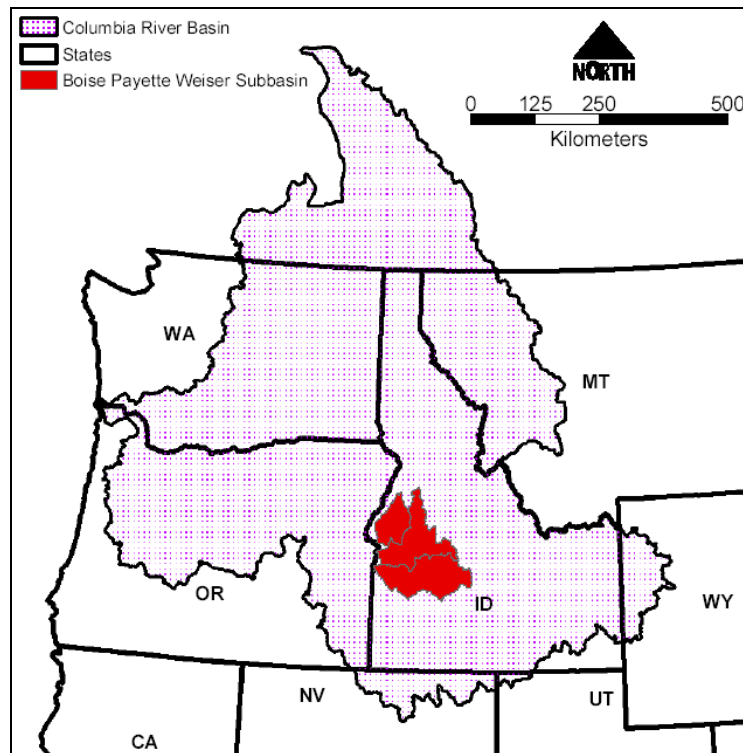


Boise, Payette, and Weiser

Subbasins Management Plan

May 2004



Written by:
Ecovista

Contracted by:
Shoshone-Paiute Tribes

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1 Introduction

The *Boise, Payette, and Weiser Subbasins Plan* has been developed as part of the Northwest Power and Conservation Council's (NPCC, formerly called Northwest Power Planning Council, or NPPC) Fish and Wildlife Program. This plan will help direct Bonneville Power Administration's (BPA) funding of projects that mitigate for damage to fish and wildlife caused by the development and operations of the Columbia River's hydropower system. Subbasin plans are to be developed in an open public process that includes the participation of a wide range of state, federal, local, and tribal governments; local managers; landowners; and other stakeholders, a process the NPCC hopes will ensure support of the final plan and direct funding to fish and wildlife projects that will do the most good.

An adopted subbasin plan is intended to be a living document that increases analytical, predictive, and prescriptive ability to restore fish and wildlife. This *Boise, Payette, and Weiser Subbasins Plan* will be updated every three to five years to include new information that will guide revision of the biological objectives, strategies, and the implementation plan. The NPCC views plan development as a continual process of evaluation and refinement of the region's efforts through adaptive management, research, and evaluation. More information about subbasin planning can be found at <http://www.nwcouncil.org>.

The Boise, Payette, and Weiser (BPW) subbasins include 3 of 62 subbasins in the region. Discrepancies exist between the maps, textual descriptions, and work plans for the subbasins on NPCC's website (NPCC 2003). The subbasin boundaries used in this document are consistent with those used in the subbasin summaries and the work plan: they include all the land draining the Boise, Payette, and Weiser rivers.

The *Boise, Payette, and Weiser Subbasins Plan* includes three interrelated volumes that describe the characteristics, management, and vision for the future of the BPW subbasins:

Assessment (Volume 1)—The assessment is a technical analysis that examines the biological potential of the BPW subbasins to support key habitats and species, as well as the factors limiting this potential. These limiting factors provide opportunity for restoration. The assessment describes existing and historic resources and conditions within the subbasin, focal species and habitats, environmental conditions, impacts outside the subbasins, ecological relationships, and limiting factors, and it provides a final synthesis and interpretation. The Fisheries and Terrestrial Technical Assessment Teams (called Technical Teams in this management plan) were formed to guide the development of the assessment and technical portions of the management plan. They were composed of scientific experts with the biological, physical, and management expertise to refine, validate, and analyze data used to inform the planning process (section 1.1.5).

Inventory (Volume 2)—The inventory summarizes fish and wildlife protection, restoration, and artificial production activities and programs within the BPW subbasins that have occurred over the last five years or are about to be implemented. The information includes programs and projects, as well as locally developed regulations and ordinances that provide protections for fish, wildlife, and habitat.

Management Plan (Volume 3)—This management plan defines a vision for the future of the subbasin, including biological goals and strategies for the next 10 to 15 years. The management plan includes a research, monitoring, and evaluation plan to ensure that implemented strategies succeed in addressing limiting factors and to reduce uncertainties and data gaps. The management plan also includes information about the relationship between proposed activities and the Endangered Species Act (ESA) and the Clean Water Act (CWA). Finally, the plan includes a gap analysis that outlines which programs and projects currently address the objectives and strategies and where additional work needs to be developed. The Planning Team, composed of representatives from government agencies with jurisdictional authority and other stakeholders in the subbasin, was formed to guide the development of the management plan (section 1.1.4).

The Planning Team is composed of representatives from government agencies with jurisdictional authority in the subbasin, fish and wildlife managers, county and industry representatives, and private landowners. The Planning Team's primary responsibility was to guide the public involvement process, develop the vision statement, review the biological objectives, and participate in prioritizing subbasin strategies. Regular communication and input among team members occurred at the inception of and throughout the planning process. The Planning Team met monthly throughout the project period.

The plans for this and each of the subbasins are developed through a process designed to involve the public and natural resource management within the subbasin. The Project Team, composed of staff from Ecovista, Idaho Department of Fish and Game (IDFG), and the Idaho Council on Industry and the Environment (ICIE), was formed to develop and document, under the guidance of the Technical and Planning Teams, the *Boise, Payette, and Weiser Subbasins Plan: the assessment, the inventory, and the management plan, including public comments* (section 1.1.3). The completed plan was submitted to the NPCC by the Shoshone-Paiute Tribes. The following sections detail the entities involved in resource management within the BPW subbasins and describe the planning, public involvement, and review procedures.

1.1 Contract Entities and Plan Participants

Multiple agencies and entities are involved in managing and protecting fish and wildlife populations and their habitats in the BPW subbasins. Federal, state, and local regulations, plans, policies, initiatives, and guidelines are part of this effort and share co-management authority over the fisheries resource. Federal involvement in this arena stems from ESA responsibilities and management responsibilities for federal lands. Numerous federal, state, and local land managers are responsible for multipurpose land and water use management, including protecting and restoring fish and wildlife habitat. The contract entities and plan participants involved in development of the BPW subbasins plan are outlined below.

1.1.1 Shoshone-Paiute Tribes (SPT) of Duck Valley Indian Reservation

The SPT served as lead entity for subbasin planning for the BPW Subbasins. The Tribes contracted with the NPCC to deliver the BPW Subbasins Plan. The Tribes provided an opportunity for participation in the process by fish and wildlife managers, local interests, and other key stakeholders, including tribal and local governments.

The Shoshone-Paiute Tribes are responsible for managing, protecting, and enhancing fish and wildlife resources and habitats on the Duck Valley Indian Reservation (which encompasses portions of the Owyhee and Bruneau subbasins) as well as surrounding areas in the Lower Middle Snake Province where the tribes held aboriginal title. They are a self-governance tribe as prescribed under Public Law 103-414. A seven member Tribal Business Council is charged with making decisions on behalf of 1,818 tribal members.

The Wildlife and Parks Department, with direction from the Tribal Business Council, is responsible for fish and wildlife species monitoring and management, recovery efforts, mitigation, research, management of the tribal fisheries, and enforcement of fishing and hunting regulations. The department implements fish and wildlife restoration and mitigation activities toward the goal of restoring properly functioning ecosystems and species assemblages for present and future generations to enjoy.

1.1.2 Northwest Power and Conservation Council

The NPCC has the responsibility to develop and periodically revise the Fish and Wildlife Program for the Columbia Basin. In the 2000 revision, the NPCC proposed that 62 locally developed subbasin plans, as well as plans for the mainstem Columbia and Snake Rivers, be adopted into its Fish and Wildlife Program. The NPCC will administer subbasin planning contracts pursuant to requirements in its Master Contract with the BPA (NPPC 2000). The NPCC will be responsible for reviewing and adopting each subbasin plan, ensuring that it is consistent with the vision, biological objectives, and strategies adopted at the Columbia Basin and province levels.

1.1.3 Bonneville Power Administration

The BPA is a federal agency established to market power produced by the federal dams in the Columbia River basin. As a result of the Northwest Power Act of 1980, BPA is required to allocate a portion of power revenues to mitigate the damages caused to fish and wildlife populations and habitat from federal hydropower construction and operation. These funds are provided and administered through the Lower Snake River Compensation Plan (LSRCP, ACOE 1975).

1.1.4 Project Team

In addition to its own staff, the Shoshone-Paiute Tribes hired two contractors to help with the planning process and writing plan documents for the BPW subbasins: Ecovista to work on the management plan and the ICIE to organize and carry out the public involvement and public relations tasks. Under a separate contract, the IDFG developed the assessment and the inventory for the BPW subbasins. Staff from these contractors served on the Project Team (Table 1), and Project Team members were not Technical or Planning Team members. For information concerning the assessment, inventory, and plan, contact Ecovista at 509-334-9438. For information concerning the public involvement process, contact Pat Barclay at 208-336-8508.

Project Team members facilitated meetings and participated only to accurately represent decisions made at the meetings by the Planning and Technical Team members.

Table 1. Names, affiliations, and roles of people on the Project Team for the BPW subbasins.

Name	Affiliation	Position
Darin Saul	Ecovista	Project coordinator, technical writer and editor
Lisa Audin	Ecovista	Aquatic ecologist, technical writer
Lance Hebdon	IDFG	Fisheries biologist, technical writer
Jon Beals	IDFG	Wildlife biologist, technical writer
Tim Dykstra	Shoshone-Paiute Tribes	Wildlife biologist, technical writer
Lisa Jim	Shoshone-Paiute Tribes	Executive Assistant/contract coordinator
Pat Barclay	ICIE	Public involvement coordinator

1.1.5 Planning Team

The Planning Team for the BPW subbasins is composed of representatives from government agencies with jurisdictional authority in the subbasins, fish and wildlife managers, county and industry representatives, and private landowners (Table 2 and Table 3). The Planning Team's primary responsibilities were to guide the public involvement process, develop the vision statement, review the biological objectives, and participate in prioritizing subbasin strategies. Regular communication and input among team members occurred at the inception of and throughout the planning process. The Planning Team met monthly throughout the project period. See Appendix A for details on recruitment for and participation on the BPW Planning Team.

Table 2. Names and affiliations of regular participants of the Planning Team for the BPW subbasins.

Name	Affiliation
Gayle Batt	Idaho Water Users Association
Paul Bryant	U.S. Forest Service, Boise National Forest
Guy Dodson	Shoshone Paiute Tribes
Tim Dykstra	Shoshone Paiute Tribes
Jerry Hoaglun	Owyhee County Natural Resources Committee
Guy Hopkins	Idaho Association of Soil Conservation Districts
Becky Johnstone	McCall and Donnelly Chamber, Valley Co. Snowmobile Groomer Advisory Committee
Tom Kerr	Valley County Commissioner
Scott Koberg	Idaho Association of Soil Conservation Districts
Jim Little	Rancher, Emmett, ID
Herb Malany	Eagle, ID, retired forester
Russ Manwaring	West Central Highlands Resource Conservation and Development Council
Greg Moody	Bureau of Land Management
Chris Reighn	U.S. Fish and Wildlife Service
Al Van Vooren	Idaho Department of Fish and Game

Table 3. Names and affiliations of occasional participants of the Planning Team for the BPW subbasins. These people followed the process by e-mail.

