any party.

Confederated Salish and Kootenai Tribes and Montana Fish, Wildlife & Parks. 2003. Flathead Subbasin Plan Assessment: Executive Summary. NWPCC. Portland, OR

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Executive Summary

Subbasin Assessment

What is the Assessment?

The primary purpose of the assessment is to bring together and synthesize technical information so that it can be used to develop the biological objectives that form the foundation of the management plan. The assessment begins with an overview of the subbasin environment. It examines in some detail the major biomes found in the subbasin—aquatic, riparian/wetland, grassland, and coniferous forest. Each of these biomes is evaluated in terms of ecological function and process and how human activities have affected those functions and processes. For each biome we also describe the current condition and several reference conditions. The assessment also examines the status of two aquatic focal species (westslope cutthroat trout and bull trout) and the status of the environment for target wildlife species. The assessment also includes a detailed aquatic evaluation of each 6th-field HUC in the subbasin and a terrestrial assessment of various units and subunits within each of five terrestrial biomes. It includes a ranking of the restoration potential and protection value of each 6th field HUC and each subunit. The last chapter is an interpretation and synthesis of the findings, and that sets the stage for the objectives that make up the bulk of the management plan, which is part III of the subbasin plan. A brief summary of each of the major sections of the assessment follows.

Overview

The Flathead Subbasin of northwestern Montana and the southeastern corner of British Columbia constitutes the northeastern-most drainage of the Columbia River. Headwater tributaries originate in Glacier National Park, the Bob Marshall Wilderness, and Canada. The river empties into the Clark Fork River at Paradise, Montana. East to west, the subbasin stretches roughly 90 miles, north to south just over 200 miles. It encompasses approximately 5.8 million acres.

Included in the Flathead Subbasin's almost 10,000 square miles are virtually all of Flathead and Lake counties and part of Missoula County; the Flathead Indian Reservation; the west half of Glacier National Park; parts of four wilderness areas; millions of acres of forest land under federal, provincial, state, tribal, and industrial management; and thousands of acres of privately owned land.

Of the 5.8 million acres in the subbasin, 389,227 (7 percent) are in British Columbia (BC). Almost all of the land in the Canadian portion of the subbasin

is provincial Crown land administered by the BC Ministry of Forests. Forty-five percent of the U.S. portion of the subbasin is under management by the U.S. Forest Service, 12 percent is managed by the National Park Service as Glacier National Park, 12 percent is owned by the Confederated Salish and Kootenai Tribes, 4 percent is owned by the State of Montana, 5 percent is corporate timberland, and 21 percent is in other private ownership.

Climate

The Flathead Subbasin is dominated by a mix of Pacific maritime and continental climatic conditions, which helps to enrich its biodiversity. Precipitation ranges from 18 to over 100 inches (460 to over 2,540 mm); most of the precipitation that arrives autumn, winter, and spring falls as snow; summers tend to be dry. The climate is classified as cool temperate with maritime influence. Temperature averages 36 to 45 °F. While maritime influences are present and winters are relatively mild, outbreaks of arctic air can occur frequently during winter. The growing season ranges from 45 to 120 days.

Geology

The geology of the subbasin is predominantly Precambrian metasedimentary rocks of the Belt supergroup, with glacial deposits and valley fill. Landforms include glaciated mountains, glacial moraines, large glacial troughs, and glacial and lacustrine basins. Elevation ranges from 2,000 to 7,000 ft (610 to 2,135 m). Belt rocks are characteristically deficient of nutrients (Stanford and Ellis 1988). Although there are limited areas of much younger and richer strata in headwater reaches of the three forks of the Flathead (Stanford and Hauer 1992), the subbasin's bedrock geology contributes little in the way of dissolved ions, nutrients, and suspended particulates to streams. Because of this bedrock geology, water chemistry is strongly a calcium bicarbonate water type—very well buffered and with very low acid content. There is little change in basic water chemistry in a downstream direction (Makepeace, CSKT pers. comm. 2003).

Hydrology

The Flathead River has a mean annual discharge of nine million acre-feet and a mean daily discharge at Perma, MT of just under 12,000 cubic feet per second. Mountains in the subbasin receive about 80% of their precipitation as snow. The melting of this snowpack during the spring and summer months produces a

characteristic "snowmelt hydrograph." Peak runoff occurs between April and June. The North, Middle, and South Fork contribute 32 percent, 26 percent, and 25 percent of the inflow into Flathead Lake, respectively, and the three forks together supply about 80 percent of the total water carried within the system.

