MIDDLE SNAKE SUBBASINS MANAGEMENT PLAN SUPPLEMENT – PRIORITIZED IMPLEMENTATION

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MIDDLE SNAKE SUBBASINS MANAGEMENT PLAN SUPPLEMENT – PRIORITIZED IMPLEMENTATION

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Introduction

In May 2004, the Northwest Power and Conservation Council (NPCC) released the Middle Snake Subbasins Plan, which consists of three volumes:

1) *Assessment* - Describes the biological potential, focal species, and limiting factors in the Subbasin.

2) *Inventory* - Summarizes existing protection, restoration, and artificial production activities in the Subbasin.

3) *Management Plan* - Describes goals and strategies for the next 10 to 15 years.

The Plan was developed as part of NPCC's Columbia River Basin Fish and Wildlife Program.

This *Supplement* is intended to be a summary document that complements the existing *Assessment* and *Management Plan* for the Middle Snake Subbasins. This document clarifies the process that was used by the Technical Assessment Team (Technical Team) to identify focal species and focal habitats, describe and rank limiting factors to those resources, and articulate objectives and strategies to address those limiting factors. Finally, this document clarifies the linkages sought by the NPCC to aid implementation of the plan.

Information on the planning and technical assessment process was taken from the *Assessment* document as well as minutes from the Technical Team and subgroup meetings between August and December 2003.[1] These sources were useful in reconstructing the process that was followed, the types of information that were used, and the expertise and backgrounds of the individuals on the Technical Team.

While this *Supplement* is expected to complete the current phase of the planning process, there will be additional iterations of this plan in the future. The Planning Team looks forward to future updates to this plan.

Planning Process

Focal species and limiting factors were identified by the Technical Team, which consisted of a fisheries subgroup and a terrestrial subgroup. The Technical Team met on a monthly basis throughout the planning process. Technical Team members were recruited to the planning process because of their technical expertise related to fisheries or terrestrial resources in the Middle Snake Subbasins study area. Team members included representatives from the following organizations:

Fisheries Subgroup

- Ecovista (planning consultant)
- Idaho Department of Fish and Game
- U.S. Fish and Wildlife Service
- U.S. Bureau of Reclamation

[1] Meeting minutes from the planning process are posted on Ecovista's website at www.ecovista.ws.

Terrestrial Subgroup

- Ecovista (planning consultant)
- Idaho Department of Fish and Game
- Shoshone-Paiute Tribes
- U.S. Fish and Wildlife Service
- Bureau of Land Management

The Technical Team met regularly and subgroup members participated in brainstorming sessions to identify potential fisheries and terrestrial focal species. Documentation on focal species, focal habitats, and limiting factors was gathered from resource-specific technical reports such as *The Place We Protect: Silver Creek* by The Nature Conservancy (TNC 2004), basin-wide summary reports such as the *Draft Upper Middle Snake Subbasin Summary* by Hurley et al. (2002), and the *Lower Middle Snake Subbasin Summary* by Ecovista, et al., and consultations with experts on a particular resource (including representatives from Idaho Fish and Game Department, the U.S. Fish and Wildlife Service, and the Bureau of Land Management).

Focal Species and Habitat Types

Aquatic Resources

Discussions of potential focal species were based on the preliminary findings for the Middle Snake Subbasin Summaries, and the professional experience of subgroup members. In general, the fisheries subgroup decided that the focal species selection should be based on native species, rather than the non-native warm water species that are good indicators of the current, altered system. The following criteria were used to identify focal aquatic species:

- Federally-listed species
- Special cultural significance
- Fulfill a critical ecological function
- Serve as an indicator of environmental health
- Are locally significant or rare

Focal Species

The fisheries subgroup identified ten focal species:

- White sturgeon
- Bull trout
- Redband trout
- Mountain whitefish
- Idaho springsnail
- Wood River sculpin
- Utah valvata snail
- Snake River physa
- Banbury Springs lanx
- Bliss Rapids snail

Aquatic focal species were identified, in part, based on the following criteria:

- White sturgeon is a federal sensitive species that represents mainstem habitats.
- Mountain whitefish is found in both the mainstem and tributaries and serves as an indicator of water quality.
- Redband trout is a federal sensitive species that is widespread in tributary streams and represents warmer water habitat. The Middle Snake redband trout population has recently become one of the most studied populations in Idaho.
- Bull trout is a federally listed threatened species that is found in select tributary systems.
- Wood river sculpin is a federal sensitive species that is endemic to the Wood River drainage.
- Idaho springsnail, Utah valvata snail, Snake River physa, Banbury Springs

lanx, and the Bliss Rapids snail are federally listed endangered species with limited range in the Subbasins.

Terrestrial Resources

Similar to other Subbasin assessment teams, the terrestrial subgroup decided that the identification of priority habitat types is more appropriate than the identification of strictly focal species. The rationale for this decision includes the commonly accepted concept that the appropriate management and conservation of habitats will benefit the species that depend on those habitats. The identification of plant species and communities as priorities may assist later for monitoring and evaluation efforts.

Focal Habitat Types

Seven priority habitat types were identified by the terrestrial subgroup:

- Shrub-steppe
- Dwarf shrub-steppe
- Desert playa
- Native grasslands
- Pine/fir/mixed conifer forests
- Aspen
- Riparian/wetland/spring

These focal habitats are based on the Wildlife Habitat Type classifications developed by the Northwest Habitat Institute (NHI 2003), with a few minor modifications. The criteria and rationale for focal habitat selection included vegetative characteristics, dominant plant species, or a successional stage that is important to wildlife (such as old growth). The following attributes were considered for the prioritization of projects within the various focal habitats:

- Comparatively high fish and wildlife density
- Comparatively high fish and wildlife species diversity
- Important fish and wildlife breeding habitat, seasonal ranges, or movement corridors
- Limited habitat availability
- High vulnerability to habitat alteration
- Unique or dependent species

Focal Species

After the terrestrial subgroup identified focal habitats, it selected focal species to represent each focal habitat. Preference was given to species designated as threatened, endangered, sensitive, Partners in Flight priority or focal, functional link, functional specialist, culturally important, or managed—when these species were considered good representatives of habitat quality. More focal species were selected to thoroughly represent diverse and important focal habitat types. The terrestrial subgroup also selected species to represent structural conditions or habitat elements that are particularly important to a variety of wildlife species in the Subbasins and that are thought to be less common than they were historically. Species' susceptibility to current and historical management, data availability, and monitoring potential were factors also considered during the selection process.

Specific rationale for selecting focal species included the following:

Shrub Steppe: Mule deer is dependent on this community for winter range, while sage grouse and pygmy rabbit are both high visibility species that are dependent on it for important components of their life cycle.

Dwarf Shrub-Steppe: Slick spot peppergrass is a rare indicator of relatively healthy habitat conditions while the spotted bat uses this community for forage and is most commonly found in desert terrain.

Desert Playa: Fourwing saltbush is an important species of the northern desert shrub association, while pronghorn are high visibility inhabitants of this community.

Native Grasslands: Sharp-tailed grouse is a sensitive species dependent on diverse grassland communities, while Spalding's catchfly is a rare plant found almost exclusively within native grasslands.

Pine/Fir Forest: White-headed woodpecker is listed as a species of special concern that prefers large diameter trees, both dead and alive, for nesting and ponderosa pine seeds for much of its diet. The flammulated owl favors areas of open aspen or ponderosa pine forests and the pileated woodpecker seeks higher elevation forest areas.

Aspen: Aspen itself was seen as the best indicator for the health of this community.