Name	Affiliation
Jamie Anderson	Garden Valley Recreation District
Judy Bartlett	Idaho Farm Bureau Federation
Claude O. Bruce	Payette, Idaho, farmer
Jeff Dillon	Idaho Department of Fish and Game
Steve Duke	U.S. Fish and Wildlife Service
Tim Hart	Valley Soil and Water Conservation District
Marilyn Hemker	U.S. Fish and Wildlife Service
Lloyd B. Knight	Idaho Cattle Association
Todd Lakey	Canyon County Commissioner
Rick Michael	Washington County Commissioner
Ron Shurtleff	Water District 65
Don Sonke	Idaho Farm Bureau Federation
Dennis Tanikuni	Idaho Farm Bureau Federation

1.1.6 Technical Teams

The Fisheries and Terrestrial Technical Teams included scientific experts who guided the development of the subbasin assessment and management plan (Table 4). These teams had the biological, physical, and management expertise to refine, validate, and analyze data used to inform the planning process. The Technical Teams also guided and participated in developing the biological objectives and strategies and the research, monitoring, and evaluation sections of the plan. Members also reviewed all project documents. The BPW Technical Teams met monthly throughout the process, participated in workshops that were one or more days long, and focused on inputting professional knowledge and judgment to fill data gaps.

1.2 Public Outreach and Government Involvement

As the *Boise, Payette, and Weiser Subbasins Plan* was developed, four methods of outreach and public and governmental participation were used in the BPW subbasins: Technical Team meetings, Planning Team meetings, public meetings, and a website.

1.2.1 Technical Team Participation

The Technical Teams were composed of members that have technical expertise in fish, wildlife, and habitat resources in the BPW subbasins. The meetings were held mornings and, when necessary, afternoons of the third Tuesday of every month in Boise at the IDFG state office and were open to the public. Meeting agendas and minutes were posted on the Ecovista website (2003) and provided at public meetings. The Technical Teams reviewed and gave input on the technical aspects of the subbasin plan; this input is in large part documented in the *Boise, Payette, and Weiser Subbasins Assessment*.

Table 4. Names and affiliations of participants of the Technical Teams for the BPW subbasins.

Name	Affiliation
Allen Dale	Idaho Department of Fish and Game
Bruce Haak	Idaho Department of Fish and Game
Jeff Dillon	Idaho Department of Fish and Game
Mike McDonald	Idaho Department of Fish and Game
Brian Flatter	Idaho Department of Fish and Game
Paul Janssen	Idaho Department of Fish and Game
Dan Kenney	U.S. Forest Service, Sawtooth National Forest
Tom Vendolin	U.S. Forest Service, Sawtooth National Forest
John Chatel	U.S. Forest Service, Sawtooth National Forest
Dave Burns	U.S. Forest Service, Payette National Forest
Floyd Gordon	U.S. Forest Service, Payette National Forest
Rodger Nelson	U.S. Forest Service, Payette National Forest
Karen Katchu	U.S. Forest Service, Payette National Forest
Lisa Nutt	U.S. Forest Service, Boise National Forest
Michael Kellett	U.S. Forest Service, Boise National Forest
Dave Hogen	U.S. Forest Service
Lowell Suring	U.S. Forest Service
Mark Robertson	U.S. Fish and Wildlife Service
Chris Reighn	U.S. Fish and Wildlife Service
Cary Myler	U.S. Fish and Wildlife Service
Don Zaroban	Idaho Department of Environmental Quality
Bryan Horsburgh	Idaho Department of Environmental Quality
Chris Randolph	Idaho Power Company
Tim Dykstra	Shoshone-Paiute Tribes
Guy Dodson	Shoshone Paiute Tribes
Greg Moody	Bureau of Land Management
Matt Dare	Boise State University
Mary McGown	Idaho Department of Water Resources

1.2.2 Planning Team Participation

The Planning Team was composed of members having expertise in and knowledge about natural resource management or socioeconomic issues in the BPW subbasins. See Appendix A for a summary of Planning Team recruitment.

The meetings were held the third Tuesday of every month in Boise at the IDFG state office and were open to the public. Meeting agendas and minutes were mailed to team members and others who wished to be kept apprised of the planning process. They were also posted on the Ecovista website (2003) and provided at Planning Team meetings. The Planning Team developed the

vision statement, the socioeconomic objectives and strategies, and the recommendations section of the plan.

1.2.3 Public Meeting Outreach

Three public meetings were held to introduce the subbasin planning process and provide an opportunity for input from local people and resource managers. Pat Barclay of the ICIE coordinated public meeting announcements and logistics for the BPW subbasins. Public meeting outreach is summarized in Appendix A.

1.2.4 Ecovista Website Information

As the *Boise, Payette, and Weiser Subbasins Management Plan* was developed, draft documents and information on meetings, the subbasin, and subbasin planning were posted on the Ecovista website (2003).

1.3 Review Process

The *Boise, Payette, and Weiser Subbasins Assessment* and *Boise, Payette, and Weiser Subbasins Management Plan* were available for review through e-mail notification lists compiled by the Project Team. The assessment was posted for review on the IDFG website (2004) February 23 and March 31, 2004. Planning documents were posted on the Ecovista website (2004) January 13, February 6, March 12, and April 15, and May 10, 2004, and reviewed during Technical and Planning Team meetings. The focal species, focal habitats, and limiting factors from the assessment were presented at the second and third public meetings in March and April. (The first meeting was an introduction to subbasin planning.) The vision for the subbasins, problem statements, and objectives from the management plan were also presented in March. Prioritizations for the subbasins were presented and discussed during the April public involvement meeting. Through this review process, comments, suggestions, and clarifications were received from local, state, tribal, and federal representatives having relevant professional expertise, as well as from landowners and other stakeholders in the subbasins.

Time was not available to obtain letters of endorsement of the plan by the Planning Team. (Once available, they will be included in Appendix B.) During development of the management plan (section 7 about recommendations and conclusions), the Planning Team described positive aspects of this process. The process provided positive interaction with stakeholders, resulting in information to direct future implementation activities in the subbasins. It also provides a rationale for increasing BPA funding for activities in the BPW subbasins. Pat Barclay is working to obtain letters of endorsement to be sent to the NPCC during the public review process. On behalf of the Shoshone-Paiute Tribes, Ecovista forwarded the *Boise, Payette, and Weiser Subbasins Management Plan* to the NPCC for adoption on May 28, 2004.

The summer schedule for the independent scientific review of subbasin plans has been developed. For a majority of the subbasin plans, the Independent Scientific Review Panel (ISRP)/Independent Scientific Advisory Board (ISAB) review process begins immediately following the May 28 deadline and concludes with submittal of final reports to the NPCC by August 12, 2004. The *Boise, Payette, and Weiser Subbasins Plan* will be reviewed during week 4: June 28 through June 30.

To complete the review, about ten review teams and one basinwide umbrella committee have been established. The review teams are organized to review sets of subbasin plans grouped by province. Each team consists of six or more reviewers and includes a mix of ISRP, ISAB, and Peer Review Group members. The umbrella group will help ensure a consistent level of review scrutiny and comment quality (NPCC 2004).

A review checklist and comment template is being developed for the ISRP/ISAB review of subbasin plans based on the NPCC's *Technical Guide for Subbasin Planners* and will include the NPCC's review questions. Reviewers must evaluate whether the subbasin plans are 1) complete, scientifically sound, and internally consistent following a transparent and defensible logic path and 2) externally consistent with the vision, principles, objectives, and strategies contained in the NPCC's 2000 Fish and Wildlife Program. The checklist also asks reviewers to evaluate whether the plan satisfactorily provides the assessment, inventory, and management elements requested by the NPCC and to recommend the level of need to further treat a specific element of the subbasin plan before the plan meets the criteria of completeness, scientific soundness, and transparency. A sample of the checklist and template was made available in March (NPCC 2004).

Regarding plan adoptability, the NPCC's Legal Division is organizing a framework that NPCC members may use to make the determinations required by the Federal Power Act relative to subbasin plan amendment recommendations. The framework is essentially a way of organizing our review around the act's standards that apply to program amendments for the Fish and Wildlife Program measures found in section 4(h) and standards set in the 2000 Fish and Wildlife Program in the unique context of subbasin plans. The framework will be discussed with NPCC members in the near future.

2 Vision for BPW Subbasins

This vision and guiding principles for the *Boise, Payette, and Weiser Subbasins Management Plan* were developed by the Planning Team. The vision was developed to present a common goal and desirable future for the subbasin. Any dissenting viewpoints are presented in Appendix E. The guiding principles are components of the vision and represent actions to be followed for obtaining the vision. These principles are not listed in order of their ranking; they are meant to be understood as important and interconnected.

2.1 Vision Statement

The vision for the BPW subbasins is healthy, productive ecosystems with diverse aquatic and terrestrial species that will support sustainable resource-based industries that provide goods and services and other activities for a growing human population.

2.2 Guiding Principles

- Respect and honor private property rights and recognize projects made by individuals, partnerships, and corporations that have protected, improved, or restored ecosystems.
- Respect, recognize, and honor the legal authority, jurisdiction, tribal rights, and legal rights of all parties, as well as the current local conditions, values, and priorities of the subbasins.
- Identify and prioritize projects and utilize resources to implement the *Boise, Payette, and Weiser Subbasins Management Plan* and the Pacific Northwest Electric Power Planning and Conservation Act, including the ESA and local, state, federal, and tribal programs, obligations, and authorities.
- Encourage ecosystem enhancement and stewardship of natural resources, while recognizing all components of the ecosystem, including the human component.
- Provide educational information and opportunities to residents of the BPW subbasins to promote understanding and appreciation of the need to protect and enhance a healthy and properly functioning ecosystem.
- Provide opportunities for natural resource-based economies to coexist and to participate in the protection and recovery of aquatic and terrestrial species.
- Promote local participation in natural resource problem solving and subbasinwide conservation efforts.
- Develop a scientific foundation for diagnosing ecosystem problems, designing and prioritizing projects, and implementing monitoring and evaluation projects to improve results of future efforts.

- Recognize the species and habitats compatible with altered ecosystems where habitats are irrevocably changed and manage without further negative impacts on native species and habitats.
- Enhance species populations to a level of healthy and harvestable abundance to support tribal and public harvest goals.

3 Problem Statements, Objectives, and Strategies

The various components (problem statements, biological objectives, and strategies) of the *Boise, Payette, and Weiser Subbasins Management Plan* described in this section have been developed from information presented in the BPW subbasins assessment and inventory. References to information contained in other volumes of the *Boise, Payette, and Weiser Subbasins Plan* or to sections of this management plan are provided, where applicable, to aid readers in finding more detailed information regarding particular problem statements, objectives, and strategies.

Although the problem statements, objectives, and strategies are commonly related to individual species or communities, none of these ecosystem components functions independently. Any actions that benefit or harm one species within the subbasins also impact other species (aquatic or terrestrial, including humans) that rely on that species. In addition, every action has social, political, and economic implications that must be addressed.