Hungry Horse Dam, completed in 1952, is located 5.2 miles upstream from the confluence of the South Fork and the mainstem of the Flathead River. Hungry Horse Reservoir is 35 miles long and covers 23,782 acres at full pool. The dam, operated by the Bureau of Reclamation (BOR), provides flood control, electrical power production, and water storage capability for the Columbia River system. Annual operations for power and flood control result in a reservoir draft toward minimum pool by mid-April and refill toward full pool (elevation 3,560 feet) during July. The maximum reservoir drawdown on record was 188 feet. Hungry Horse Dam has a peak capacity of 320,000 kilowatts. Kerr Dam, located 4.2 miles downstream of the natural lake outlet, was built in 1938 and is currently operated by Pennsylvania Power and Light Montana (PPLM). The dam regulates the top three meters of water and is operated to provide flood control and power production. Its peak capacity is 180,000 kilowatts. The dam is now operated as a base-load facility. Presently, flood control and recreation require the lake level to be dropped to the low pool elevation of 2,883 feet by April 15, refilled to 2,890 feet by May 30, raised to full pool elevation of 2,893 feet by June 15, and held at full pool through Labor Day (Deleray et al. 1999).

On the Flathead Indian Reservation, the Flathead Agency Irrigation District (FAID) consists of an intricate network of natural channels, irrigation canals, and storage reservoirs that retain spring runoff and distribute the water to cultivated lands. Approximately 1,930 km of irrigation canals and 17 reservoirs exist under FAID.

Vegetation

Vegetation of the Flathead Subbasin is typical of the Northern Rocky Mountain Forest-Steppe-Coniferous Forest-Alpine Meadow Province (Bailey et al. 1994). Engelmann spruce and subalpine fir occur in subalpine areas and give way to forests of western redcedar, Douglas-fir, western white pine, western larch, grand fir, and western ponderosa pine at lower elevations. In the southern part of the subbasin, grasslands dominated by wheatgrasses, fescues, and introduced bluegrasses occur in valley bottoms. River floodplains support ponderosa pine, Rocky Mountain juniper, Douglas-fir, black cottonwood, aspen, paper birch, willow, chokecherry, service berry, alder, dogwood, rose, and snowberry. Willows, alder, aspen, dogwood, cattails, meadow grasses, and sedges dominate wetlands.

Species at Risk

The Federal government has classified eight species of plant and animals that occur within the Flathead Subbasin as threatened or endangered under the Endangered Species Act (ESA). The peregrine falcon was formerly endangered but was delisted in 1999 and is now considered recovered subject to five years of monitoring. ESA listed species in the subbasin include the gray wolf (E), grizzly bear (T), Canada lynx (T), bald eagle (T), whooping crane (E), bull trout (T), Spalding's Catchfly (T), Water Howellia (T). A number of other species in the subbasin are considered species of special concern or sensitive species by the lead agencies.

Focal and Target Species

As part of this assessment, fish and wildlife managers in the subbasin were asked to develop a subset of fish and wildlife species that will be used to characterize the status, functions and management actions in the subbasin. Members of the Flathead Subbasin Technical Team selected bull trout and westslope cutthroat trout as the aquatic focal species. The Team selected these two species based upon their population status and their ecological and cultural significance.

For the terrestrial environment, the Technical Team took a multi-species approach as opposed to identifying individual focal species. The team identified 77 terrestrial species, which we call target species. These were chosen because: (1) they have been designated as a Federal endangered or threatened species or have been otherwise designated a priority species for conservation action, (2) they play an important ecological role in the subbasin (for example as a functional specialist or as a critical functional link species), or (3) they possess economic or cultural significance to the people of the Flathead Subbasin.

Characterization of Biomes

For the purposes of this assessment, we divided the subbasin into six biomes: aquatic, riparian, wetland, grassland/shrub, xeric forest, and mesic forest. We describe the critical functional processes that occur in each of these biomes and how humans have altered those processes. We also describe four reference conditions: presettlement (1850), present (2004), future potential (2050), and future no action (2050 with no change in current management).

Aquatic Biome

During presettlement times aquatic and hydrologic processes and functions were intact, and while headwater areas across large parts of the subbasin (Glacier Park and wilderness and roadless areas) remain relatively pristine, aquatic habitats in the roaded portions of the subbasin have been impacted to varying degrees by the cumulative effects of logging, road building, dams, grazing, irrigation and cropland agriculture, and urban and suburban development. The magnitude and persistence of these impacts varies widely. Dams have also impacted Rivers and some tributaries; the most notable of these dams are Hungry Horse and Kerr.