Riparian/wetland/spring: The Columbia spotted frog is a rare species that is generally found near springs or small ponds, while mountain quail are dependent on riparian habitat areas. The willow flycatcher is a relatively common species that is dependent on willow communities, while willows were selected because they are an important source of food and cover for a variety of species. Sedges were selected because of their food and habitat value and important role in streambank stabilization.

Limiting Factors

As part of the planning process, the Terrestrial and Fisheries subgroups identified factors that limit the biological potential of focal species or habitat types, and then ranked their severity. These factors are referred to as "limiting factors" and include both direct and indirect threats to the viability of focal species and habitat types.

In the *Assessment* report, limiting factors for aquatic and terrestrial focal species and habitats are treated differently. The *Assessment* report identified 21 different limiting factors, which were unevenly distributed between aquatic-tributary, aquatic-mainstem, and terrestrial. The entire list of original limiting factors in the Assessment report is shown in Table 1.

Aquatic Limiting Factors

The identification of limiting factors for aquatic resources was based on technical information compiled from numerous sources, and then revised by the Technical Team members using their best professional judgment. Limiting factors were identified for tributary Subbasins as identified, and for mainstem (see Tables 31 and 32 in the *Assessment*). The Technical Team did not attempt to address limiting factors in individual tributary streams or tributary stream reaches, largely due to a lack of site-specific information.

Terrestrial Limiting Factors

The identification of limiting factors for terrestrial resources was treated separately from the limiting factors for aquatic resources. Consistent with the habitat-based approach to identifying focal habitats/species, terrestrial limiting factors were presented in two ways. First, they were described for each focal habitat type. Second, recognizing that the impact of the limiting factors varies throughout the Subbasin, the severity of the limiting factors was described by watershed. Only the limiting factors for watersheds were ranked in terms of their severity.

Table 1. Limiting Factors Presented in the Assessment Report

Aquatic[†]		Terrestrial[†]
Tributary	***Mainstem***	
• Temperature • Base flow/irrigation[‡] • Flow variation • Sediment • Watershed disturbance • Habitat degradation • Hatchery influence • Harvest • Connectivity/passage • Predation • Loss of prey base • Introduced species	• Temperature • Base flow • Flow variation • Sediment • Watershed disturbance • Habitat degradation • Hatchery influence • Harvest • Connectivity/passage • Predation • Loss of prey base • Harassment • Introduced species • Recruitment • Water quality	• Altered fire regime • Grazing/browsing • Altered hydrological regime • Timber harvest[*] • Land use conversion • Invasive/exotics

[†]Aquatic limiting factors are listed in Section 3.4.2 of the *Assessment* report, in Tables 31 and 32. Terrestrial limiting factors are listed and described in Section 3.5.3 of the *Assessment* report, in Tables 43 and 44.

[‡]Irrigation was included with base flow as a limiting factor for most of the tributaries but the relationship of irrigation to base flow was not explained in the Assessment. Since irrigation can impact base flow both positively and negatively, irrigation is omitted here since its actual impact is unknown.

[*] Timber harvest is limited to the forested areas of the Subbasins, which are relatively small compared to the Subbasins as a whole. Although important in these limited areas, timber harvest does not occur and is not a factor throughout the majority of the Middle Snake Subbasins.

These limiting factors are a summation of a variety of resource-specific issues that the Terrestrial Subgroup recognized within the Subbasin. For example, the effect of a lack of beaver activity on riparian areas and wetlands was classified under "altered hydrologic regime" for that habitat type. For the shrub-steppe habitat type, "land-use conversion" included urban development.

Identification of Key Limiting Factors

To identify the most severe and highest priority — or "key" — limiting factors for the entire Subbasin, additional analysis was conducted to identify the top aquatic limiting factors and the top terrestrial limiting factors. The final step was a comparative analysis of the top aquatic and terrestrial limiting factors to identify the five key limiting factors for the Subbasin as a whole. This process is described in greater detail in Appendix I.

Key Aquatic Limiting Factors

Limiting factors for focal fish species were identified in Section 3.4.2. of the Assessment report for tributary habitats and mainstem habitats. These factors are broken out by watershed. Based on the rankings assigned by the Fisheries subgroup, the highest priority limiting factors were identified for the tributary and mainstem habitat areas, as well as for the individual

species within those areas. For the purposes of this analysis, the key limiting factors are defined as those with the four highest ranking scores for both tributary and mainstem habitat areas. Rankings for the combined tributaries and mainstem were then combined to identify the six highest priority limiting factors for all aquatic habitats in the Subbasin. A more specific description of the evaluation method and the evaluation tables are included in Appendix I.

Based on the analysis conducted for this report, the five highest priority limiting factors for both tributary and mainstem aquatic habitats are:

1. Base flow/ Flow variation
2. Watershed disturbance
3. Water quality/sediment
4. Connectivity/passage
5. Temperature

Key Terrestrial Limiting Factors

Terrestrial limiting factors were identified for each focal habitat type in Table 43 of the Assessment report, and their impacts were ranked by watershed in Table 44. In order to identify and rank the impacts of the limiting factors for each focal habitat type, a conversion process was used to identify the most severe limiting factors across the entire Subbasin. This conversion process assigned weights to the each limiting factor based on the relative abundance of the habitat type in each watershed. Focal terrestrial species for each focal habitat type also were considered as a secondary element of the weighting process. Scoring tables and weighting rationale for each focal habitat type, are included in Appendix I, and are presented in Table 2.

Based on this analysis, the four highest priority limiting factors for terrestrial habitats are:

1. Invasive/exotics
2. Grazing/browsing
3. Altered fire regime
4. Land use conversion

Table 2. Priority ranks of Terrestrial Limiting Factors

Focal Habitat Type	Altered Fire Regime	Grazing/ Browsing	Altered Hydrologic Regime	Timber Harvest	Land Use Conversion	Invasive/ Exotics
Shrub-steppe	3	2				1
Dwarf shrub-steppe	2	3				1
Native grasslands	1	2				1
Desert playa and salt scrub	1	1				1
Pine/fir forest	2				3	1
Aspen	2	1				
Riparian/wetlands/ springs		2	2			1
Subbasin-wide priority rank	3	2	5	6	4	1

Description of Key Limiting Factors

Key limiting factors for the Subbasin were identified based on the analysis of the aquatic and terrestrial limiting factors, an understanding of both the relationship between focal species/habitats and limiting factors, and the relationships among various limiting factors. This analysis and the assumptions that went into it are described in Appendix I. The key limiting factors for the Mid Snake Subbasin, in order of priority are water flow, watershed disturbance/land conversion, invasive/exotic species, grazing/browsing, water quality/sedimentation.

Key Limiting Factors

1. Water flow
2. Watershed disturbance/ land conversion
3. Invasive/exotic species
4. Grazing/browsing
5. Water quality/sedimentation

Each of these limiting factors is described below. These descriptions include an explanation of how the limiting factor was selected, and a brief overview of the ecological issues involved. It also identifies "cross-cutting issues," which are ways in which the limiting factor in question influences or is influenced by other limiting factors.

The limiting factor descriptions also identify the core objectives from the Management Plan, which directly address the limiting factor, as well as other individual strategies that would address it. For more detailed information on individual objectives or strategies, consult Sections 3.2 and 3.3 of the Management Plan.

Cause/Effect Relationships

Some limiting factors are *causes* of ecological stress, while others are *effects* of ecological stress. For example, a watershed disturbance (limiting factor #2), such as a large development adjacent to a stream, can create conditions that increase sedimentation and reduce water quality (limiting factor #5). If this development includes the removal of riparian habitat, this can further reduce water quality and may contribute to increased downstream water temperature (limiting factor #8). Finally, the culverts under the access road for this theoretical development could reduce the connectivity of fish populations in the area (limiting factor #7).