Social, economic, and political factors in the BPW subbasins are important considerations in determining the success of the implementation phase of this management plan. These factors are referenced in the vision and guiding principles for the BPW subbasins and must be considered at all levels of the planning process, including development of appropriate problem statements, objectives, and strategies. Accounting for the human component of the subbasins increases the probability that this plan will be successfully implemented and viewed as a necessary, socially acceptable, and reasonable step in the protection and recovery of aquatic and terrestrial species in the subbasins.

3.1 Problem Statement Summary

The problem statement summary is technically called the *working hypothesis* in NPCC documents. Both terms are intended to provide a scientific basis for developing biological objectives and strategies. In this plan, we follow the recommendation of the ISRP (2001) to state the hypotheses as problem statements. The problem statement draws from the scientific foundation that underlies the NPCC's Fish and Wildlife Program. The NPCC recognizes eight scientific principles (NPCC 2001, p. 15) that form the scientific foundation, and all actions taken to implement the program must be consistent with these principles. The problem statement developed for the BPW subbasins is based on information and findings presented in the subbasin assessment, thereby summarizing the available scientific information and knowledge in developing the management plan. The problem statement summary provides an explicit scientific rationale under which various component problem statements, objectives, and strategies are organized to provide a linkage between the science and strategies presented within this plan.

Focal species in the subbasins were identified as having special ecological, cultural, or legal status, or could be used to evaluate the health of the ecosystem and effectiveness of management actions. These species were selected primarily because they are species at risk, and can be used as indicators for related species in similar focal habitats (assessment section 2 about biological resources). Understanding ecological roles of fish and wildlife in different habitat types is important to decision makers because it aids in understanding the consequences of management

actions (assessment section 3 about limiting factors for the biological resources). For ecosystems to provide the maximum amount of habitat quantity and quality for native species all components of the ecosystem must be functioning. Each component of the ecosystem performs a different function though none of the components functions in isolation.

Focal habitats and species are limited in the BPW by habitat quality, habitat quantity, predation, harvest, competition, linkage/fragmentation and disease (assessment section 3 about limiting factors for the biological resources). Limiting factors are caused by a variety of actions such as: 1) altered fire regimes (primarily fire suppression practices), 2) grazing/browsing by livestock, 3) altered hydrologic regimes (impoundments, channel modifications and diversions), 4) timber harvest, 5) land-use conversion (both urban and agricultural), and 6) invasive and exotic species introductions. These activities have altered the composition and distribution of the focal habitats and the species associated with them within the BPW subbasins, in addition to modifications through natural disturbance events such as flooding and fire (see assessment section 3 about limiting factors for biological resources). These anthropogenic disturbances, without balance, cause risks to ecological integrity by reducing biodiversity and threatening species across broad geographic areas.

3.2 Problem Statements, Objectives, and Strategies

The following list of component problem statements, objectives, and strategies is derived from the problem statement summary. Biological objectives describe the physical and biological changes needed to achieve the vision, consistent with the scientific principles. Strategies provide specific steps necessary to accomplish the biological objectives. The strategies and biological objectives were developed from the factors limiting focal species and habitats in the subbasins, as well as conditions that inhibit natural ecological processes, as described in the subbasin assessment.

For organizational purposes, problem statements, objectives, and strategies are grouped by three categories: biological, environmental, and socioeconomic components, although these three components are intrinsically linked. The problems, objectives and strategies under biological components are generally directed toward fish and wildlife populations, when sufficient data exists. Problems and the objectives and strategies meant to address habitat for fish and wildlife populations are listed under environmental components. The biological objectives were developed by the Project and Technical Teams, with support from the Planning Team. Objectives and strategies addressing the human components of protecting and enhancing fish and wildlife populations and their habitats are considered socioeconomic components. Objectives for socioeconomic components, as appropriate, were developed by the Planning Team.

The Planning Team considers these three components critical to successfully implementing the *Boise, Payette, and Weiser Subbasins Management Plan*. Economic and social objectives, as appropriate, were developed by the Planning Team. Recommendations for further data collection or prioritization were noted where data gaps limit development of sound biological objectives and strategies. These information needs are further detailed in section 4 about research, monitoring, and evaluation.

Objectives are consistent with the four overarching biological objectives for the 2000 Columbia River Basin Fish and Wildlife Program (NPCC 2004):

1. A Columbia River ecosystem that sustains an abundant, productive, and diverse community of fish and wildlife.
2. Mitigation across the basin for the adverse effects to fish and wildlife caused by the development and operation of the Columbia Basin hydropower system.
3. Sufficient populations of fish and wildlife for abundant opportunities for tribal trust and treaty right harvest and for non-tribal harvest.
4. Recovery of fish and wildlife that are listed under the Endangered Species Act and that are affected by the development and operation of the Columbia basin hydrosystem.

Formatting of the problem statements, objectives, and strategies follows the recommendations made by the ISRP in their review of the *Clearwater Subbasin Plan* (ISRP 2002). The ISRP's suggested format was consistent with guidance in the Technical Guide (NPCC 2001) and used in this document with minor modifications.

3.3 Biological Components

The problem statements and biological objectives developed to address potential limiting factors in the BPW subbasins are summarized in Table 5. The associated strategies are detailed in the text. These problems, objectives and strategies are generally directed toward fish and wildlife populations, when sufficient data exists. This section is divided into two parts, the objectives and strategies to solve problems for aquatic species, followed by those for terrestrial species.

Table 5. Problems statements and biological objectives for the BPW subbasins. These must be taken in context with associated strategies and discussion comments in this section about biological components.

Problem Statements		Biological Objectives	
Aquatic Species			
1	Anadromous fish have been extirpated from the subbasins, with widespread impacts on aquatic ecosystems and user groups.	1A	Rehabilitate aquatic ecosystems and restore user opportunities impacted by the loss of anadromous fish components.
2	Bull trout within the BPW subbasins are not as widely distributed or abundant as they used to be.	2A	Maintain and increase bull trout distribution and abundance (greater than or equal to 500 adults) within historic range in the local population watersheds.
		2B	Meet criteria in the draft recovery plan for bull trout
		2C	Reduce and prevent impacts of brook trout on bull trout. Identify overlapping distributions of brook trout and bull trout.
3	Redband trout populations are reduced throughout much of the subbasin due to high temperatures, habitat alteration, flow limitations, drought, limited connectivity, and competitive or other interactions with hatchery or other introduced species. Many relevant actions are addressed through environmental objectives 6A through 6E (connectivity, flow, temperature, sediment, nutrients) and 7A (habitat complexity). Relevant biological considerations include the continued existence of core populations, satellite populations, hatchery rainbow trout influence, and isolation from migratory stocks.	3A	Ensure continued existence of high-density (core) redband trout populations at or near current levels identified in assessment section 2.2.1.2.
		3B	Ensure continued existence of moderate- or low-density (satellite) redband trout population areas identified in assessment section 2.2.1.2 (with information from the Native Salmonid Assessment [NSA]) and move forward with restoration in prioritized areas and establishment of priorities for undefined areas.
		3C	Evaluate hybridization between hatchery rainbow trout and redband trout, where it occurs, within 10 years.
		3D	Evaluate the effect of the loss of the migratory life history component from local populations of redband trout (including anadromous).
4	Long-term persistence and abundance of native resident fish species within the BPW subbasins are of concern.	4A	Increase data collection and prioritization of restoration efforts to protect and rebuild populations of native fish species in the BPW subbasins to self-sustaining, harvestable levels to the extent possible.
5	Limited understanding of the composition, population trends, and habitat requirements of the wildlife and plant (terrestrial) communities limits the ability to effectively manage or conserve these species.	5A	Increase understanding of the composition, population trends, and habitat requirements of the terrestrial communities of the BPW subbasins.

3.3.1 Aquatic Species

Problem 1: Anadromous fish have been extirpated from the subbasins, with widespread impacts on aquatic ecosystems and user groups (Appendix C).

Biological Objective 1A: Rehabilitate aquatic ecosystems and restore user opportunities impacted by the loss of anadromous fish components.

Strategies:

- 1A1. Participate in province and basinwide coordinated studies and water management forums to manage out-of-subbasin impacts. Out-of-subbasin factors require allocation of water for summer augmentation flows. This impacts reservoir operations and resident fish populations in the BPW subbasins. Conduct research within the context of identifying impacts. Work with other entities to ameliorate and mitigate limiting factors (see Table 11 in section 4.2 about research needs).
- 1A2. Evaluate effects of lost anadromous components on the aquatic ecosystems in the subbasins (see Table 11 in section 4.2 about research needs).
- 1A3. Continue to investigate the feasibility of restoring anadromous fish runs above Hells Canyon Dam (see Table 11 in section 4.2 about research needs).
- 1A4. Compensate for lost opportunities to user groups related to diminished fish runs and ecological function.

Problem 2: Bull trout within the BPW subbasins are not as widely distributed or abundant as they used to be (see assessment section 2.2.1.1 about bull trout).

Biological Objective 2A: Maintain and increase bull trout distribution and abundance (greater than or equal to 500 adults) within historic range in the local population watersheds identified in Table 2-4 (southwestern Idaho bull trout recovery subunits and core areas) and Figure 2-13 (local and potential populations of bull trout in the BPW subbasins) in assessment section 2.2.1.1 about bull trout.

Strategies:

- 2A1. Maintain existing self-sustainable (categorized as strong in 2003 USFS Land Resource Management Plan) local populations by protecting existing water temperature, stream flows, habitat quality, connectivity, and invasion from nonnative species (see Table 13 in section 4.3 about monitoring and evaluation).
- 2A2. Increase depressed local populations to at least 500 adults by following environmental objectives 6A through 6E (flows, temperature, sediments,

nutrients, and passage), 7A (habitat complexity), and 9A (reservoir operations) to restore habitat where limiting (see Table 13 in section 4.3 about monitoring and evaluation).

- 2A3. Consider supplementation of bull trout within suitable depressed (less than 50 adults) local population watersheds. Prioritize based on connectivity to a migratory population and/or strong refugia population and presence of suitable habitat (see section 4.1 about data gaps).
- 2A4. Monitor and evaluate biological response by sampling strong populations every 5 years. Sample depressed populations every 3 years. Integrate new data and information into strategies 1 and 2 to reclassify population status as indicated by monitoring results. Adapt protection and restoration measures as necessary.

Discussion: The maintenance or increased distribution and abundance of bull trout to greater than or equal to 500 adults in local populations was determined to be a stable population level with adequate genetic variation (USFS 2003). Populations of less than 50 adults are considered depressed (USFWS 2002).

Recommendations from the subbasin summary process were to determine status of fluvial migratory bull trout in the upper South Fork Payette River, including abundance, life history, and migratory patterns, and to improve knowledge of status, life history, and habitat use for bull trout in the upper Deadwood River.

Biological Objective 2B: Meet criteria in the draft recovery plan for bull trout (USFWS 2002).

Strategies:

- 2B1. Maintain current distribution of bull trout in the 54 local populations identified (Table 6) and expand distribution by establishing local populations of bull trout in areas identified, by the recovery plan (USFWS 2002), as potential spawning and rearing habitat (see the discussion below, assessment section 2.2.1.1 about bull trout and assessment Figure 2-13 about local and potential populations of bull trout in the BPW subbasins). The following are numbers of existing local populations by recovery subunit and core area: Boise River Recovery Subunit, 31 existing local populations; Payette River Recovery Subunit, 18 existing local populations; and Weiser River Recovery Subunit, 5 existing local populations. Establishing at least one new local population each in the Lucky Peak, Middle Fork Payette River, North Fork Payette River, Squaw Creek, and Weiser River core areas is necessary, if evaluations indicate that it is feasible in a specific core area (USFWS 2002) (see Table 13 in section 4.3 about monitoring and evaluation).
- 2B2. Maintain or increase the estimated abundance of adult bull trout in the BPW subbasins (Southwest Idaho Recovery Unit) to at least 17,600

individuals (Table 6) (USFWS 2002) (see Table 13 in section 4.3 about monitoring and evaluation).