One of the chief impacts to the aquatic biome has been an increase in the amount of fine sediments entering streams. Past forestry practices have increased sediment in streams, increased peak flows, caused hydrograph and thermal modifications, and contributed to the loss of instream woody debris and channel stability. Although the heaviest timber harvest occurred in the 1960s and 1970s, past forest practices continue to impact aquatic habitats (USFWS 2002a).

Other impacts to the aquatic biome come from changes associated with population growth. Flathead and Lake counties are among the fastest growing in Montana, and additional residential development of corporate timberlands is expected in the future. Much of the development occurs along streams and the changes have interfered with fish spawning and generally degraded the quality of stream habitats for native fish and other aquatic life. This has affected the food base for the many wildlife species. In some streams, human-caused barriers such as road culverts, dewatered stream reaches, and irrigation diversions have blocked fish migrations.

Another major impact, perhaps the most significant single impact, on headwater aquatic habitats has been the introduction of non-native species. Nonnative species now threaten the diversity and abundance of native species and the ecological stability of ecosystems in many areas of the subbasin.

Riparian/Wetland Biome

The Flathead drainage supports one of the greatest and most diverse concentrations of wetlands in the Rockies, including peatlands, oxbow ponds, springs and seeps, complexes of pothole ponds, vernal pools, and beaver ponds (Cooper et al. 2000).

Prior to European settlement, ecological functions and processes in riparian and wetland areas were intact. Over the past 100 years in unprotected parts of the subbasin, humans have reduced beaver populations; logged, cleared, and grazed riparian zones; filled wetlands; built dams; and initiated erosion control efforts, irrigation withdrawals, and road building. This has caused the loss of structural elements, floodplain processes, and vegetative diversity. It has eliminated thermal cover from areas, reduced streambank stability, and reduced vegetative cover and vigor. The result is wider and more open channels with lower, warmer, more turbid summer flows, more extensive ice conditions in winter, and flashier more turbid flows during runoff. Dams have inundated riparian habitats, eliminated flood pulses, changed stream temperatures, and created unvegetated varial zones. This in turn has adversely affected the fish and wildlife populations.

Grasslands Biome

During presettlement times, natural fire frequencies cleared organic debris, encouraged perennial grasses, and played key thermal and nutrient cycling roles. Over the past one hundred years fires have been mostly excluded, and there have been invasions of woody and exotic plant species. Many sites have been overgrazed. Large areas have been converted to cropland or other uses. Soil crusts have been disturbed, adversely affecting the rates of nitrogen fixation and soil stability, fertility, structure, and water infiltration. Native plant species have been significantly reduced, as has the value of grasslands to native wildlife.

Coniferous Forest Biome

During presettlement times, low-elevation dry forests were characterized by large, widely spaced ponderosa pine trees maintained by frequent, low-intensity fires. At mid and higher elevations, cool, moist sites supported fire dependent, seral old-growth trees. Wildlife species easily moved across large habitat blocks. Over the last 100 years, large trees have been harvested and fires have been excluded. Shade tolerant species, more prone to disease and lethal fires, have increased. Habitats have been roaded. Now, stands tend to be overstocked compared to historic conditions, especially on drier sites. Fire regimes have shifted to more lethal fires. Patch sizes are smaller, and the amount of interior habitat is less than historic conditions. Existing forests are more fragmented.

Focal Species Descriptions

Bull Trout

Within the Clark Fork Recovery Unit the historical distribution of bull trout is considered to be relatively intact, with some notable exceptions in the headwaters. However numbers have been reduced and some remaining populations are highly fragmented (USFWS 2002a).

In a HUC-by-HUC assessment of all Flathead Subbasin 6th-field HUCs, our technical team concluded that of the habitat attributes considered most important to resident salmonids, the four most limiting for bull trout in streams are riparian condition, fine sediment, channel stability, and habitat diversity, in that order. In lakes they are migratory obstructions, pollutants, shoreline condition, and hydraulic regime. This phase of the HUC assessment considered only habitat factors.

Major impacts affecting bull trout stem from dams, past forest practices, grazing, agricultural practices, roads, mining, residential development, and past fish fisheries management activities.

Westslope Cutthroat Trout

In the U.S. portion of the Flathead, westslope cutthroat occur in about 2,609 linear miles of stream habitat. Approximately 66% of these stream miles have stocks that are considered abundant. Data from the Interior Columbia Basin Ecosystem Management Project (ICBEMP) indicate westslope cutthroat trout stocks are strong or predicted strong in 55 HUCs, depressed or predicted depressed in 220 HUCs, and absent or predicted absent in the remaining 37 HUCs that collectively constitute the Flathead River drainage.