The limiting factors analysis in the Assessment report was not set up to effectively discern which limiting factors are the causes or the effects of ecological stress. Indeed, some limiting factors such as water flow and altered fire regime can be both a cause and effect, depending on the situation. Therefore, it is important to keep this distinction in mind when evaluating ecological issues and implementing mitigating strategies.

Key Limiting Factor #1: Water Flow

This Subbasin-wide limiting factor is a combination of the aquatic limiting factors of base flow and flow variation, and the terrestrial limiting factor of altered hydrologic regime. Based on the rankings provided in the Assessment, low base flow is the greatest limiting factor to tributary aquatic habitats, while flow variation ranks second among the limiting factors identified for mainstem aquatic habitats. This altered hydrologic regime was identified as a relatively minor limiting factor for terrestrial

habitats with the exception of riparian habitat.

Low base flows, or dewatering of streams, has been identified as highly limiting to several focal fish and mollusk species in the Subbasin. State minimum stream flows have been identified for some tributary and mainstem watersheds. Terrestrial impacts such as land conversion, stream channelization, and channel modification have altered the hydrologic regime of many streams in the Subbasin, which contributes to base flow alterations, habitat degradation, and water quality concerns which diminishes the suitability of instream and riparian habitat for fish and wildlife.

Cross-Cutting Issues

The restoration and maintenance of adequate water flows is dependent on many other factors such as land conversion and management, water conservation, and riparian and upland habitat conservation. Likewise, water flows also influence other factors such as water quality, water temperature, and the sustainability of wetland and riparian habitats. These cross-cutting issues illustrate the importance of maintaining adequate water flows in the function of the greater ecosystem for the benefit of terrestrial and aquatic habitats and species.

Management Plan Elements

Some of the primary objectives that will address this issue include:

- Objective 11A: Restore flows in limited stream and spring reaches
- Objective 19C: Restore hydrologic processes

Other specific strategies that help address water flows include those that call for the protection and/or restoration of wetland, riparian, and floodplain areas (11B5, 11F5, 19A2, 19A3, 19A5, 19B2, 19B3, 19B5).

Key Limiting Factor #2: Watershed Disturbance/Land Conversion

This Subbasin-wide limiting factor is a combination of the aquatic limiting factor of watershed disturbance, and the terrestrial limiting factor of land use conversion. Watershed disturbance was determined to be the second highest priority limiting factor for aquatic habitats, while land use conversion is the fourth highest priority limiting factor for terrestrial habitats.

Land conversion and development for agriculture, mining, timber harvest, livestock production and road development are the root causes of this limiting factor. Urban encroachment and off-highway motor vehicle (OHMV) use are becoming increasingly significant as the population of Subbasin and adjoining area increases. One of the most direct effects of these disturbances are the elimination of native habitat areas, erosion and sedimentation, the proliferation of exotic weed species, aquatic and terrestrial habitat fragmentation due to road and infrastructure development, and general displacement of wildlife.

Cross-Cutting Issues

The consequences of land use and development are evident throughout the Subbasin, and influence several other key limiting factors. For example, land conversion can contribute to erosion and water quality concerns, alter or reduce stream flows, encourage noxious weed infestation, and otherwise diminish the quality of native habitat for terrestrial and aquatic wildlife species.

Management Plan Elements

Some of the primary objectives that address land conversion issues include:

- Objective 15A: Minimize the impacts of current and future development including roads

- Objective 19A: Protect, enhance or restore wetlands and spring habitats
- Objective 19B: Protect, enhance or restore riparian habitats
- Objective 19C: Restore hydrologic processes

Other specific strategies that help address watershed disturbance and land conversion issues include wetland, riparian and floodplain protection and restoration (11B5, 11F5), the removal or modification of instream habitat barriers (such as culverts) (11E4, 11F2), protection and restoration of forested and sagebrush communities (16A3, 16A5, 16B3, 17A2, 17A7), and the protection of remnant grassland communities (18A3, 18B4).

Key Limiting Factor #3: Invasive/Exotics

This Subbasin-wide limiting factor is mostly related to terrestrial habitat areas. The terrestrial subgroup identified invasive exotics as having the most severe impact of any limiting factor in the Subbasins. Invasive exotics are the primary limiting factor for all terrestrial focal habitat types except for aspen.

Invasive or exotic plant and animal species are organisms that have expanded beyond their native range or have been introduced from other parts of the world. Invasive species can displace native species, alter predator-prey relationships, destroy crops, and decrease ecosystem resiliency. Of particular concern in the Columbia River Basin are introduced weedy plants, which are invading at an alarming rate. Control of infestations has been difficult, and the ecological consequences have been serious.

Cross-Cutting Issues

Issues related to invasive or exotic plant species are interrelated with many of the other limiting factors in the Subbasin. For example, land disturbance due to land use conversion or grazing or OHMV use can provide a foothold for weed infestations, and may contribute to runoff, erosion, and water quality issues. The degradation of native wetland and riparian areas due to invasive/exotic species can diminish the function of these habitat types to sustain base flows, protect water quality, and provide habitat for native terrestrial and aquatic species. Likewise, and altered fire regime can reduce the ability of native plant communities to compete with invasive exotic species such as cheatgrass.

Management Plan Elements

The primary objectives that address invasive/exotics in the Subbasin Management Plan include:

- Objective 12A: Prevent weed introduction
- Objective 12B: Reduce weed extent
- Objective 17A: Protect shrub-steppe habitats
- Objective 18B: Protect historical native grassland habitats

Other specific strategies that help address issues related to invasive/exotic species include improved fire management (13A2, 16A4, 16B2), rehabilitation of burned areas (13A3), manage grazing for the benefit of focal habitats and species (14A2), compliance with weed laws (15A4), and general habitat protection and restoration strategies (15A5, 16A3, 16A5, 16B3, 18A3, 19A3, 19A4, 19B2, 19B3, 19B5).

Key Limiting Factor #4: Grazing/Browsing

This Subbasin-wide limiting factor is mostly related to terrestrial habitat areas. The terrestrial subgroup identified grazing and browsing as the primary limiting factor in shrub-steppe, native grassland,

riparian/wetland, desert playa and aspen habitat types[2].

The introduction of domestic livestock has been one of the most significant human-induced changes affecting the western landscape. Grazing is a significant land use throughout the Subbasin. The impacts of grazing to various habitat types can include the following:

- Riparian degradation
- Water quality impacts
- Vegetation trampling
- Increased runoff and erosion
- Changes to forest composition
- Increased weed dispersal
- Soil compaction
- Hydrological changes
- Livestock/wildlife conflict

Cross-Cutting Issues

The impacts of grazing in the Subbasin have contributed to almost every other limiting factor, including water quality degradation and invasive/exotic species. Strategies that reduce the impacts of grazing will help address other limiting factors in the Subbasin.

Management Plan Elements

The primary objectives from the Management Plan that address the impacts of grazing and browsing include:

- Objective 14A: Manage grazing to reduce impacts
- Objective 14B: Reduce livestock/wildlife conflicts.

Other specific strategies that help address issues related to grazing and browsing include the use of appropriate practices to minimize ground disturbance (12A2, 12A3, 12A5, 12B2) and reduce weed infestations, and the protection of high-quality habitat areas, including riparian areas, wetlands and springs, from grazing (17A3, 18A3, 19B3, 19A2, 19C2).