- 2B3. Ensure that adult bull trout exhibit stable or increasing trends in abundance in the Southwest Idaho Recovery Unit (*i.e.*, BPW subbasins) (see Table 13 in section 4.3 about monitoring and evaluation).
- 2B4. Remove specific barriers to bull trout migration in the Southwest Idaho Recovery Unit (*i.e.*, BPW subbasins). The USFWS draft bull trout recovery plan (2002) recommends continued passage provided for (*e.g.*, using the existing trap-and haul program) bull trout at Arrowrock Dam and the identification, assessment, and modification of potential passage barriers in the Lucky Peak Core Area of the Boise River Recovery Subunit. In addition, passage at the Gold Fork River irrigation diversion and the identification, assessment, and modification of potential passage barriers in the Squaw Creek, North Fork Payette River, Payette River, and Weiser River Recovery core areas (see Table 13 in section 4.3 about monitoring and evaluation).
- 2B5. Sample strong bull trout populations every 5 years and depressed populations every 3 years to monitor and evaluate biological response to recovery efforts.

Discussion: Priority should be placed on restoring functional bull trout populations within their documented distribution. Such populations should be considered experimental and not regulated under ESA to alleviate concerns about implications for land planning.

A summary of values for recovery criteria at the watershed scale is presented in Table 6; The Fisheries Technical Team is concerned about the specific numbers and costs associated with determining these numbers. There is agreement that a “bar” (*i.e.*, specific numbers) is needed to measure success, but there is not agreement about what the specific numbers mean or should mean. The team questioned whether the numbers are biologically feasible, defensible, and, if reached, whether they would lead to recovery and delisting. They were also concerned about the number of years requirements would need to be met, as details were not available. Overall, the team felt there are not enough definitions about the specific numbers and time constraints did not allow for further development.

Table 6. Values for recovery criteria of bull trout (USFWS 2002).

Recovery Subunit	Number of Core Areas	Minimum Number of Local Populations	Adult Abundance	Trend in Abundance
Boise River	3	31	>10,100	stable or increasing
Payette River	5	18	>7,000	stable or increasing
Weiser River	1	5	>500	stable or increasing
Total	9	54	>17,600	stable or increasing

Biological Objective 2C: Reduce and prevent impacts of brook trout on bull trout. Identify overlapping distributions of brook trout and bull trout (assessment section 1.5.1 about fish species occurring in the subbasins and Table 1-2).

Strategies:

- 2C1. Based on current state of knowledge, prevent introduction and expansion of brook trout into bull trout habitats without compromising connectivity for bull trout. Evaluate brook trout threat prior to barrier removal or installation (see Table 13 in section 4.3 about monitoring and evaluation).
- 2C2. Identify and eradicate isolated populations of brook trout where feasible and limiting to bull trout (see section 4.1 about data gaps).
- 2C3. Compile and synthesize existing bull trout and brook trout survey data. Determine additional populations and areas impacted by hybridization problems by continuing and expanding surveys of both brook and bull trout that are underway, including standardized genetic sampling, to determine levels of hybridization (see Table 11 in section 4.2 about research needs). Use phenotypic/morphometric characteristics in the field using, when possible, genetic sampling for validation (IDFG 2002).
- 2C4. Determine the effects of brook trout on bull trout related to hybridization, competition, and habitat (see Table 11 in section 4.2 about research needs).
- 2C5. Determine the scale, if any, at which brook trout are invasive (see Table 11 in section 4.2 about research needs).
- 2C6. Prioritize additional areas impacted by hybridization and brook trout eradication projects at a finer scale than presented in this plan (see section 4.1 about data gaps).
- 2C7. Develop and test methods to prevent the spread of brook trout, thereby reducing the spread of impacts of hybridization on bull trout (see Table 11 in section 4.2 about research needs).

- 2C8. Monitor and evaluate eradication efforts under strategy 2C2. Integrate data into next reiteration along with other new data developed for objectives. Revise strategies as necessary to reflect new information and repeat strategies for subsequent iterations.

Discussion: In the BPW subbasins, competition between native and nonnative salmonids has resulted in displacement or isolation of some populations of bull trout and is currently a factor defined as limiting to bull trout populations in specific areas of the BPW subbasins (see assessment section 3.1 about limiting factors by watershed and assessment Table 3-2 about factors identified as constraining populations of salmonids and other aquatic species in the BPW subbasins). Brook trout threaten bull trout through hybridization and competition. However, limited data exist regarding the extent of bull × brook trout hybridization in the BPW subbasins, supporting the need for further research.

Brook trout eradication projects are usually very expensive and not very successful. Eradication should be lower priority than prevention of invasion (T. Salow, personal communication, March 14, 2004). The only brook trout removal effort known in these basins is on the Pikes Fork of the Boise River, resulting in little success and significant expense (T. Salow, personal communication, March 14, 2004). The question still remains as to whether it is possible to effectively eradicate brook trout, even in the smallest of areas. Thus, it is extremely important to focus efforts on preventing the spread of brook trout. Care must be taken during projects to restore connectivity to prevent the spread of brook trout.

Brook trout are the dominant salmonid in a number of watersheds in the BPW subbasins formerly or currently occupied by bull trout and redband trout (see assessment section 1.7.2.1). Brook trout distribution appears to be limited to a relatively small area of the Boise River drainage, with most observations in the Crooked River watershed. Hybridization has been documented in the lower Crooked River, Bear Creek, and lower Bear River tributaries of the Boise (USFWS 2002). Hybrids have also been observed in the upper Middle Fork and South Fork Boise Rivers (USFWS 2002). Bull trout are residing at lower elevations in streams lacking brook trout (e.g., Sheep, Anderson, and Olive creeks in the Weiser drainage), compared to streams with both species, suggesting that brook trout are influencing the distribution of bull trout (USFWS 2002). Priority watersheds for reduced competition include the Upper Crooked River, Lower Crooked River, Pikes Fork, Salt Creek, Upper Bear River, and Lower Bear River (IDFG 2002, USFWS 2002).

In the Payette River drainage, brook trout are locally abundant in the upper Middle Fork Payette River (e.g., Bull Creek) and are present in Squaw Creek and portions of the North Fork Payette River drainage (e.g., Gold Fork River and Lake Fork Creek) (USFWS 2002). Brook trout have not been documented in the Deadwood River drainage or in bull trout spawning and rearing habitat in the South Fork Payette River basin (USFWS 2002).

Brook trout are established in several areas throughout the Weiser River drainage (USFWS 2002). A comprehensive survey for brook trout has not been conducted for the basin; however, brook trout are known to co-occur with bull trout in the upper Little Weiser River, Dewey Creek, and East Fork Weiser River. Hybrids between bull trout and brook trout have been observed in the Little Weiser River and Dewey Creek (USFWS 2002).

Rainbow trout distribution also overlaps that of bull trout in the Weiser River basin (USFWS 2002). It is uncertain whether the stocked rainbow trout life histories and habitat needs differ from those of the native fish, potentially resulting in competition with bull trout (USFWS 2002) and native redband trout. Incidental harvest of bull trout by anglers fishing for rainbow trout or brook trout may also be negatively affecting bull trout (IDFG 2002).

Problem 3: Redband trout populations are reduced throughout much of the subbasin due to high temperatures, habitat alteration, flow limitations, drought, limited connectivity, and competitive or other interactions with hatchery or other introduced species. Many relevant actions are addressed through environmental objectives 6A through 6E (connectivity, flow, temperature, sediment, nutrients) and 7A (habitat complexity). Relevant biological considerations include the continued existence of core populations, satellite populations, hatchery rainbow trout influence, and isolation from migratory stocks.

Biological Objective 3A: Ensure continued existence of high-density (core) redband trout populations at or near current levels identified in assessment section 2.2.1.2.

Strategies:

- 3A1. Continue with the Native Salmonid Assessment (NSA), including activities aimed at identification of stocks endemic to BPW subbasins and introgressed populations (see section 4.1 about data gaps).
- 3A2. Expedite analysis of archived and/or additional necessary genetic samples to facilitate achievement of strategy 3A1 (see section 4.1 about data gaps).
- 3A3. Evaluate the need for focused restoration activities (begin with activities that address limiting factors in section 6.1 about aquatic prioritization) within core areas that will facilitate maintenance or increases in current population levels (see section 4.1 about data gaps).
- 3A4. Compile data from strategies 3A1 and 3A2 to aid future prioritization efforts.

Biological Objective 3B: Ensure continued existence of moderate- or low-density (satellite) redband trout population areas identified in assessment section 2.2.1.2 (with information from the Native Salmonid Assessment [NSA]) and move forward with restoration in prioritized areas and establishment of priorities for undefined areas.

Strategies:

- 3B1. Continue evaluation of redband population structure and limiting factors (e.g., NSA) (see section 4.1 about data gaps).
- 3B2. Evaluate restoration feasibility in priority areas identified in assessment section 2.2.1.2 and move forward with habitat restoration where feasible (see section 4.1 about data gaps).
- 3B3. Where unidentified in assessment section 2.2.1.2, establish restoration priority and feasibility for satellite population areas (see section 4.1 about data gaps).
- 3B4. Reprioritize actions as necessary based on development of new information (genetic analyses, population status, etc.).

Biological Objective 3C: Evaluate hybridization between hatchery rainbow trout and redband trout, where it occurs, within 10 years.

Strategies:

- 3C1. Determine extent of hybridization problems by sampling redband trout at historical rainbow trout stocking locations for evidence of genetic introgression. Develop a genetics protocol and monitoring plan that integrates past genetics work and includes documentation and interpretation of natural or hatchery influenced genetic interaction between hatchery rainbow and redband trout (see Table 11 in section 4.2 about research needs).
- 3C2. Prioritize protection on unimpacted redband trout populations and restoration on impacted populations based on strategy 3C1 (see section 4.1 about data gaps).
- 3C3. Eliminate stocking or stock only sterile rainbow trout where stocking continues to be desired and adverse impacts to native species are a concern (start with list of desired fishing opportunities, overlay with information from strategy 3C1) to reduce future threats of hybridization (see Table 13 in section 4.3 about monitoring and evaluation).
- 3C4. Monitor and evaluate effectiveness of activities implemented under strategies 3C2 and 3C3. Integrate data into strategies 3C1 and 3C2. Revise strategies 3C2 and 3C3 if necessary based on new information.

Discussion: Hybridization with exotic trout maybe a threat to native resident fish in the subbasins where multiple species coexist; the extent and nature of the threat is unknown. Data gaps have prevented the development of a genetic monitoring plan. Genetic monitoring methods are not currently available and need to be developed (assessment section 2.2.1.2.3). Prioritization efforts are difficult due to

the widespread distribution of redband and rainbow trout in the subbasins and the data gaps that exist.

Biological Objective 3D: Evaluate the effect of the loss of the migratory life history component (particularly the anadromous component) from local populations of redband trout.