Shepard et al. (2003) report that among the occupied stream miles surveyed in the Flathead Subbasin, stocks of genetically unaltered westslope cutthroat trout occupy 740 miles; stocks that are less than 10% introgressed occupy 293.7 miles; stocks between 25% and 10% introgressed occupy 58.1 miles; and stocks greater than 25% introgressed occupy 56.1 miles. Westslope cutthroat trout stocks inhabiting 1,160 miles of stream are suspected unaltered (with no record of stocking or contaminating species present), and stocks inhabiting 441.7 miles are potentially altered (potentially hybridized with records of contaminating species being stocked or occurring in stream). Hybridized and pure populations coexist in 218.2 stream miles.

The Montana Chapter of the American Fisheries Society (MTAFS) identified the following four factors as the primary reasons for the decline of

westslope cutthroat trout in Montana: over exploitation, genetic introgression and competition from nonnative fish species, and habitat degradation. In their Flathead Lake and River Fisheries Co-Management Plan (2000) MFWP and CSKT identified the same four factors as the MTAFS, but went on to conclude that the greatest threat to westslope cutthroat trout persistence in the Flathead Subbasin is hybridization with nonnative rainbow trout and Yellowstone cutthroat trout.

In a HUC-by-HUC assessment of all Flathead Subbasin 6th-field HUCs, our technical team concluded that of the habitat attributes considered most important to resident salmonids, the four most limiting for westslope cutthroat trout in Flathead Subbasin streams are riparian condition, channel stability, habitat diversity, and fine sediment, in that order. In lakes the most limiting attributes are shoreline condition, migratory obstructions, and hydraulic regime. This phase of the HUC assessment considered only habitat factors.

External Environmental Conditions Impacting the Subbasin Focal Species

The primary external factors impacting the Flathead Subbasin fish and wildlife resources come from the mainstem Columbia River federal hydropower operations, which profoundly influence dam operations as far upstream as headwater reservoirs. Dam operations affect environmental conditions in the reservoirs upstream and rivers downstream of Hungry Horse and Kerr dams. Mainstem Columbia River operations affect native fish and wildlife in the following ways:

- Unnaturally high flows during summer and winter negatively impact resident fish.

- Summer flow augmentation causes reservoirs to be drafted during the biologically productive summer months. This impacts productivity in the reservoirs.

- Drafting the reservoirs too hard prior to receiving the January 1 inflow forecast places the reservoirs at a disadvantage for reservoir refill. This is especially important during less-than-average water years.

- Flow fluctuations caused by power, flood control or fish flows create a wide varial zone in the river, which becomes biologically unproductive.

- The planned reservoir-refill date in the NOAA Fisheries BiOp of June 30, will cause the dam to spill in roughly the highest 30 percent of water years. This is because inflows remain above turbine capacity into July on high years. That means the reservoirs fill and have no remaining capacity to control spill, which causes gas super saturation problems.

- Flow fluctuations caused by power, flood control or fish flows cause sediments to build up in river cobbles. Before dams were built, these sediments normally deposited themselves in floodplain zones that provided the seedbeds necessary for establishment of willow, cottonwood, and other riparian plant communities. Young cottonwood stands are needed to replace mature stands that are being lost to natural stand aging as well as adverse human activities such as hardwood logging and land clearing.

Target Species

The heart of our terrestrial target species assessment is focused on the condition of target species habitats, specifically the target biomes within each 4th-field HUC. We developed and employed a spreadsheet tool called Terrestrial Biome Assessment (TBA) that utilizes existing data and the knowledge of professional biologists who have worked in the subbasin for many years to assess the current condition of subbasin terrestrial habitats. In addition to rating the current condition of specific geographical areas (biome subunits), this process identified the major impacts affecting each biome. In the regulated mainstem's wetland and riparian habitats the major impact is an altered hydrograph. In the rest of the subbasin, the major impacts in the wetland biome are land conversion, forest management, human/wildlife conflicts, exotic species, and an altered hydrograph. In the riparian biome, they are land conversion, an altered hydrograph, human/wildlife conflicts, exotic species, and altered vegetation. In the grassland/shrub, they are forest encroachment, land conversion, exotics, and overgrazing. In the xeric forest, the major impacts are fire exclusion, encroachment, forest fragmentation, and human/wildlife conflicts. In the mesic forest, they are fire exclusion, forest management, roads, and exotic species.