Key Limiting Factor #5: Water Quality

This Subbasin-wide limiting factor is a combination of the aquatic limiting factors of water quality, sediment, and temperature, and is the third most prominent limiting factor for aquatic habitat.

Water quality concerns include such factors as excess nutrients, dissolved oxygen concentrations, increased bacterial counts, decreased turbidity, sedimentation and increased water temperature. These factors result from non-point pollution sources such as habitat conversion and development (including urban development), point sources of pollution, and reduced or altered flows. Stream sedimentation is one of the primary water quality issues in the Subbasin (and was originally presented as a stand-alone limiting factor). Most of the sediment loading is from local inputs, such as instream channel and bank erosion in tributary streams, irrigation return flows, bank erosion, and irrigation drains. Elevated water temperature, which adversely affects habitat for aquatic species, is a result of water quality degradation, and reduced flows. Total Maximum Daily Load (TMDL) standards have been developed for five watersheds within the Subbasin. Issues related to water quality in the Subbasin are discussed in detail in Section 5.2 – *Clean Water Act Considerations*, of the Management Plan.

[2] Although Table 2 indicates Grazing/browsing as second priority for shrub-steppe and riparian/wetland habitat types, the predominance of shrub-steppe and the value of riparian/wetland habitats make their inclusion here appropriate for consideration in selecting objectives and strategies to address this limiting factor.

Cross-Cutting Issues

Water quality is a limiting factor for all of the aquatic focal species, and indirectly impacts many other aquatic and terrestrial species. Most water quality issues are a result of other broad-ranging limiting factors in the Subbasin, such as land use conversion, water use, and altered stream flows.

Management Plan Elements

Some of the primary objectives in the Management Plan to address water quality issues include:

- Objective 11A: Restore flows
- Objective 11B: Reduce water temperatures
- Objective 11C: Reduce sedimentation
- Objective 11D: Nutrient reduction
- Objective 19A: Protect and enhance wetland and spring habitats
- Objective 19B: Protected and enhance riparian habitats
- Objective 19C: Restore hydrologic processes.

Other specific strategies that help address water quality issues include the protection and restoration of wetland, riparian and floodplain areas (15A5, 16A3, 16A5, 16B3, 18A3, 19A3, 19A4, 19B2, 19B3, 19B5), reducing impacts from confined livestock operations by bringing currently non-compliant operations into compliance with state and federal regulations (14A3), and improved rangeland management (14A2).

Implementation Strategy

This section identifies the objectives and strategies that best address the key limiting factors for the Mid-Snake Subbasin. Objectives and strategies from the Management Plan are listed below in order of their priority for implementation. The implementation priorities are not in the same order as the limiting factor priorities because some of the objectives and strategies identified for implementation address several limiting factors. Those "cross-cutting" objectives and strategies are generally given a higher priority. Table 3 details how the high-priority objectives from the Management Plan address various key limiting factors.

Management Plan Considerations

The existing Middle Snake Subbasins Management Plan contains a significant amount of useful information and guidance to address the limiting factors in the Subbasin. While this document identifies which objectives and strategies should be prioritized, the Management Plan will continue to be an important tool to implement the priority objectives and strategies. The prioritization in the Management Plan also contains important information that will be useful as projects are selected for implementation.

Procedural Strategies

Most of the objectives in the Management Plan include procedural strategies. These are steps that need to be taken in order to effectively implement the "action" strategies for that objective. Procedural strategies generally include the following elements:

- A fine-scale evaluation to better identify where the related action strategies should be implemented
- Development of a monitoring program to track the success or failure of action strategies
- Adaptive monitoring and evaluation of the action strategies to assess their effectiveness and if needed, revise their implementation

These procedural strategies are very important to the success of any implementation actions, and should not be forgotten.

Lower-Priority Objectives and Strategies

This document is intended to identify the highest priority objectives and strategies that will have the greatest overall impact on limiting factors in the Subbasin. The Management Plan includes a wealth of information and guidance that is pertinent to both high-priority objectives (described below) and lower-priority objectives. While it is recommended that the highest priority objectives receive most of the implementation energy and resources, it is important that lower-priority objectives are not dismissed. An example of a lower-priority objective is 16A, which seeks to protect mature pine/fir forest habitats. While this objective does not address high priority limiting factors for the entire Subbasin, it is still an important component of the Management Plan that addresses limiting factors for specific focal species in specific portions of the Subbasin.

Lower priority objectives should continue to be considered for a variety of situations, including the following:

- A unique opportunity to implement the objective
- An efficient response to a ecological crisis or event
- Localized partnership opportunities

Table 3. Relationship of Objectives to Key Limiting Factors.†

Relevant Objectives		Key Limiting Factors							
		Water Flow	**Watershed Disturbance/ Land Conversion**	**Invasive/ Exotics**	**Grazing/ Browsing**	**Water Quality/ Sediment**	**Altered Fire Regime**	**Connec-tivity/ Passage**	**Temp.**
11A	Restore flows	✓				✓		✓	✓
11B	Reduce water temperatures								✓
11C	Reduce sedimentation					✓			
11D	Nutrient reduction					✓			
11E	Reduce blocked streams							✓	
11F	Improve aquatic habitat diversity							✓	
12A	Prevent weed introduction			✓	✓				
12B	Reduce weed extent			✓	✓				
13A	Manage a natural historical fire regime						✓		
14A	Manage rangeland to reduce impacts				✓				
14B	Reduce livestock/ wildlife conflicts				✓				
15A	Minimize impact of development/ roads		✓	✓					
17A	Protect shrub-steppe habitats			✓					
18B	Restore historical native grassland habitats			✓	✓		✓		
19A	Protect/enhance wetlands/spring habitats	✓	✓			✓			✓
19B	Protect/enhance riparian habitats	✓	✓			✓		✓	✓
19C	Restore hydrologic processes	✓	✓			✓			✓

†This table includes the five key limiting factors as well as the next three most significant limiting factors. The additional limiting factors are included to show the extent to which the selected objectives address the eight most significant limiting factors rather than just the five key limiting factors.

Prioritized Implementation

This section identifies the highest priority objectives and strategies that will address the most severe limiting factors to the focal species and habitats in the Subbasin. The highest priority Management Plan implementation priorities for the Middle Snake Subbasin are listed in the box below.

These implementation priorities are designed to address the key limiting factors described in the previous section. However, it is important to note that there is not a parallel relationship between the key limiting factors and implementation priorities because, as shown in Table 3, the objectives that address more than one limiting factor are given a higher priority.

IMPLEMENTATION OF THESE PRIORITY OBJECTIVES AND STRATEGIES, AS WELL AS ALL OTHER COMPONENTS OF THE MANAGEMENT PLAN MUST BE CONDUCTED ACCORDING TO THE LAW AND AGENCY RULES AND PLANS, AND MUST PROTECT THE RIGHTS AND PRIVACY OF PRIVATE PROPERTY OWNERS.

In the interest of efficiency and inter-jurisdictional collaboration, existing programs and efforts need to be considered during the implementation planning process so that those efforts are enhanced but not duplicated by the NPCC's implementation priorities.