Strategies:

- 3D1. Determine extent of isolation problems by developing a population monitoring plan that integrates and includes existing information and interpretation of the natural interaction between resident and migratory redband trout. Use data to evaluate the extent of limitation posed by isolation (see section 4.1 about data gaps).
- 3D2. If limitation is significant, prioritize protection and restoration opportunities based on predicted or expected biological response and socioeconomic feasibility (see section 4.1 about data gaps).

Discussion: Data gaps exist that prevent further development of monitoring plan.

Problem 4: Long-term persistence and abundance of native resident fish species within the BPW subbasins are of concern.

Biological Objective 4A: Increase data collection and prioritization of restoration efforts to protect and rebuild populations of native fish species in the BPW subbasins to self-sustaining, harvestable levels to the extent possible.

Strategies:

- 4A1. Assess current stock status and population trends of native fish and their habitat (see section 4.1 about data gaps).
- 4A2. Identify, describe, and measure stream and landscape-level characteristics at the fish sampling sites assessed following strategy 4A1 (see section 4.1 about data gaps).
- 4A3. Coordinate with Native Salmonid Assessment (NSA) efforts, future projects and entities (none currently defined in the project inventory) to avoid data duplication and to prioritize sampling efforts.
- 4A4. Use bull trout survey data from strategy 2C3 (genetic sampling of brook and bull trout) and add data from surveys of other native fish. Include standardized genetic sampling to determine levels of hybridization, the purity of populations, and the degree of genetic variability among and within populations (see Table 11 in section 4.2 about research needs).

- 4A5. Provide additional data for models that explain the occurrence and abundance of native fish based on measurable characteristics of stream habitat and landscape features (effort underway: USFS Rocky Mountain Research Station, J. Dunham, personal communication, April 28, 2004). Results will identify populations at risk and in need of recovery strategies, and will guide study design for strategy 4A7.
- 4A6. Protect quality habitat and restore degraded habitat to promote self-sustainable populations of native salmonid fishes in coordination with environmental objectives 6A through 6E (flow, temperature, sediment, nutrients, passage), following established priorities (see Table 13 in section 4.3 about monitoring and evaluation).
- 4A7. Based on results from strategies 4A1 through 4A6, initiate studies to identify major limiting factors, life history, and habitat needs for native fish populations throughout the BPW subbasins, especially for populations most at risk of extirpation (see Table 11 in section 4.2 about research needs).
- 4A8. Based on results from strategy 4A7, develop and implement cooperative recovery and protection plans.

Discussion: Efforts to develop a model that explains the occurrence and abundance of native fish based on measurable characteristics of stream habitat and landscape features is underway, but not comprehensive, effort in the BPW subbasins by the USFS Rocky Mountain Research Station (J. Dunham, personal communication, April 29, 2004). There has been some work done in Boise River Basin upstream of Arrowrock Dam looking at landscape occurrence and bull trout (USFS website, Publications and “what’s new”). The Rocky Mountain Research Station is presently working extending the landscape models for the Boise River basin to the South Fork Payette. They are not sure if they will extend the model to the Weiser or North Fork Payette for Bull trout. They are also in the North Fork Boise and Middle Fork Boise looking at distribution and abundance of all species of trout, sculpins, and frogs in relation wildfire history. They have also collected fin tissue from 50 populations of rainbow trout in South Fork Payette and Boise Rivers to look at patterns of genetic diversity to indicate real population size rather than presence only (project to start summer 2004). This will relate genetic variation, fire history and connectivity.

Native fish are limited by population connectivity, passage, habitat quality and quantity, and genetic introgression in the BPW subbasins (assessment section 3 about limiting factors for biological resources). Continued data collection and prioritization efforts are required to improve habitat and reduce the factors limiting native aquatic species in the subbasins. Coordinate with and add to the NSA led by the IDFG.

Develop one database for all fisheries data housed at one facility. This information would, optimally, be available to online (similar to Hydromet data (USBR 2004) where historical data through 1940s can be retrieved by watershed for flow, temperature, precipitation, volumes, elevations, discharges etc.).

3.3.2 Terrestrial Species

Problem 5: Limited understanding of the composition, population trends, and habitat requirements of the wildlife and plant (terrestrial) communities of the BPW subbasins limits the ability to effectively manage or conserve these species (see assessment section 2.3 for presentation of available data related to terrestrial communities).

Biological Objective 5A: Increase understanding of the composition, population trends, and habitat requirements of the terrestrial communities of the BPW subbasins (see section 4.2 about research needs).

Strategies:

- 5A1. Develop a subbasinwide survey program and database for terrestrial focal, ESA-listed, and culturally important species (see section 4.1 about data gaps).
- 5A2. Support the efforts of the Idaho Conservation Data Center (ICDC 2004) to document populations and sightings of aquatic and terrestrial species of interest (see section 1.5.2, Figure 1-8, and Table 1-3 of the assessment for a summary of rare or significant species and their designation in the subbasins) (see section 4.1 about data gaps).
- 5A3. Research life history requirements, population demographics, abundance, distribution, and genetic integrity of species, as well as habitat associations, quantity, and quality of the terrestrial species of the BPW subbasins. Focus efforts on focal, ESA-listed, and culturally important species and focal habitats (see Table 12 in section 4.2 about research needs).

Discussion: Increasing the amount of data collection focused on terrestrial species will improve understanding and the ability to manage these species. Establishing a baseline understanding of current habitat conditions and population numbers will allow managers to evaluate the affects of management activities and adapt them as necessary. This objective is not intended to imply that implementation of on the ground projects should wait, but that adaptive management is necessary. Projects should be based on what we know, and those types of decisions are reflected in other objectives. However, many problems need further data to enable effective decision-making.

The ICDC (2004) is the central repository for all terrestrial and aquatic data on population information and sightings of rare species. It provides a single, easily

accessible database on species. Increased data will improve the accuracy of this effort and strengthen terrestrial and aquatic planning and management in these subbasins. A memorandum of understanding or other form of interagency agreement needs to be developed or expanded to insure the timely, comprehensive data collection and dissemination.

3.4 Environmental Components

The environmental objectives and strategies developed to address problems in the BPW subbasins are listed in Table 7. These problems, objectives and strategies are generally meant to address habitat for fish and wildlife populations.

Table 7. Problems statements and environmental objectives in the BPW subbasins. These must be taken in context with associated strategies and discussion comments in this section about environmental components.

Problem Statements		Environmental Objectives	
Aquatic Ecosystems			
6	Water quantity, quality, and connectivity are key environmental factors that limit the production of resident fish and aquatic wildlife populations.	6A	Significantly reduce the number of artificially blocked streams or unscreened irrigation diversions by 2005.
		6B	Restore flows in limited reaches to support resident fish needs (especially spawning, rearing, and migration).
		6C	Reduce water temperature to levels that meet applicable water quality standards for life stage-specific needs of aquatic focal species and, by 2019, establish an upward trend in the number of stream miles meeting those standards.
		6D	Reduce instream and bedload sedimentation to levels meeting applicable water quality standards and life stage-specific needs of aquatic focal species. Establish an upward trend in the number of stream miles meeting such criteria by 2019.
		6E	Develop a nutrient allocation plan for the subbasins that investigates the potential benefits to fish and wildlife of nutrient additions to replace lost marine-derived nutrients (salmon and steelhead) without negative impacts to reaches with excess nutrients.
7	Degraded habitat complexity and channel alterations limit the availability of quality habitat for aquatic focal species.	7A	Improve aquatic habitat diversity and complexity in tributary systems where focal species populations are limited.
8	Roads and trails have altered the size, quality, and distribution of habitats for native species in the subbasins. Highly roaded and traileed areas have problems of wildlife security, harassment, and energetics. Roads are also conduits for the spread of exotic plants and changing predator behavior. Roads and trails allow for the spread of human activities and increase intensity of human impacts year around.	8A	Reduce the impact of the transportation system on fish and wildlife populations and habitats.

Problem Statements		Environmental Objectives	
9	Some reservoir operations negatively affect aquatic focal species in the BPW subbasins.	9A	Collaborate with reservoir operation managers to reduce the negative impacts of operations on aquatic and terrestrial species (drawdown timing, dissolved oxygen at low flows, predators, instream flows, flooding habitat).
10	The introductions of noxious weeds and undesirable nonnative species into the BPW subbasins have negatively impacted terrestrial focal habitats and species. It was suggested that exotics be considered a primary anthropogenic concern for terrestrial habitats based on the significant problem that medusahead rye and cheatgrass have become.	10A	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.
		10B	Reduce the extent and density of established noxious weeds and invasive exotics and restore native habitats.
11	The expansion of urban and rural human development has impacted native species and habitats.	11A	Minimize the potential negative impacts of current and future development on the native species and habitats of the subbasins.
12	Historic and current livestock grazing has impacted fish and wildlife habitats and populations in some areas of the subbasins.	12A	Reduce the negative impacts of livestock grazing on fish, wildlife, and plant populations in the subbasins.
		12B	Reduce conflicts between livestock and native wildlife and plant populations.
13	Alteration of the natural fire regime in the BPW subbasins has negatively impacted native terrestrial focal habitats and species.	13A	Manage fire on the landscape to achieve natural ecosystem processes and succession.
14	The loss or degradation of wetland and riparian habitats has negatively impacted the numerous wildlife species that utilize these habitats.	14A	Protect, enhance, or restore wetlands or create new wetlands to mitigate for permanently lost wetlands and manage for hydrologic processes that protect water quality, base flows, peak flows, and timing to ensure proper wetland function.
		14B	Protect, enhance, or restore riparian habitats and manage for hydrologic processes that protect water quality, base flows, peak flows, and timing to ensure proper riparian function
15	The loss and degradation of shrub-steppe habitat in the BPW subbasins has negatively impacted numerous native plant and animal species dependent on these habitats.	15A	Protect, enhance, or restore shrub-steppe habitat and increase stand density and diversity.

Problem Statements		Environmental Objectives	
16	Alterations of forest structure (including timber harvest and fire suppression) are limiting pine/fir forest habitats in some areas of the BPW subbasins.	16A	Protect mature pine/fir forest habitats by promoting ecological processes (i.e., natural fire regime) that lead to late seral stages while protecting meadow habitats from pine/fir encroachment. This includes processes that lead to forest stability in this habitat type.

3.4.1 Aquatic Ecosystem

Problem 6: Water quantity, quality, and connectivity are key environmental factors that limit the production of resident fish and aquatic wildlife populations (see assessment section 3 about limiting factors for biological resources).

Environmental Objective 6A: Significantly reduce number of artificially blocked streams or unscreened water diversions by 2005.

Strategies:

- 6A1. Restore connectivity at known, prioritized artificial barriers and screen diversions (see Table 13 in section 4.3 about monitoring and evaluation) where impairment is known, especially those negatively affecting listed species. Species-specific data exists regarding barriers in the Boise and Deadwood Rivers (T. Salow, USBR, personal communication, March 14, 2004).
- 6A2. Inventory and identify additional barriers to fish migration (culverts, bridges, stream crossings, water diversion structures, etc.). Integrate data from all sources to refine priorities at the 4th field HUC (see section 4.1 about data gaps).
- 6A3. Prioritize barriers for removal or modification based on connection of stream reaches with suitable habitat for focal species, the availability of population sources for genetic diversity, and/or the prevention of species migration into irrigation diversions (see section 4.1 about data gaps).
- 6A4. Identify and implement additional opportunities to screen other diversions (see section 4.1 about data gaps).
- 6A5. Modify additional artificial barriers to restore connectivity based on the outcome of strategy 6A4.
- 6A6. Avoid genetic introgression of exotic species where elimination of barriers may pose a high risk to the genetic make-up of upstream fish stocks. De-emphasize barrier modification until the risk of introgression is minimized or eliminated.
- 6A7. Monitor and evaluate biological response resulting from strategies 6A1, 6A2, 6A5, and 6A6 to determine if passage has been established. Integrate new data into strategies 6A3 and 6A4. Modify strategies based on new information and repeat until connectivity has been restored.