HUC/Unit Classification

Technical team members from the Flathead Subbasin used a spreadsheet tool called Qualitative Habitat Assessment (QHA) to assess the current condition of each stream in the subbasin (at roughly the HUC-6 scale) and its value to each of our focal species. The version of QHA that we used considered both habitat and nonhabitat parameters. We then used the habitat scores derived from QHA to group streams into a classification scheme based on the level of degradation in the watershed and the streams protection value. The team also evaluated selected lakes and reservoirs based on the level of degradation of the watershed, the natural capability of the waterbody, and species interactions. Class 1 waters are the most intact with high protection values for a given focal species. Class 2 waters have low to moderate levels of degradation and high to moderate protection value. Class 2.5 waters have a high restoration priority driven by the ESA needs or the needs of species of concern. Class 3 waters have a moderate to high degree of degradation and low protection value. Class 3.5 waters have a high degree of degradation and low protection value.

Interpretation and Synthesis

The assessment estimates that the abundance and productivity of bull trout is currently at about 60 percent of what it was historically. The abundance and productivity of westslope cutthroat trout is currently at about 30 percent of what it was historically. Target wildlife species are at about 50 to 70 percent of what they were historically.

Working Hypothesis

For the aquatic system at the subbasin scale, we the following four-part working hypothesis:

1. The presence of non-native species and introgression are the primary factors limiting productivity of focal species on a subbasin scale.

2. On a subbasin scale, the primary habitat factors limiting focal species in the regulated mainstem are riparian condition, habitat diversity, altered hydrograph, and fine sediment.

3. On a subbasin scale, the primary habitat factors limiting focal species in tributaries are: riparian condition, fine sediment, channel stability, and habitat diversity.

4. When considered on a subbasin scale, the primary habitat factors limiting focal species in reservoirs are hydraulic regime, shoreline condition, migratory obstructions, volumetric turnover rates, habitat diversity, and macrophytes.

For the terrestrial system at the subbasin scale, we developed the following working hypotheses:

1. On a subbasin scale, the chief impacts limiting wildlife populations in the Mesic Forest Biome are fire exclusion, forest management, roads, and exotic species (noxious weeds).

2. On a subbasin scale, the chief impacts limiting wildlife populations in the Grassland/Shrub Biome are forest encroachment, land conversion, exotic species, and overgrazing.

3. On a subbasin scale, the chief impacts limiting wildlife populations in the Riparian Biome are land conversion, altered hydrographs, human-wildlife conflicts, exotic species and altered vegetation.

4. On the regulated mainstem, the chief impact limiting wildlife populations in the Riparian Biome is an altered hydrograph.

5. On a subbasin scale, the chief impacts limiting wildlife populations in the Wetland Biome are land conversion, forest management, human/wildlife conflicts, exotic species, and altered hydrographs.

6. On the regulated mainstem, the chief impact limiting wildlife populations in the Wetland Biome is an altered hydrograph.

7. On a subbasin scale, the chief limiting factors limiting wildlife populations in the Xeric (Ponderosa Pine) Forest Biome, are fire exclusion, encroachment, forest fragmentation, and human-wildlife conflicts.

Class 1 and Class 2 waters for bull trout and westslope cutthroat trout and Class 1 and Class 2 terrestrial subunits are considered near-term opportunities for protection (Class 1) and restoration (Class 2).

Subbasin Inventory

What is the Inventory?

The purpose of the inventory, which is Part II of the Subbasin Plan, is to determine what work is being done for fish and wildlife in the subbasin and how well that work is addressing limiting factors identified in the Assessment. The inventory describes past (within the last five years) and present management plans and restoration and conservation plans, programs, and projects and then assesses how well the various on-the-ground projects are addressing the factors limiting fish and wildlife productivity and abundance.

Existing Protections

There are substantial protections for fish and wildlife habitats in the Flathead Subbasin. They come in many forms and can include Federal or tribal Wilderness designations, National Parks, Wild and Scenic River designations, wildlife management and conservation areas, natural areas, or various special fisheries or wildlife designations.

Existing Plans and Management Programs

As might be expected, federal, state, tribal and provincial agencies have a broad range of planning documents in place in the Subbasin. They range from general resource management plans like those in place for the Flathead National Forest , Glacier National Park, and the Flathead Indian Reservation, to ESA-recovery plans for listed species, to fish and wildlife mitigation plans, wetland/riparian area restoration and conservation plans, TMDL plans, and plans for the management of individual species such as elk and black bears. Similarly, there are a broad range of management programs that oversee fish and wildlife management in the subbasin. They operate at the federal, state, tribal, provincial, county, and nongovernmental level, and their activities and responsibilities vary dramatically.