Implementation Priorities

1. Protect, enhance or restore riparian habitats *(Objective 19B)*
2. Protect, enhance or restore wetlands and spring habitats *(Objective 19A)*
3. Restore hydrologic processes *(Objective 19C)*
4. Restore water flows *(Objective 11A)*
5. Minimize impacts of development and roads *(Objective 15A)*
6. Prevent weed introduction *(Objective 12A)*

First Priority – Riparian Habitat Protection

Objective 19B: Protect, enhance or restore riparian habitats

Strategies:

- 19B1. Identify and prioritize riparian areas at a finer scale
- 19B2. Restore degraded riparian areas
- 19B3. Protect riparian communities
- 19B4. Minimize road/land use impacts to riparian areas
- 19B5. Protect riparian areas in agricultural lands
- 19B6. Increase public knowledge of riparian areas
- 19B7. Monitor and evaluate implementation

Other Related Strategies:

- 11B4. Rehabilitate wetland and floodplain function
- 11F5. Rehabilitate upland, wetland, and floodplain areas
- 11B5. Increase streamside shading with forest/agricultural. BMPs
- 11A4. Increase base flow and restore natural flow timing through riparian enhancements
- 11E1. Remove or modify known barriers (such as culverts) limiting aquatic listed and focal species

Limiting Factors Addressed

The implementation of these objectives and strategies will have a direct impact in addressing the following limiting factors:

- Watershed disturbance/land conversion
- Water quality/sedimentation
- Temperature

These objectives will have secondary benefits by indirectly benefiting water flow and connectivity/passage[3].

Discussion

The protection and enhancement of riparian and wetland habitats will be the most effective way to reduce the ecological effects of the priority limiting factors across the Subbasin. These objectives have similar ecological benefits as wetland protection and enhancement. While riparian habitats comprise a very small portion of the Subbasin area, they are the interface between aquatic and terrestrial habitat types, and play a critical role in the ecological function of both. As described in the relevant objectives and strategies, the basic methods for implementation will be to identify key riparian habitat areas, protect existing habitat, and restore degraded habitat.

Second Priority – Wetland and Spring Habitat Protection

Objective 19A: Protect, enhance or restore wetlands and spring habitats or create new wetlands to mitigate for permanently lost wetlands

Strategies:

- 19A1. Refine protection and restoration priorities
- 19A2. Protect wetland and springs habitats
- 19A3. Restore wetland function and quality
- 19A4. Create wetlands to mitigate water quality impacts
- 19A5. Protect wetlands to mitigate for hydropower system
- 19A6. Work with landowners to protect private wetlands
- 19A7. Monitor and evaluate implementation

Other Related Strategies:

- 11B4. Rehabilitate wetland and floodplain function
- 11F5. Rehabilitate upland, wetland, and floodplain areas

Limiting Factors Addressed

The implementation of these objectives and strategies will have a direct impact in addressing the following limiting factors:

- Water flow[4] and water quality.
- Watershed disturbance/land conversion
- Water quality/sedimentation

These objectives will have secondary benefits by indirectly benefiting water temperature.

Discussion

Similar to riparian habitat protection, the protection and enhancement of wetland habitats will be an effective way to reduce the ecological effects of the priority limiting factors across the Subbasin. While wetland habitats comprise a very small portion of the Subbasin area, they are part of the interface between aquatic and terrestrial habitat types, and play a critical role in the ecological function of both. The benefits of wetland protection and enhancement are similar to

[3] Among other things, water flow and connectivity/passage are improved through a more stable channel that remains wetted for longer periods of time.

[4] Water flow and quality, among other things, may be enhanced by a more stable channel that remains wetted for a long period of time.

those of riparian conservation, except that wetlands have additional value in water quality protection by acting as a filter for sediment, nutrients, and other pollutants. As described in the relevant objectives and strategies, the basic methods for implementation will be to identify key wetland habitat areas, protect existing habitat, and restore degraded habitat.

Third Priority – Restore Hydrologic Processes

Objective 19C: Restore hydrologic processes that protect water quality, base flows, peak flows, and timing to ensure that riparian, wetland, and aquatic resources are in proper functioning condition.

Strategies:

- 19C1. Minimize development in riparian areas
- 19C2. Minimize grazing impacts to riparian areas/streams
- 19C3. Monitor water diversions for riparian/wetland impacts
- 19C4. Improve water efficiency and reduce consumption
- 19C5. Reduce impacts of land conversion on flows

Other Related Strategies:

- 11B4. Rehabilitate wetland and floodplain function
- 11F5. Rehabilitate upland, wetland, and floodplain areas
- 11B5. Increase streamside shading with forest/agricultural. BMPs
- 11A4. Increase base flow and restore natural flow timing through riparian enhancements

Limiting Factors Addressed

The implementation of these objectives and strategies will have a direct impact in addressing the following limiting factors:

- Water flow
- Water quality/sedimentation
- Temperature

These strategies will have secondary benefits by indirectly mitigating the impacts of watershed disturbance/land conversion.

Discussion

Human manipulation of natural watercourses and water flows is the greatest limiting factor to focal species and habitats across the Subbasin. This objective includes elements of riparian habitat (Objective 19B) and instream flow protection (Objective 11A), and is truly a cross-cutting objective. The general restoration of hydrologic processes, coupled with the restoration of adequate water flows (Objective 11A) would improve the function and quality of both aquatic and terrestrial habitats, as well as the native wildlife species that depend on them.

Fourth Priority – Restore Water Flows

Objective 11A: Restore flows in limited stream and spring reaches to support resident fish needs (including spawning, rearing, and migration) and the needs of other aquatic species, resulting in an increased trend in the number of stream miles with adequate flows.

Strategies[5]:

- 11A1. Research flows at finer scale
- 11A2. Prioritize problems/activities at finer scale
- 11A3. Establish minimum flows in accordance with applicable law.
- 11A4. Increase/restore flow through riparian enhancements

[5] These strategies have been modified from those in the Management Plan to be compliant with Idaho State water law and the hydraulic realities of water use.

- 11A6. Rent water, when available, to meet minimum flows
- 11A7. Monitor and evaluate implementation

Other Related Strategies:

- 11B4. Rehabilitate wetland and floodplain function
- 19A2. Protect wetland and springs habitats
- 19B2. Restore degraded riparian areas
- 19C3. Monitor water diversions for riparian/wetland impacts
- 19C4. Improve water efficiency and reduce consumption
- 19C5. Reduce impacts of land conversion on flows
- 19A2. Protect wetland and springs habitats
- 19B3. Protect riparian communities
- 19C1. Minimize development in riparian areas
- 19C5. Reduce impacts of land conversion on flows

Limiting Factors Addressed

The implementation of these objectives and strategies will have a direct impact in addressing the following limiting factors:

- Water flow
- Water quality/sedimentation
- Connectivity/passage
- Temperature

Discussion

These strategies directly address the top priority limiting factor for the Subbasin: water flows[6]. The terrestrial benefits of more water flows would be seen in the improvement of wetland and riparian habitat areas.

The restoration of water flows is a critical element in addressing the limiting factors that threaten aquatic, riparian, and wetland habitats in the Subbasin, including water quality, connectivity/passage, and temperature. Therefore it is a critical element of any effort to restore the diversity and vigor of native aquatic species in the Subbasin.

Fifth Priority – Minimize Impacts of Development and Roads

Objective 15A: Minimize the negative impact of current and future development, including roads, on the native terrestrial species of the Subbasins.

Strategies:

- 15A1. Identify and prioritize important habitats and corridors
- 15A2. Integrate focal habitats/corridors into planning
- 15A4. Encourage compliance with weed/pet control rules
- 15A5. Protect high-quality focal habitats
- 15A6. Monitor and evaluate implementation

Other Related Strategies:

- 11B4. Rehabilitate wetland and floodplain function
- 11E1. Remove or modify known barriers (such as culverts)
- 11F5. Rehabilitate upland, wetland, and floodplain areas
- 12A2. Minimize ground disturbance in habitat areas
- 12B5. Use BMPs and land use to reduce weed infestations

[6] These strategies are not the highest priority for implementation because, while they are very important, their direct benefits are mostly limited to aquatic habitats. (Higher priority strategies address a greater diversity of habitats.)