Discussion: Where adjacent fish populations appear to have been fragmented by anthropogenic barriers, remove those barriers first. Dams, irrigation diversions, and road crossings have formed impassable barriers to fish fragmenting habitats and isolating populations (USFWS 2002). There are many known passage

barriers in the BPW subbasins that are a major limiting factor for focal species (assessment section 3.1 about limiting factors by watershed).

Restoration projects should begin in known problem areas. However, the current list is not all inclusive and surveys must continue to prioritize future efforts. Upon development of a fish passage database for the subbasins, known barriers will be prioritized for removal or alteration and decisions will be made to either replace structures with fish/aquatic species friendly crossings, or to remove the crossing if it is no longer needed. Barrier modification will only occur upon the validation that it will not negatively impact upstream populations. The effects of barrier removal/alteration will be evaluated to determine if adequate passage has been achieved.

Diversions are numerous and distributed throughout the three subbasins. The majority of these diversions occur in the Weiser watershed (3,400), followed by the Payette (2,000), Lower Boise (1,900), and North Fork Payette (1,350) watersheds. Losses of bull trout into irrigation diversions have been documented on Big Smokey and Willow creeks, both in the South Fork Boise River basin (USFWS 2002). The diversions in the mainstem waters are not screened (assessment section 1.6.3 about diversions, impoundments, and irrigation projects).

Road culverts are also a factor limiting the connectivity of habitat and fish populations. High priority watersheds are defined in section 6.1 about aquatic prioritization and discussed in assessment section 3.1. There are over 6,600 culverts and road crossings throughout the Boise River Basin that may be a fish passage issue for adult and juvenile bull trout (USFWS 2002). Culverts acting as barriers need to be identified and modified (e.g., by using concrete box or bottomless arched culverts, bridges, or other means). The Feather River, Trinity Creek and Beaver Creek watersheds should be inventoried first, followed by the Deer Creek, Dog Creek, Nichols Creek, Big Owl Creek, Wren Creek, Trapper Creek, Trail Creek, Swanholm Creek, Hot Creek, Cottonwood Creek, and Roaring River watersheds (USFWS 2002). In the South Fork Boise River drainage, Idaho Department of Fish identified 26 culverts that could be potential barriers to fish passage (USFWS 2002). Several of the creeks were considered of sufficient size to support bull trout: Big Water, Fall, Little Water, Steel, Trinity, and Whiskey Jack Creeks, and the Feather River (USFWS 2002).

In the Payette River drainage, there are three major dams constructed for hydroelectric generation and irrigation water storage that affect passage: Deadwood Dam on the Deadwood River, Black Canyon Dam on the mainstem Payette River, and Cascade Dam on the North Fork Payette River (USFWS 2002). Smaller dams that have been constructed primarily for irrigation diversions are suspected passage barriers for bull trout (e.g., in the Squaw Creek watershed on the lower Gold Fork River). Barriers are also present in areas where bull trout have been documented in the past (Lake Fork Creek, Fisher Creek) in the upper North Fork Payette River (USFWS 2002). Barriers (e.g., irrigation diversions and

road crossings) have isolated bull trout in the upper reaches of Squaw Creek and the degree of connectivity between bull trout in the Middle Fork Payette River and the South Fork Payette River is uncertain (USFWS 2002).

In the Weiser River, several types of barriers to migrating adult and juvenile bull trout exist, such as dams, culverts, water diversions, severely degraded habitat (e.g., subsurface flow and unsuitable water temperature), and natural waterfalls (USFWS 2002). Seventeen fish passage barriers have been identified within the Little Weiser River watershed. Road culverts were also identified as passage barriers in the Hornet Creek watershed, which included one each in North Creek and Placer Creek, two in South Fork Olive Creek, and one at the mouth of Grouse Creek (USFWS 2002). Major reservoirs upstream of either existing or potential bull trout habitats include Hornet Creek Reservoirs, C. Ben Ross Reservoir, and Lost Valley Reservoir (USFWS 2002). Major water diversions blocking bull trout passage are in the Little Weiser River, West Fork Weiser River, East Fork Weiser River, upper Weiser River, and Hornet Creek watersheds. In the lower portion of the Weiser River basin the Galloway diversion prevents bull trout in the Weiser River from potentially interacting with bull trout from Snake River tributaries in Oregon (USFWS 2002). The historic distribution of bull trout in the Weiser River basin is unknown. It is known that Indians and early settlers caught anadromous fish in the Weiser River as far upstream as Council, bull trout occurrence is undocumented (R. Nelson, USFS, personal communication, May 14, 2004).

Recommendations from the BPW Subbasin Summary (IDFG 2002) include installation of a fish ladder at the Gold Fork Canal diversion structure as fish passage at this structure would open approximately 44 stream miles to migratory fish. Provide fish passage at all flow stages around irrigation diversion structures. Evaluate the distribution and potential impacts of brook trout hybridization with bull trout in the Fall Creek drainage and assess habitat quality. If habitat is suitable and brook trout threat is negligible, consider developing passage around the falls. Replace or modify culverts that are potential barriers in the Trinity Creek and Spring Creek drainages. Build fish ladder on Brown's Pond to connect the upper Lake Fork Creek with Little Payette Lake. Restore fish passage at Black Canyon Dam. Use TMDL process in the Weiser to prioritize landscape scale management plans and secure funding to restore connectivity (IDFG 2002).

Environmental Objective 6B: Restore flows in limited reaches to support resident fish needs (especially spawning, rearing, and migration).

Strategies:

- 6B1. Research adequate flows for native aquatic fauna. Identify problems and opportunities for improvement once adequate flows are determined (see Table 11 in section 4.2 about research needs). Minimum flows have already been designated for some reaches in the BPW subbasins (IDWR

2003). These flows are not necessarily adequate for sustainable maintenance of aquatic species, but are truly a minimum requirement.

- 6B2. Prioritize flow problems and activities for protection and restoration at a finer scale than presented in section 6.1 about aquatic prioritization. These problems have a long history and a complex legal and social context that must be taken into account while planning and implementing activities. Prioritize activities based on cost-effectiveness and expected biological response, taking account of and working with social and economic complexity and its constraints in the subbasins (see section 4.1 about data gaps).
- 6B3. Determine appropriate flow regimes/flow requirements for specific stream reaches within 15 years (see Table 11 in section 4.2 about research needs).
- 6B4. Coordinate efforts with the Idaho Department of Water Resources to secure water rights designated to meet flows, where necessary.
- 6B5. Provide adequate flows where hydrographs have been altered and are limiting production (see section 3.1 and Table 3-3 of the assessment), continue and expand efforts aimed at increasing base flows and restoring natural flow timing through riparian, floodplain and wetland enhancement, and implementation of forest and agricultural BMPs. Collaborate with local, state, tribal, federal, water users, and other relevant agencies/entities to provide adequate flow requirements (see Table 13 in section 4.3 about monitoring and evaluation).
- 6B6. Where hydrographs have been altered (see section 3.1 and Table 3-3 of the assessment), work to develop cooperative efforts to provide adequate flows through water conservation (see Table 13 in section 4.3 about monitoring and evaluation).
- 6B7. Implement adaptive management approach—monitor and evaluate outcomes of implementation strategies. Integrate new data and revise strategies as necessary to reflect new information. Continue or repeat strategies 6B4 through 6B5 until all flows are adequate.

Discussion: Altered hydrologic regimes resulting in low flows or dewatering has been identified as limiting in many areas in the BPW subbasins (see section 3.1 and Table 3-2 of the assessment). Recommendations of minimum stream flow requirements have been completed for the North Fork, South Fork, and Middle Fork Payette and the Middle Fork Boise Rivers (IDWR 2003). These are minimum stream flows and are not necessarily considered adequate for all life stages of the focal species in the subbasins.

Specific recommendations of flow for all life stages of the focal species are unknown and research is needed. A lot of work to determine adequate flows has been done, and continues to be completed, under consultation for Bureau of

Reclamation reservoir operations in the Upper Snake. While there are many unknowns, it is clear that further degradation of instream flows will not reverse the declining trend of certain resident fish populations (IDFG 2002). This makes it necessary to address the current recommendations for evaluation of additional minimum flow designations. Research should initiate by focusing on areas where natural hydrographs have been altered, establishing the extent of impairment that reduced flows are having on various life history stages of focal aquatic species.

Prioritization of problem areas should differentiate between systems naturally limited by flow, and those impacted by anthropogenic activities. Flow problems and restoration are especially controversial in these subbasins. Approaches to addressing these problems should be solved in cooperation with the water users of the subbasins.

Recommendations from the BPW Subbasins Summary (IDFG 2002) are to secure and increase minimum stream flows in the Boise River between Lucky Peak Dam and the mouth. To install and maintain fish screens on all significant diversion structures; include flow monitoring at head gates to improve efficiency of irrigation systems. To secure and increase minimum stream flows in the Boise River between Lucky Peak Dam and the mouth. Also, to pursue water transfers and agricultural incentives to improve summer flows, decrease water temperatures, and restore riparian corridors.

Environmental Objective 6C: Reduce water temperatures to levels that meet applicable water quality standards for life stage-specific needs of aquatic focal species and, by 2019, establish an upward trend in the number of stream miles meeting those standards (see assessment section 1.7.1 and Figure 1-16 about water quality).

Strategies:

- 6C1. Begin riparian and flow restoration activities in spawning and rearing areas where temperature has been identified as limiting to aquatic focal species, followed by migration corridors (section 6.1 about aquatic prioritization and Table 13 in section 4.3 about monitoring and evaluation).
- 6C2. Use 303(d)-listed streams (assessment section 1.7.1 and Figure 1-16) as guidance to further identify and prioritize areas where temperature amelioration would most benefit focal species. Prioritization should consider cost effectiveness and potential biological responses. This prioritization will determine the sequencing of activities in strategies 6C3 and 6C4 (see Table 9 in section 4.1 about data gaps).
- 6C3. Continue efforts aimed at increasing riparian functions where they have been reduced by human and fire activities, and restoration is feasible. This strategy includes implementing forest, range, agricultural, and other agency BMPs. Encourage partnerships to implement riparian restoration

projects where impairment has impacted temperatures (see Table 13 in section 4.3 about monitoring and evaluation).

- 6C4. Continue TMDLs, Ecosystem Analysis at the Watershed Scale (EAWS), and other watershed-scale assessments to define factors negatively influencing temperature regimes at a finer scale than presented in section 6.1. Differentiate between natural and human influences (see section 4.1 about data gaps).
- 6C5. Monitor and evaluate the results of implementation strategy 6C3— Integrate data with other new information and revise assessment and priority strategies. Repeat implementation and monitoring and evaluation strategies until water temperature is no longer a problem in the subbasins.

Discussion: Stream temperature in various portions of the BPW subbasins is considered to be a factor limiting the production of all focal aquatic species (see assessment section 3 and Table 3-2). Nearly 900 miles of rivers and streams are water quality limited in the BPW subbasins, many by temperature (see assessment section 1.7.1 and Figure 1-16). A recommendation from the BPW subbasin summary (IDFG 2002) is to modify the outlet structure of Deadwood Dam to allow mixing of warmer surface waters with cold deepwater releases for temperature amelioration downstream.