Restoration and Conservation Projects

The following BPA projects are ongoing in the subbasin:

- Hungry Horse Mitigation, *Project Number 199101903*
- Stocking of offsite waters for Hungry Horse Mitigation, *Project Number 199101904*
- Research, Monitor, and Restore Native Species, *Project Number 199101901*
- Riparian Habitat Protection — Weaver Slough and McWinegar Slough, *Project Number 200204200*
- Secure and Restore Critical Habitats, *Project Number 200200300*

In addition, we identified 107 other fish and wildlife restoration and conservation projects funded by BPA and a variety of other agencies and programs. The projects range from removing fish-passage barriers to restoring degraded riparian areas. They include projects as minor as providing an off-stream stockwater development to major reconstruction projects designed to restore stream segments critical to spawning native trout. Some include protecting important habitat through conservation easements and acquisitions, others involve prescribed burning to restore wildlife habitat.

Project Assessment

This part of the assessment examines how effective these various projects have been at addressing the limiting factors identified in the Assessment. Projects were grouped according to the limiting factor they were intended to address, and these clusters of projects were then evaluated based on how effective they have been. On the aquatic side, most projects were found to be moderately effective, although projects intended to address the altered hydrograph (and varial zone) associated with hydropower development were considered to have a low level of effectiveness. Similarly, most terrestrial projects were found to be moderately effective. Treatments for exotic species were generally considered to have a low level of effectiveness, while projects addressing road impacts and land conversion were often highly effective.

Subbasin Management Plan

What is the Management Plan?

The Management Plan sets forth desired direction for the subbasin, using a hierarchical approach and taking into account the science, local conditions, concerns, treaty rights, and applicable law and policy. The hierarchical approach begins with a vision for the subbasin, then outlines biological objectives and strategies to achieve the objectives. It also includes a monitoring and evaluation plan for the strategies that may be implemented. This plan has a 10-15 year horizon, recognizing that additional information and analysis may indicate the need for periodic refinement.

Vision for the Flathead River Subbasin

The vision for the Flathead River Subbasin is a healthy ecosystem supporting natural physical and biological conditions and a sustainable human community. Achievement of this vision is supported and guided by the scientific principles of the Fish and Wildlife Program and guiding principles for the subbasin.

Scientific Framework

Flathead River Subbasin planners have adopted a scientific framework to address primary and secondary limiting factors in varying levels of scope, from basin-wide, over-arching mitigation requirements to more site-specific objectives. Our first priority is to prevent impacts that can reduce the overall health of the subbasin ecosystem.

Modifications to dam operation are a basin-wide mitigation requirement because of the far-reaching influence of dam operations on environmental conditions in the reservoirs and rivers throughout the Columbia River basin. Preventing the introduction and spread of invasive aquatic nuisance species is another over-arching priority of the subbasin plan.

Onsite mitigation addresses habitat degradation, fish passage barriers, genetic introgression in pure native fish stocks and negative interactions between native and nonnative fish species. Much of the altered habitat can be mitigated using techniques that do not require changes in reservoir or river management.

Offsite mitigation presents opportunities to create genetic reserves to conserve native species and to increase angling opportunities. Complete mitigation

of the documented fisheries losses is not currently possible on-site given the state of the science. Therefore, off-site mitigation will be necessary to achieve the best possible outcome. This subbasin plan uses a mixture of strategies designed to produce the greatest benefit to the fishery resource as cost effectively as possible.

Subbasin Objectives

In our assessment, we identified three primary aquatic limiting factors in the Flathead River Subbasin: (1) impoundment and hydro operations, (2) physical habitat alteration (in addition to impoundments and hydro operations), and (3) the introduction of non-native species. These three aquatic primary limiting factors have resulted in at least 18 important secondary aquatic limiting factors that negatively affect habitat, fish, and wildlife (figure 1). Aquatic objectives and strategies were developed to address all of these limiting factors (table 1).

Our assessment also identified 18 terrestrial limiting factors, and we developed objectives and strategies for each (table 2).