- 12B6. Enforce and educate about OMHV restrictions
- 16A3. Protect mature ponderosa pine communities
- 16A5. Acquire are restore mature pine/fir forests
- 17A2. Protect high-quality shrub-steppe habitats
- 18A3. Protect remnant grasslands
- 18B4. Acquire and restore prairie and canyon grasslands

Limiting Factors Addressed

The implementation of these objectives and strategies will have a direct impact in addressing the following limiting factors:

- Watershed disturbance/Land conversion
- Invasive exotics
- Connectivity

These strategies will have secondary benefits by indirectly addressing water quality issues.

Discussion

Any new urban or natural resource development activity will always have an ecological impact. Impacts to the terrestrial environment can include the elimination or degradation of native habitat, the proliferation of invasive or exotic weed species, and the disturbance of natural ecological processes. This disruption can then lead to increased runoff, additional stream crossings, erosion, sedimentation and other water pollution, which can impact downstream aquatic habitat. These strategies will help mitigate the impacts of development by protecting and rehabilitating important habitat areas including road crossings, and by working with existing planning processes to ensure that ongoing development activities, including urban development, can take place in a way that minimizes impacts to the environment.

Sixth Priority – Prevent Weed Introduction

Objective 12A: Protect the existing quality, quantity, and diversity of native plant communities providing habitat to native wildlife species by preventing the introduction of noxious weeds and invasive exotic plants into native habitats.

Strategies:

- 12A1. Identify problem areas at a finer scale
- 12A2. Minimize ground disturbance in habitat areas
- 12A3. Prevent weed seed dispersal
- 12A4. Increase public education, awareness, and participation
- 12A5. Minimize new infestations
- 12A6. Monitor and evaluate implementation

Objective 12B: Reduce the extent and density of established noxious weeds and invasive exotics and restore to a naturally functioning system using effective perennial species.

Strategies:

- 12B1. Identify problem areas at a finer scale
- 12B2. Treat local weed infestations
- 12B3. Control weeds in reservoir drawdown areas
- 12B4. Restore naturally functioning system
- 12B5. Use BMPs and land use to reduce infestations
- 12B6. Enforce and educate about OMHV restrictions
- 12B7. Monitor and evaluate implementation

Other Related Strategies:

- 14A2. Improve rangeland management

Limiting Factors Addressed

The implementation of these objectives and strategies will have a direct impact in addressing invasive/exotic species. These strategies will have secondary benefits by indirectly addressing the impacts from grazing and browsing.

Discussion

While invasive/exotic species are the highest priority limiting factor for terrestrial habitat areas, these objectives that address them are lower priority because other objectives address a wider range of limiting factors. Both Objectives 12 A and 12B are included together for two reasons. First, they are equal in their importance in addressing priority limiting factors. Second and more importantly, they must be pursued concurrently. Any effort to prevent new infestations of invasive/exotic species must be pursued along with efforts to reduce existing infestations. The inverse is also true.

Conclusion

Based on the information presented in the Assessment report and Management Plan, this evaluation has identified the five key limiting factors that impair the ecological health of the Subbasin, and the top six implementation priorities to address those key limiting factors on a Subbasin-wide scale. By focusing implementation resources on the top six implementation priorities, the NPCC will leverage the greatest Subbasin-wide benefits from its conservation and restoration resources. When selecting implementation objectives, higher priority should be given to those objectives that address a broader range of limiting factors in addition to addressing multiple key limiting factors.

The key limiting factors for the Subbasin are:

1. Water flow
2. Watershed disturbance/land conversion
3. Invasive/exotic species
4. Grazing/browsing
5. Water quality/sedimentation

The top six implementation priorities to address these limiting factors are:

1. Protect, enhance, or restore riparian habitats
2. Protect, enhance, or restore wetlands and spring habitats
3. Restore hydrologic processes
4. Restore water flows
5. Minimize impacts of development and roads
6. Prevent weed introduction

This document is intended to be a decision-making tool to assist in the implementation process; it should not be used as an absolute rule about how NPCC resources should be allocated. While NPCC planners should use the implementation priorities identified in this report to guide broad based decisions, they should not dismiss other, lower-ranking objectives that are identified in the Management Plan. The Subbasin Management Plan contains a wealth of information and guidance about some objectives and strategies that are not high priorities for the entire Subbasin, but are still useful in addressing species-specific problems at a local scale.

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The Nature Conservancy. 2004. Places We Protect: Silver Creek. http://nature.org/wherewework/northamerica/states/idaho/preserves/art415.html.

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Appendix A – Methods Report

METHODS REPORT

MIDDLE SNAKE SUBBASINS MANAGEMENT PLAN SUPPLEMENT – PRIORITIZED IMPLEMENTATION

NOVEMBER 24, 2004

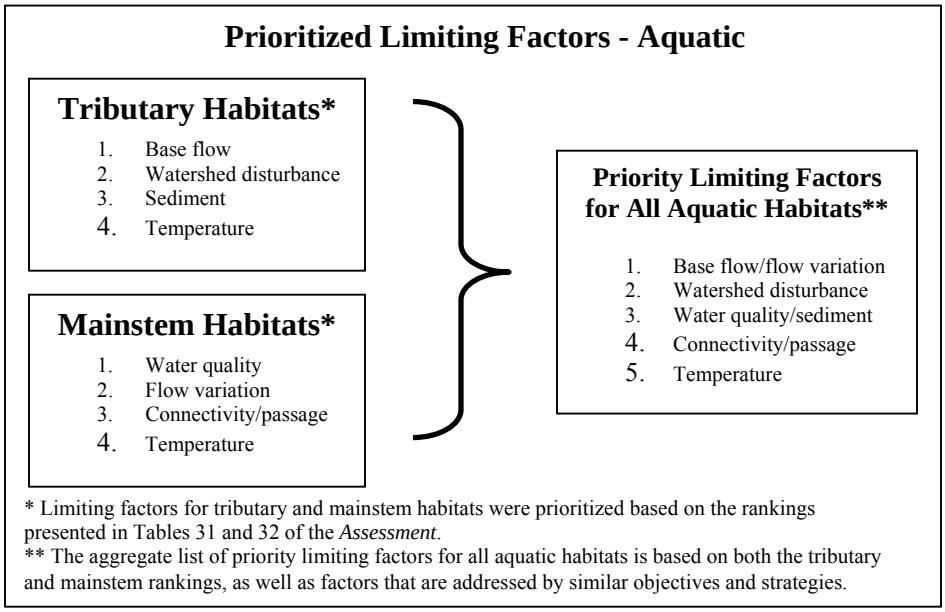
The primary purposes of the *Middle Snake Subbasins Management Plan Supplement – Prioritized Implementation* are to a) identify and prioritize the key limiting factors, and b) identify and prioritize the objectives and strategies to address those key limiting factors. This report illustrates the methods that were used to address item (a), as well as the proposed methods to address item (b).

Key Limiting Factors

The goal of this first step was to identify the key limiting factors for terrestrial and aquatic resources. The Middle Snake Subbasins Assessment report outlines limiting factors for both aquatic and terrestrial resources. Aquatic resources were broken into tributary habitats and mainstem habitats, while the limiting factors for terrestrial resources are identified for each focal habitat type, but are ranked by watershed.

Aquatic Habitats

The first step was to identify the key limiting factors for both the mainstem and tributary aquatic habitats, based on the ranking data presented in Tables 31 and 32. (Copies of the spreadsheets used in this analysis are attached.)