There is controversy about the streams on the 303(d) list. Goals and expectations must be set while recognizing the limitations in the natural system. The list is not explicitly endorsed by this plan; rather, it should be used as a starting point for prioritization. There may be a few systems in the BPW subbasins where high temperatures (in exceedance of standards) are a regular and natural occurrence. Continued effort should be dedicated to the investigation and/or establishment of localized temperature standards to account for variability in the biological response to temperature conditions.

Reaches that are 303(d) listed and that are inhabited by multiple focal species or influence habitats supporting key species will direct prioritization of restoration efforts. On-the-ground restoration efforts need to focus on rehabilitating a naturally functioning thermal regime and will entail addressing hydrologic function in riparian areas, wetland areas, and floodplains. Assessments of total maximum daily loads (TMDL) are in review for phosphorous, sediment, bacteria and temperature in the Weiser River (see assessment section 1.7.1). TMDL assessments are currently underway in the North Fork Payette, South Fork Payette and Payette watersheds, while none are in place for the North/Middle Boise or South Fork Boise watersheds (assessment section 1.7.1). Monitoring and evaluation of restoration efforts, including agricultural and forestry BMPs, will ensure quality assurance/quality control and efficient use of resources.

Environmental Objective 6D: Reduce instream and bedload sedimentation to levels meeting applicable water quality standards and life stage-specific needs of aquatic focal species. Establish an upward trend in the number of stream miles meeting such criteria by 2019.

Strategies:

- 6D1. Continue development of TMDLs, EAWS, and other watershed-scale assessments designed to define both localized sediment sources and opportunities to reduce impacts (see section 4.1 about data gaps). Begin assessments in areas illustrated in assessment section 1.7.1 and Figure 1-16.
- 6D2. Begin restoration activities to address sediment sources beginning in areas defined as being limited by sediment in section 6.1. At a finer scale than available in this plan, inventory and prioritize additional areas known to be limiting aquatic focal species or habitats where sediment reductions would be most beneficial (see section 4.1 about data gaps).
- 6D3. Reduce sediment inputs within the natural range of variability for a particular system. Cooperatively implement BMPs that address soil erosion and sediment delivery from roads, logging, fire, floods, mining, agriculture, grazing, and other historic and natural, current, and future activities (see Table 13 in section 4.3 about monitoring and evaluation)
- 6D4. Monitor and evaluate results of all implementation activities. Integrate new data and information into strategies 6D1 through 6D3. Revise and repeat implementation strategies until the problem is adequately addressed.

Discussion: Sedimentation is a limiting factor affecting all focal fish species in the BPW subbasins to a varying degree in all 4th field HUCs (see assessment section 3.1, Table 3-2, and Figure 1-16). Sediment is also the most common pollutant listed on the 303(d) list (USFWS 2002). In an effort to address reach-specific issues, including sedimentation problems, watershed-scale assessments have been and or are being developed for sediment and bacteria in the Lower Boise River and are in review for phosphorous, sediment, bacteria and temperature in the Weiser River. TMDL assessments are currently underway in the North/Middle Boise or South Fork Boise watersheds (see assessment section 1.7.1 about water quality). These finer-scale assessments are helpful in defining localized source areas, and they use reach-specific data to address problems and provide treatments. Also helpful are studies specifically designed to identify sediment production areas, track sediment movement, and estimate where sediment deposition will occur. By using a combination of these and other approaches and by establishing where sedimentation will cause the greatest ecologic impact, managers will be able to prioritize sediment abatement actions that will be most beneficial to subbasin resources.

Recommendations from the BPW Subbasin Summary (IDFG 2002) include installing modern irrigation diversion structures within the Cascade Reservoir watershed of the Payette River to accomplish sediment and erosion control. Sediment and nutrient control programs throughout the subbasin should include but not be limited to 1) improved road maintenance or road closures to reduce erosion of roadbed materials into streams, 2) incentives for landowners to provide riparian buffers in croplands and pastures, 3) development of settling ponds or wetland filters to treat agricultural return flows, and 4) purchase of grazing rights or reductions in grazing intensity on public lands along high priority stream reaches (IDFG 2002). Sediment inputs to the Deadwood Reservoir should be reduced (IDFG 2002). The feasibility of adding a roadbed stabilizer to the road that parallels the Deadwood River should be addressed. Fine sediment inputs to the South Fork Payette River exceed the flushing capacity of the river. Sediment sources of fines need to be identified and controlled in that watershed. Final recommendations are to complete the TMDL process in the Weiser basin to identify specific sources of sediment.

Environmental Objective 6E: Develop a nutrient allocation plan for the subbasins that investigates the potential benefits to fish and wildlife of nutrient additions to replace lost marine-derived nutrients (salmon and steelhead) without negative impacts to reaches with excess nutrients.

Strategies:

- 6E1. Inventory nutrient-poor headwater streams and map all potential augmentation sites (see section 4.1 about data gaps).
- 6E2. Implement pilot nutrient supplementation study in bull trout local population watersheds (see Table 11 in section 4.2 about research needs).
- 6E3. Coordinate with and utilize TMDLs, 303(d) list for nutrients, and other efforts to avoid negative impacts in areas with excess nutrients.
- 6E4. Monitor effectiveness of nutrient supplementation by bull trout population response without impacts in downstream reaches where nutrients are in excess (see Table 13 in section 4.3 about monitoring and evaluation).
- 6E5. Use monitoring results to modify the protocol as needed to achieve the objective and apply on broader scale, if successful.

Discussion: Portions of the BPW subbasins suffer from excessive nutrients, while other areas are thought to be nutrient deficient (see assessment section 1.7.1). Most headwaters areas probably did not receive much in the way of marine-derived nutrients and should not be targeted for augmentation (R. Nelson, USFS, personal communication, May 14, 2004). Nutrient augmentation projects should be carefully planned.

Nutrient additions to the waterways in the BPW subbasins are most often transported via irrigation return flows (Fisheries Technical Team meeting minutes, Ecovista 2004). The Hells Canyon TMDL process requires a Snake River Total Phosphorus target of 0.07 mg/L within 70 years, suggesting the mainstem Boise, Payette, and Weiser Rivers should meet a similar target as they are upstream of Hells Canyon.

Efforts to collect information on streams limited by excessive nutrients or where they may be limited due to nutrient deficiencies needs to be increased. Current knowledge is largely based on the 303(d) list and TMDL process, which focuses on defining areas of excessive nutrient input. The loss of marine-derived nutrients due to diminished anadromous salmonid runs may impact both fish and wildlife species (see assessment section 3.2.2.1 about nutrient loss), but such impacts are not clearly defined within the BPW subbasins. Upon establishment of a broader knowledge base, it will be possible to further prioritize where nutrient abatement efforts should occur and/or where nutrient additions may be most beneficial.

Recommendations to reduce nutrient inputs were made during the subbasin summary process (IDFG 2002). Purchasing and retiring grazing and agricultural easements, as they become available on USBR lands around Cascade Reservoir, are thought to aid in nutrient reduction inputs to the reservoir and create upland wildlife habitat. Additional grazing and riparian easements along critical stream reaches may help reduce nutrient inputs and rebuild riparian plant communities. It is important to monitor and evaluate projects to determine whether the nutrient source has been properly identified and reduced, allowing for adaptive management to improve actions.

Problem 7: Degraded habitat complexity and channel alterations limit the availability of quality habitat for aquatic focal species.

Environmental Objective 7A: Improve aquatic habitat diversity and complexity in tributary systems where focal species populations are limited by habitat.

Strategies:

- 7A1. Continue aquatic habitat improvement efforts consistent with existing federal, tribal, state, and local habitat improvement plans and guidelines such as the USFS Aquatic Conservation Strategy, the USFWS Bull trout Draft Recovery Plan, and the Independent Scientific Advisory Board Tributary Habitat Recovery Manual in limited areas (section 6.1 about aquatic prioritization). Supplement with additional data, literature, and regionally or locally specific information available at time of project proposal.

- 7A2. Prioritize additional habitat improvement projects for protection and restoration using information generated in strategy 4A2 to identify, describe, and measure stream habitat and landscape-level characteristics at the fish sampling sites (see section 4.1 about data gaps).
- 7A3. Restore habitat complexity in priority areas with protection and restoration activities designed to promote development of more complex and diverse habitats through improved watershed condition and function. Monitor biological response to habitat improvements at the project level (see Table 13 in section 4.3 about monitoring and evaluation).
- 7A4. Design restoration projects to incorporate upland, wetland, and floodplain processes (see Table 13 in section 4.3 about monitoring and evaluation).
- 7A5. Monitor long-term effectiveness of cumulative habitat improvement efforts at the scale of the subbasin or priority 4th field HUC (see Table 13 in section 4.3 about monitoring and evaluation). Modify strategies based on new information to achieve greater habitat quality as necessary.

Discussion: Habitat fragmentation and degradation are likely the most limiting factors for bull trout throughout the Southwest Idaho Recovery Unit that includes the BPW subbasins (USFWS 2002). Reductions in large woody debris components and deep pools are limiting the spawning and rearing habitat available to aquatic focal species in the Lower Boise, Boise-Mores, Main Payette, and Middle Fork Payette (see assessment section 3.1). Land management activities such as water diversions, past and current mining operations, timber harvest, road construction, and improper grazing practices degrade aquatic and riparian habitats by altering stream flows and riparian vegetation, reducing the available habitat for focal species in the subbasins.

Fish habitat results from complex interactions between water, sediment, and channel structure. A greater variety of fish species and life stages are supported by complex and diverse habitat (see assessment section 3.1). The supply of large woody debris to stream channels is typically a function of the size and number of trees in riparian areas and can be profoundly affected by timber harvest. Many BMPs are currently implemented during logging operations that limit harvest near stream channels. Many benefits result as large woody debris influences channel morphology (especially in pool formation), provides instream cover, retention of nutrients, and the storage and buffering of sediment.

Many rivers and streams in the BPW subbasins have been channelized or otherwise altered for purposes of flood control, navigation, drainage improvement, and the reduction of channel migration (see assessment section 3.1). These forms of hydromodification typically result in more uniform channel cross-sections, steeper stream gradients, a reduction in average pool depths, and altered stream flow. These conditions decrease the availability of cover from predators and refugia from high flows, reduce organic substrate for

macroinvertebrates, decrease the availability of overwintering habitat, and reduce the survival of eggs and alevins, among others (see assessment section 3.1 on limiting factors and assessment Table 3-2 on types of habitat alteration and effects on salmonid fishes).

Priority areas for protection of quality habitat include those where bull trout populations reside, restoring outward from strength (see section 6.1). Recommendations made during the subbasin summary process (IDFG 2002) suggest use of the TMDL process to prioritize landscape scale management plans and secure funding to restore stream habitats (especially in the Weiser subbasin).

Problem 8: Roads and trails have altered the size, quality, and distribution of habitats for native species in the subbasins. Highly roaded and traileed areas have problems of wildlife security, harassment, and energetics. Roads are also conduits for the spread of exotic plants and changing predator behavior. Roads and trails allow for the spread of human activities and increase intensity of human impacts year around.

Environmental Objective 8A: Reduce the impact of the transportation system on fish and wildlife populations and habitats.