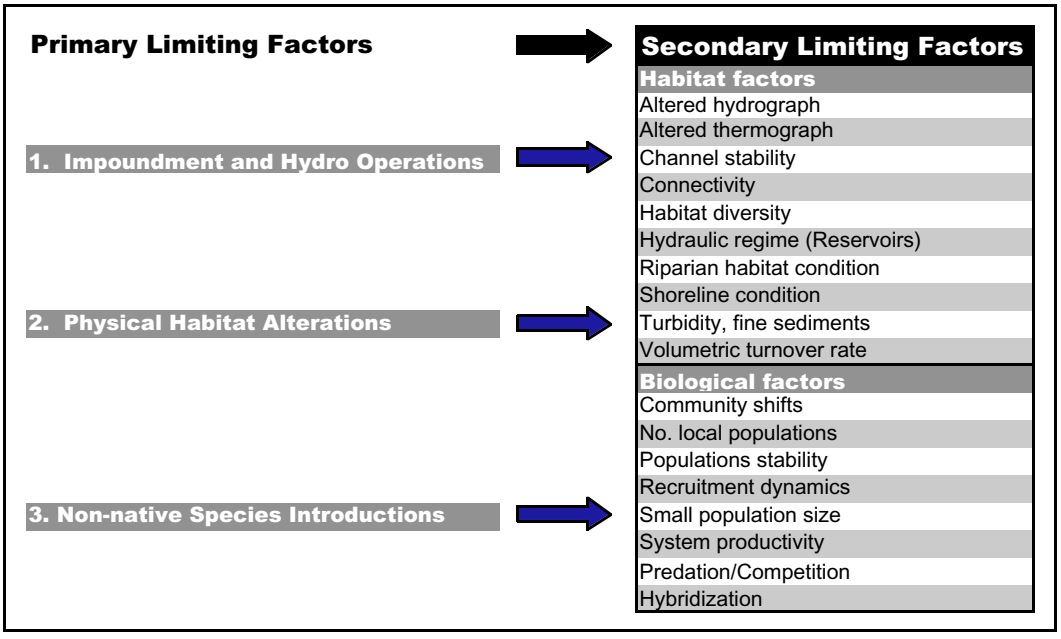

Figure 1. Primary and secondary aquatic limiting factor linkage in the Flathead River Subbasin.

Table 1. Linkage of secondary limiting factors and remedial management objectives, by habitat type and focal species in the Flathead River Subbasin. Each objective is supported by multiple management strategies.

Secondary	Habitat Types				Focal Species	
Limiting Factors	**Mainstem**	**Tributaries**	**Reservoirs**	**Lakes**	**Bull Trout**	**WCT**
Habitat Factors						
Altered hydrograph	**M3**				**M3**	M3
Channel stability		**T2**			**T2**	**T2**
Connectivity		**T5**			T5	T5
Habitat diversity	**M2**	**T3**	**R3**		**M2, T3, R3**	**M2, T3, R3**
Hydraulic regime			**R2**		R2	R2
Class 1 habitat protection		**T6**			**T6**	**T6**
Shoreline condition			**R1**	L1	**R1, L1**	**R1, L1**
Riparian condition	**M1**	**T1**			**M1, T1**	**M1, T1**
Fine sediments	**M4**	**T4**			**M4, T4**	**M4, T4**
Volumetric turnover rate			**R4**		**R4**	**R4**
Pollutants				L2	**L2**	**L2**
Biological Factors						
No. local populations	BT1, WCT1	BT1, WCT1	BT1, WCT1	BT1, WCT1	**BT1**	WCT1
Non-native species	**BT4, WCT3**	**BT4, WCT3**	**BT4, WCT3**	**BT4, WCT3**	BT4	**WCT3**
Populations stability	BT3	BT3	BT3	BT3		
Recruitment failure						
Small population size	BT2, WCT2	BT2, WCT2	BT2, WCT2	BT2, WCT2, WCT4	**BT2**	WCT2, WCT4

Table 2. Linkage of terrestrial limiting factors and remedial management objectives, by biome. Each objective is supported by multiple management strategies.

	Biome				
Limiting Factor	**Regulated Mainstem**	**Riparian/ Wetland**	**Grassland/ Shrub**	**Xeric Forest**	**Mesic Forest**
Altered Hydrograph	RW1	RW4			
Land Conversion		RW2	GS2		
Forest Management		RW3			
Human/Wildlife Conflicts		RW5		XF4	MF2
Exotics		RW6	GS3		MF4
Forest Encroachment			GS1	XF2	
Overgrazing			GS4		
Fire Exclusion				XF1	MF1
Forest Fragmentation				XF3	
Roads					MF3

Research, Monitoring and Evaluation (RM&E) Program

The RM&E program provides a framework for monitoring and evaluation of activities implemented under the Plan. Flathead Subbasin planners are aware of regional (Columbia Basin scale) efforts to standardize monitoring in state federal, and tribal salmon programs. To the extent appropriate, planners will coordinate with the Pacific Northwest Aquatic Monitoring Partnership (Partnership), and will incorporate recommendations for coordinating state, federal, and tribal monitoring practices, as presented in the partnership plan.