Limiting Factors - Tributary Habitats	Temperature	Base flow	Flow variation	Sediment	Watershed disturbance	Habitat degradation	Hatchery	Harvest	Connectivity/ passage	Predation	Loss of prey	Introduced species
Wood River												
Redband trout	3	3	3	2	3	1	2		2			1
Mountain whitefish	3	3	3	2	3	1			2			1
Wood River sculpin	3	3	3	2	3	1						
Molluscs		3	3		2							
Score	***9***	***12***	***12***	***6***	***11***	***3***	***2***		***4***			***2***
Camas Creek												
Redband trout	3	3	3	3	3	1			1			
Mountain whitefish	3	3	3	3	3	1			1			
Wood River sculpin	3	3	3	3	3	1			1			
Score	***9***	***9***	***9***	***9***	***9***	***3***			***3***			
Rock Creek												
Redband trout	1	1	1	2	3		2					
Mountain whitefish	1	1										
Score	***2***	***2***	***1***	***2***	***3***		***2***					
Canyon Springs												
Redband trout		3		3		3	2		3			1
Molluscs		2		2		3	3					2
Score		***5***		***5***		***6***	***5***		***3***			***3***
Salmon Falls Creek												
Redband trout	2	2	1	3	3	2	1			1		1
Mountain whitefish	2	2	1	3	3	2				1		
Score	***4***	***4***	***2***	***6***	***6***	***4***	***1***			***2***		***1***
Lower tributaries												
Redband trout					3	3	1					
Bull trout	2			1	2	3			3		2	3
Score	***2***			***1***	***5***	***6***	***1***		***3***		***2***	***3***
Upper/central tributaries												
Redband trout	3	3	2	2	2	2			3			
Molluscs		2		3		3	3					2
Score	***3***	***5***	***2***	***5***	***2***	***5***	***3***		***3***			***2***
Tributary Score	**29**	**37**	**26**	**34**	**36**	**27**	**14**	**0**	**16**	**2**	**2**	**11**

Limiting Factors - Mainstem Habitats	Temperature	Base flow	Flow variation	Sediment	Watershed disturbance	Habitat degradation	Hatchery	Harvest	Connectivity/ passage	Predation	Loss of prey	Harassment	Introduced species	Recruitment	Water quality
Hells Canyon-Upper Brownlee															
White sturgeon			3						3		2			3	3
Bull trout	3				2				3		2				
Mountain whitefish	3		1	1		3			3		1		3		2
Score	***6***		***4***	***1***	***2***	***3***			***9***		***5***		***3***	***3***	***5***
Upper Brownlee - CJ Strike															
White sturgeon			3						3		2			3	3
Mountain whitefish	3		1	2		3			2		1				3
Molluscs	2	3	3		2	3							2		3
Score	***5***	***3***	***7***	***2***	***2***	***6***			***5***		***3***		***2***	***3***	***9***
CJ Strike - Bliss															
White sturgeon	1	3	3						3	1	2	1		2	2
Mountain whitefish	3		1						2	1				1	3
Molluscs	2	3	3		2	3	2						2		3
Score	***6***	***6***	***7***	***0***	***2***	***3***	***2***	***0***	***5***	***2***	***2***	***1***	***2***	***3***	***8***
Bliss - Shoshone Falls															
White sturgeon	1	3	3	1	3				3	1	2			3	3
Mountain whitefish	3		1	3	1	3			2	1					3
Molluscs	2	3	3		2	3	2						2		3
Score	***6***	***6***	***7***	***4***	***6***	***6***	***2***	***0***	***5***	***2***	***2***	***0***	***2***	***3***	***9***
Mainstem Score	**23**	**15**	**25**	**7**	**12**	**18**	**4**	**0**	**24**	**4**	**12**	**1**	**9**	**12**	**31**

- The limiting factors ranking data for focal fish species (by watershed) were entered into one spreadsheet for tributary habitats and another spreadsheet for mainstem habitats. (Note that the rankings were reversed so that a higher score "3" represents a greater risk).

- The total score for each watershed was calculated.

- A total score for all tributary and mainstem habitats was then calculated for each limiting factor.

- The top four limiting factors for each were identified, then combined into the top six aquatic limiting factors: base flow/flow variation, water quality, watershed disturbance, sediment, connectivity/passage, temperature.

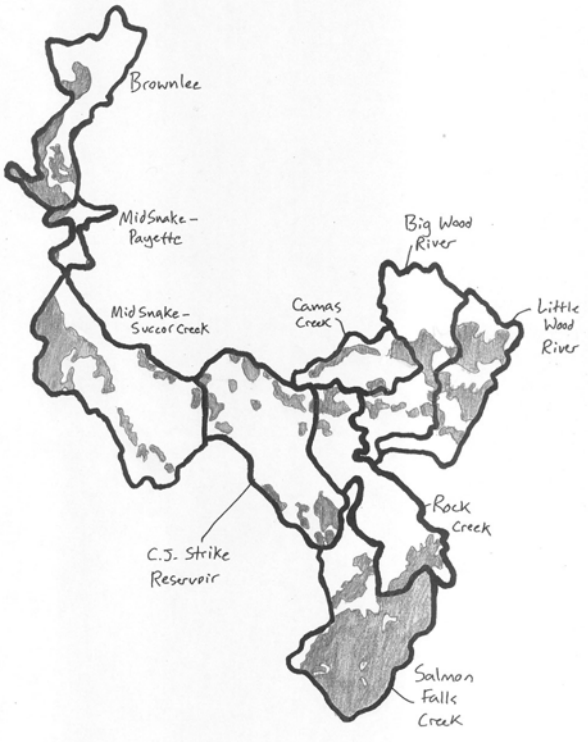
Terrestrial Habitats

The next step was to identify the key limiting factors for terrestrial habitats. This was more difficult because Table 43 identifies which limiting factors apply to each focal habitat type, but does not rank them. Table 44 provides severity rankings, but the rankings are by watershed, not focal habitat types. The method used to identify and rank the key terrestrial limiting factors by focal habitat type are described as follows. (A copy of one of the spreadsheets used in this analysis and a summary sheet is attached.)

- A spreadsheet was set up for each focal habitat type, with the limiting factors across the x-axis and the watershed down the y-axis.

- The impact rankings from Table 44 were added for each watershed. (Note that the rankings were reversed so that a higher score "3" represents a greater risk).

- In order to appropriately weight the influence of a particular limiting factor in each watershed, the "relative abundance" of the focal habitat in question was assigned for each watershed in a High-Medium-Low fashion. This weighting was based primarily on the wildlife habitat type map (Figure 29). Focal species maps were used a secondary source for determining the relative abundance, and were especially useful for habitat types such as wetlands and riparian that are limited in area but widely dispersed.



Example of a sketch-map used to estimate the relative abundance of shrub-steppe habitat in various watersheds in the Subbasin.

Limiting Factors - Shrub-Steppe Habitat Type

Watershed	Relative Abundance Rank	Altered Fire Regime		Grazing/ Browsing		Altered Hydrologic Regime		Timber Harvest		Land Use Conversion		Invasive/ Exotics	
		Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score
Brownlee Reservoir	2	2	4	1	2					0	0	2	4
Middle Snake River-Payette River	1	3	3	3	3					2	2	3	3
Middle Snake River-Succor Creek	2	3	6	3	6					2	4	3	6
C.J. Strike Reservoir	1	3	3	3	3					2	2	3	3
Upper Snake River - Rock Creek	2	3	6	3	6					2	4	3	6
Salmon Falls Creek	3	3	9	3	9					1	3	3	9
Big Wood River	1	2	2	2	2					1	1	3	3
Little Wood River	3	2	6	3	9					2	6	3	9
Camas Creek	2	2	4	3	6					2	4	3	6
Total Limiting Factor Score			43		46		0		0		26		49

Ranking Factors:
3 - High
2 - Medium
1 - Low
0 - None

This is the scoring sheet for the Shrub-Steppe Habitat Type. Similar scoring sheets were completed for Dwarf Shrub Steppe, Native Grasslands, Desert Playa-Scrub, Pine-Fir Forest, Aspen, and Riparian - Wetland

Limiting Factors Summary - Terrestrial Habitats

	Altered Fire Regime	Grazing/ Browsing	Hydrologic Regime	Timber Harvest	Land Use Conversion	Invasive/ Exotics
Shrub-Steppe	43	46			26	49
Dwarf shrub-steppe	37	36			20	40
Native grasslands	6	3			0	6
Desert playa-scrub	21	21			13	21
Pine-fir forest	18			8	9	24
Aspen	31	36				
Riparian-wetland		50	50		29	55
Overall	156	192	50	8	97	195

- *For example, the Big Wood River watershed has a relatively low abundance of shrub-steppe habitat, so it was assigned a weighting factor of 1.*

  Limiting factors that are not relevant for a particular focal habitat type (as identified in Table 43) are excluded from this analysis (such as Timber Harvest for the shrub-steppe habitat type).

- For each watershed, the ranking value was multiplied by the weighting factor to determine a weighted score for that watershed. The sum of the weighted score determined the total score for each limiting factor.

- In order to identify the key limiting factors for <u>all</u> terrestrial habitat types, the limiting factor scores for each focal habitat type were added in a summary spreadsheet.

- Based on this analysis, the top four terrestrial limiting factors are invasive exotics, grazing/browsing, altered fire regime, and land use conversion.

Implementation Priorities to Address Key Limiting Factors

The next step was to identify the objectives and strategies from the Management Plan that best address the key limiting factors for aquatic and terrestrial habitats. In general, the most effective objectives and strategies are those that address more than one limiting factor. Some of the strategies address both aquatic and terrestrial limiting factors. The highest priority objectives and strategies are presented in the supplement document as Implementation Priorities.

The Implementation Priorities were determined using a combination of several methods, including a scoring system to identify the most effective individual strategies, which then influenced an evaluation of the effectiveness of objectives. These methods are described below. The six Implementation Priorities were identified and ranked somewhat subjectively, looking at these three methods as a whole.

Strategy Scoring System

In order to get a sense of which individual Management Plan strategies would be the most effective, a scoring spreadsheet was developed with the key limiting factors across the x-axis, and all of the strategies from the Management Plan down the y-axis. As shown in the following mock-up diagram, each strategy gets a single point for each limiting factor that it addresses. Each limiting factor has a multiplier (1 through 5) that is based on its relative priority (first priority = 5, fourth priority = 1). The sum of the multiplied points for each strategy indicates a score for that strategy.

Mock-up of Strategy Scoring Spreadsheet

	Limiting factor 1	*Score*	**Limiting factor 2**	*Score*	**Limiting factor 3**	*Score*	**Limiting factor 4**	*Score*	**Total Score**
Multiplier	*4*		*3*		*2*		*1*		
Strategy									
1A3…	●	*4*			●	*2*			6
14B3…			●	*3*					3
15A7…	●	*4*			●	*2*	●	*1*	7
19B2…			●	*3*	●	*2*			5

Based on the scoring spreadsheet, the top 20 strategies were identified. These are listed as follows:

Strategy	Score
19B3. Protect riparian communities	16
19C2. Minimize grazing impacts to riparian areas/streams	16
16B3. Restore deforested communities	13
19A2. Protect wetland and springs habitats	13
19A6. Work with landowners to protect private wetlands	13
14A2. Manage grazing to reduce impacts	12
11B4. Rehabilitate wetland and floodplain function	11
11B5. Increase streamside shading with forest/agricultural BMPs	11

Strategy	Score
11F5. Rehabilitate upland, wetland, and floodplain areas	11
19A3. Restore wetland function and quality	11
19A4. Create wetlands to mitigate water quality impacts	11
19B2. Restore degraded riparian areas	11
19B5. Protect riparian areas in agricultural lands	11
19C1. Minimize development in riparian areas	11
19C5. Reduce impacts of land conversion on flows	11
18A3. Protect remnant grasslands	10
17A3. Develop plans to protect quality areas from grazing	9
15A5. Protect high-quality focal habitats	8
17A7. Restore fragmented/degraded sagebrush areas	8
11A3. Designate minimum flow requirements	7

These top strategies were taken into account in identifying which types, or "bundles" of strategies have the greatest effect in addressing the key limiting factors in the Subbasin.

Relevant Objectives	Key Limiting Factors					
	Water Flow	Watershed Disturbance /Land Conversion	Invasive/ Exotics	Grazing/ Browsing	Water Quality/ Sediment	SCORE
11A – Restore flows	5				1	6
11B – Reduce water temperature						
11C – Reduce sedimentation					1	1
11D – Nutrient reduction					1	1
11E – Reduce blocked streams						
11F – Improve aquatic habitat diversity						
12A – Prevent weed introduction			3	2		5
12B – Reduce weed extent			3			3
13A – Manage a natural historic fire regime						
14A – Manage grazing to reduce impact				2		2
14B – Reduce livestock/wildlife conflicts				2		2
15A – Minimize impact of development/roads		4	3			7
17A – Protect shrub-steppe habitats			3			3
18B – Restore historic native grasslands			3			3
19A – Protect/enhance wetlands/spring habitats	5	4			1	10
19B – Protect/enhance riparian habitats	5	4		2	1	12
19C – Restore hydrologic processes	5	4			1	10

Objective Scoring

The Subbasin Management Plan packages groups of interrelated strategies that meet an overriding objective. It is important to identify which objectives, taken together, are the most effective in addressing the key limiting factors in the Subbasin. The strategy scoring system described above was an important first step in identifying the types of strategies are the most important, and which objectives contain most of those top strategies.

Once the top objectives were identified, a separate analysis was conducted to evaluate the relative effectiveness of these various objectives in addressing the key limiting factors in the Subbasin. Similar to the strategy scoring system described above, a simple weighted scoring matrix was used to evaluate the relative impact of the objectives. This matrix further revealed which objectives were the most effective across the entire Subbasin, and therefore should be given a higher priority. The scoring matrix is presented below, and is included (without the scoring) in the supplement report to illustrate the relationship of the objectives and key limiting factors.

Final Prioritization

The final list of Implementation Priorities was based largely on the objectives scoring table above. However, some minor adjustments were made after comparing the results of the scoring analysis to the rankings of the key limiting factors. One of these adjustments elevated "restoring water flows" from fifth priority in the above table to fourth priority overall. This decision was largely based on the recognition that water flows were identified as the highest priority limiting factor in the Subbasin. The fourth priority ranking appears to be reasonable because the first, second and third priorities all influence water flows in the Subbasin.

Based on the analysis described above, the top six implementation priorities for the Mid-Snake Subbasin were identified to be:

1. Protect, enhance or restore riparian habitats *(Objective 19B)*
2. Protect, enhance or restore wetlands and spring habitats *(Objective 19A)*
3. Restore hydrologic processes *(Objective 19C)*
4. Restore water flows *(Objective 11A)*
5. Minimize impacts of development and roads *(Objective 15A)*
6. Prevent weed introduction *(Objective 12A)*

The supplemental report describes each of these Implementation Priorities, the primary strategies that they represent, and the limiting factors that they address.