Determination of RM&E needs

The Technical and Planning Team determined research and monitoring needs for the Flathead River Subbasin using Qualitative Habitat Assessment (QHA) and Terrestrial Biome Assessment (TBA) scores and their best collective scientific knowledge. After reviewing outputs from QHA and TBA, the Technical Team used the scores to identify the habitat attributes currently limiting fish and wildlife productivity and abundance in the subbasin. The planning team developed objectives and strategies to address those limiting factors. They will then use the objectives to identify monitoring needs on a project-by-project basis, (i.e. restoration and protection projects will require monitoring activities specific to the strategies employed). Research needs will be defined by gaps in knowledge identified through QHA, TBA, and other analyses.

Development of research and monitoring objectives

Defining research and monitoring objectives is the next logical step in the development of an RM&E Program. Managers in the subbasin will develop a comprehensive RM&E program prior to July 2005. Section 10.3.7 describes evaluation protocols that will be used in the development of the RM&E program.

Ongoing research and monitoring activities

The Management Plan presents an annotated list of ongoing RM&E activities in the Flathead Subbasin and RM&E activities associated with specific BPA-funded projects.

Consistency with ESA and CWA requirements

Table 3 shows how the Subbasin habitat and biological objectives are reflective of and integrated with recovery goals of ESA recovery plans and where they are

supportive of and consistent with the federal Clean Water Act (CWA). The majority of subbasin habitat and biological objectives directly support goals and objectives in relevant ESA recovery plans and involve activities that help satisfy CWA objectives in the Subbasin. Table 3 also shows the priority of each objective.

Prioritization of Strategies (Measures/Projects) in the Flathead Subbasin

As part of the subbasin planning process, planners present an approach for prioritizing management strategies to assist the Council in making recommendations for specific projects for BPA funding.

Table 3. Priority, code, and description of habitat and biological objectives, BPA funded projects that address these objectives, and whether they address ESA and CWA responsibilities. Objectives titles were shortened for inclusion in this table; objecitve codes, full objective titles and supporting strategies can be found in the objectives and strategies tables.

Priority Score (U,H,R)	Objective Number	Prioritized Flathead River Subbasin Objectives (Habitat and Biological)	199101901	199101903	199101904	199608701	200200300	Addresses ESA	Addresses CWA
U	M3,RW1, RW3	Bring Hungry Horse Dam operations 50% closer to normative conditions	X	X		X		X	X
U	T6, GS1, RW2	Protect Class 1 habitat	X	X		X	X	X	X
U	BT2, WCT2, WCT4	Achieve population goals in terms of abundance and distribution	X	X				X	
U	WCT4	Remove non-native species or introgressed populations and repopulate with compatible, genetically pure westslope cutthroat trout.	X	X				X	
U	BT1, WCT1	Maintain or increase number of genetically pure local populations	X	X				X	
U	BT3	Achieve population trend that is accepted, under contemporary standards of the time, as stable or increasing	X	X		X	X	X	
U	BT4, WCT3, GS3, MF4, RW6	Prevent further expansion, suppress and where possible remove non-native species	X	X			X	X	
H	M2, T3, R3	Improve/Restore habitat diversity	X	X		X		X	X
H	M1,T1	Improve/Restore riparian habitat condition	X	X		X	X	X	X
H	M4,T4	Reduce delivery of fine sediments	X	X		X	X	X	X
H	T2	Improve channel stability to a level equivalent to the channel stability habitat restoration score of reference streams	X	X		X	X	X	X
H	T5	Restore passage to migratory fish by removing potential man-caused barriers	X	X		X	X	X	
H	L1,R1	Restore shoreline conditions to a level equivalent to the shoreline condition habitat restoration score of reference lakes	X	X		X	X	X	X
H	L2	Reduce pollutants to a level equivalent to the pollution habitat restoration score of reference lakes.	X	X		X	X	X	X
H	R1	Revegetate top ten fee of varial zone substrate	X	X				X	X
H	R2	Reduce reservoir drawdown and reduce frequency of HHR refill failure to within 5 feet of full pool as compared to historic operation.	X	X		X			X
H	R2	Implement Article 63(1) of the Kerr Project license		X				X	X
H	R4	Increase seasonal or in-seasonal reservoir retention time by 5 days relative to past operations in similar water years.		X		X			
H	HAR1	Harvest Objective	X	X	X			X	