Strategies:

- 8A1. Reduce road impacts by implementing road closure and decommissioning programs (not critical for transportation, recreation, and land management activities) in areas most limiting focal or listed species and habitats (see Table 13 in section 4.3 about monitoring and evaluation). Prioritize for restoration areas having high road densities, high sediment production, riparian degradation, high weed densities, high surface erosion and/or be landslide prone, or critical habitat for listed species (sections 6.1. and 6.2 about aquatic and terrestrial prioritization and assessment section 3.1). Prioritize protection in areas with high quality wildlife and fish habitat, especially for listed species (i.e., bull trout, lynx, bald eagle, wolf, North Idaho ground squirrel). Implement weed control strategies following Objective 10B along transportation corridors (see Table 13 in section 4.3 about monitoring and evaluation).
- 8A2. Protect high-quality habitats with diverse communities in existing roadless areas (see Table 13 in section 4.3 about monitoring and evaluation).
- 8A3. Monitor and evaluate efforts to reduce the impact of roads on the fish and wildlife populations of the subbasins (see Table 13 in section 4.3 about monitoring and evaluation). Modify implementation strategies as necessary.

Discussion: The BPW subbasins encompass 40 USFS roadless areas (assessment section 1.6.4 and Figure 1-14 about protected areas). However, development, recreation, and resource management have increased road and trail densities in many areas of the subbasins. Roads and their associated impacts have significant impacts in the

Lower Boise, Boise-Mores, Payette, North Fork Payette and Weiser watersheds. The greatest impact occurs in the Lower Boise watershed where the majority of the State's population resides (see assessment section 3.1.4 and Figure 3-4).

Road construction eliminates the habitat in its path and fragments surrounding habitat patches. They compact soils, disturb organic layers, and cause higher rates of erosion or mass wasting resulting in increased sediment delivery to aquatic systems. Road culverts can pose barriers to fish migration. Automobile traffic associated with roads becomes a vector for the spread of noxious weeds, injures and kill animals through collisions, alters migration patterns, reduces security and increases harvest rates, poaching, and harassment (see assessment section 1.6.5 about roads). Paved and unpaved roads and trails can negatively impact habitats. Snowmobile trails can change the activity patterns of both people and wildlife, leading to the distribution expansion of generalist species and a contraction of specialist species (Jared et al. 1986, Lande 1988, Urban et al. 1987). Hiking, biking, horseback riding, ATVs, and other activities can trample native vegetation, and increase noise pollution, soil compaction, and erosion.

Implementation of the strategies to reduce the impact of the transportation system on populations and habitats in the subbasins should be consistent with objectives 7A (Improve habitat diversity and complexity) and 10B (Reduce the extent and density of established noxious weeds). Priority areas for protection include currently roadless areas in the subbasins (see assessment section 1.6.4 and Figure 1-14). Areas impacted by sediment and connectivity are likely candidates for road upgrades or obliteration (see section 6.1).

Roads are also vital to the economy of the region. They are necessary for access for fire suppression, recreation and most resource based uses of the land in the subbasins. There was a 700% increase in off-highway vehicle users from 1972 to 2000 (M. Madrid, personal communication, Payette National Forest Supervisor, March 18, 2004). The trend continues upward. As the region shifts from a natural resource industry based economy to a recreation/tourist based economy roads become even more important to users who do not generate adequate funds to replace or build new roads.

Both motorized and non-motorized winter recreational users of the land require roads for access. Cross country skiers average 4 miles from the trailheads in the rugged terrain of the BPW subbasins (Payette National Forest Winter Recreation Forum 2004). Hikers, bikers and even motorized recreational users are limited in the distance they can travel from road accessible portal points. Many recreational users of the BPW subbasins are seeking solitude and their own version of the wilderness experience. Overcrowding will diminish that experience.

Road maintenance or upgrading is frequently more cost effective and less polluting than road obliteration. Reforestation following catastrophic forest fire is not economically feasible in areas that are not roaded. Greater erosion will occur in burned areas if they are not accessible and are left untreated after fires. 30% of

the Payette National Forest burned during the 1990s (D. Alexander, personal communication, former Payette National Forest Supervisor, March 18, 2004). Fires burned mainly in roadless areas.

Problem 9: Some reservoir operations negatively affect aquatic focal species in the BPW subbasins.

Environmental Objective 9A: Collaborate with reservoir operation managers to reduce the negative impacts of operations on aquatic and terrestrial species (drawdown timing, dissolved oxygen at low flows, predators, instream flows, flooding habitat).

Strategies:

- 9A1. Collect or compile population data in reservoirs believed to be negatively affecting focal species. Continue data collection in Arrowrock Reservoir (see Boise State University research project in the inventory). Determine the extent and nature of limitation that reservoir operations are having on focal species (see Table 11 in section 4.2 about research needs).
- 9A2. Complete fish and wildlife loss assessments to establish mitigation responsibility for habitat and prevention of critical habitat loss (see discussion regarding Lost Valley Reservoir and ESA-listed species) for federal projects at Lucky Peak, Arrowrock, Cascade, and Deadwood (see Table 11 in section 4.2 about research needs).
- 9A3. Provide specific management recommendations that would improve conditions based on interpretation of data from strategy 1. (This is already being done by Boise State University on Arrowrock Reservoir; see inventory (submitted M. Dare).
- 9A4. Collaborate with reservoir operation managers to determine where or how changes can be made to improve conditions.
- 9A5. Monitor following improvements and determine adequacy by integrating data into strategy 9A1. If further changes are needed, revise and repeat implementation strategies until problems are addressed to the extent possible.

Discussion: Research regarding reservoir operations limiting focal species should focus on habitat downstream of Deadwood Reservoir. Information regarding the limitations of dam operations on focal species is available in Arrowrock Reservoir (see assessment section 3.1.1). This enables managers to develop specific recommendations for improvements to Arrowrock Reservoir, whereas limited data are available regarding populations in Deadwood Reservoir.

Examples of specific management actions from BPW Subbasin Summary (IDFG 2002) are to 1) enhance the minimum conservation pool in Arrowrock Reservoir

to secure overwintering habitat for bull and redband trout and 2) purchase storage space in Cascade Reservoir to increase minimum pool storage to approximately 475,000 acre-feet; needed to increase survival of coldwater fishes currently limited by high nutrient loading and low dissolved oxygen. Other recommendations are to monitor bull trout entrainment losses from Arrowrock Reservoir following proposed valve replacements and installation of hydroelectric plant; work with USBR and hydro operators to develop and test avoidance technologies to minimize entrainment. Flows into Deadwood River need to match inflows to the reservoir from mid-June until August. This change would rely on using Cascade Reservoir waters for irrigation earlier in the summer.

Currently, there is local interest in enlarging the dam and pool size of the Lost Valley Reservoir (North of Council in the Weiser subbasin) from 1,233.5 hectare/meters to 3,700.5 hectare/meters (10,000 acre/feet to 30,000 acre/feet) for irrigation. If this expansion occurs, it would likely flood key habitat currently occupied by northern Idaho ground squirrels (ESA listed species) at Slaughter Gulch, the largest known population site. This action would require section 7 consultation since federal land managed by the Payette National Forest would be flooded, necessitating the acquisition of a special-use permit (USFWS 2003).

3.4.2 Terrestrial Ecosystem

Problem 10: The introductions of noxious weeds and undesirable nonnative species into the BPW subbasins have negatively impacted native terrestrial focal habitats and species (see assessment section 3.2.2.2 about noxious weeds). It was suggested that exotics be considered a primary anthropogenic concern for terrestrial habitats based on the significant problem that medusahead rye and cheatgrass have become.

Environmental Objective 10A: 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 (see assessment section 1.7.5 about noxious weeds).

Strategies:

- 10A1. Continue identification of invasive or noxious plant species in the BPW subbasins (see Table 12 in section 4.2 about research needs).
- 10A2. Identify and prioritize native plant communities for protection from exotic weeds using information in section 6.2 in addition to other plans (Cooperative Weed Management Area [CWMA] plans, county weed boards, or other sources) that provide information to be used in prioritization. Prioritize by cost-effectiveness and expected biological response (see section 4.1 about data gaps).
- 10A3. Prevent new infestations by minimizing ground disturbing activities in habitats highly susceptible to weed invasion through local cooperation and revegetate following disturbance. This includes evaluating the impact of

fire on sensitive habitats and the exotic species invasions that potentially could occur. See objective 13A for more information on fire management (see Table 14 in section 4.3 about monitoring and evaluation).

- 10A4. Prevent dispersal by encouraging the use of weed-free seeds and feeds and develop and implement programs and policies designed to limit the transportation of weed seeds and other propagules from vehicles and livestock (see Table 14 in section 4.3 about monitoring and evaluation).
- 10A5. Increase public participation by promoting and participating in existing programs (none in Inventory at this time). Support the Idaho Weed Management Strategy in developing education and awareness programs in noxious weed identification, spread, prevention, and treatment.
- 10A6. Monitor and evaluate the effort to protect native plant communities from exotic plants. Integrate new information into strategy 10A1 and modify implementation strategies as necessary.

Discussion: Invasive plant and animal species—also referred to as exotics, nonnatives, introduced weeds, or nonindigenous species—are organisms that have expanded beyond their native range or have been introduced from other parts of the world. Species are considered invasive if their presence in an ecosystem causes environmental harm, economic harm, or harm to human health. Human activities such as grazing or logging, with associated road networks, often disturb biotic communities enough to allow the establishment of invasive species. Attempts to control infestations have been difficult and extremely expensive, and the ecological consequences have been serious.

Introduced plants in the subbasins often outcompete native plant species and alter ecological processes, reducing habitat suitability for native fish and wildlife, and negatively impact agriculture and ranching. Increased surface runoff and sediment yield may occur in areas infested by noxious weeds, which would also negatively impact aquatic systems. About 42% of all federally ESA threatened or endangered species are listed because of threats from invasive plants and invasive species are considered the second leading cause in species endangerment nationwide.

Noxious weeds and other invasive plants have been identified as a moderate to highly limiting factor in all focal habitats in the subbasins (see assessment section 3.1 and Table 3-1). Preventing the spread and establishment of invasive exotic species in other areas of the subbasins is a priority. Future planning efforts should consider the recommendations of the Idaho Invasive Species Council (IISC) plan when it becomes available.

An assessment of invasive species management in Idaho was completed by the Idaho IISC in July 2003 (NNRG 2003). The IISC recommends that the assessment become the basis for a more comprehensive plan designed to address

the threats posed by invasive species in Idaho. Other recommendations include the establishment of an equitable and stable source of funds as insufficient funding and staff was noted as a major barrier by a great majority of Idaho's invasive species managers. It was also recommended that educational programs are conducted with focus on: (1) property owners, and (2) those having some relationship with invasive species pathways. The latter category ranges from nursery operators who import exotic species to recreationists. It is also important to set priorities for species to be addressed. There is a wide variety of species requiring control efforts and little consensus among managers on priorities for them. Efforts to prioritize species, and then work to prevent or manage outbreaks of them, must be accompanied by an assessment of the risk that each poses, including the risk of introduction if they are not already established. Coordination of invasive species work within state government is important to ensure that a comprehensive invasive species program in Idaho is not diluted by competing efforts among various agencies. Enactment of changes in state law should be considered to provide the Idaho Invasive Species Council with a clear statutory basis for developing and implementing a comprehensive invasive species program. The identification of research needs is recommended as there is much to be learned about invasive species, ranging from how some microbes might spread to finding acceptable biological controls for noxious weeds. Finally, it is recommended that the Idaho "Invasive Species Summit" re-convene to review the current situation and discuss what future steps will be needed (NNRG 2003).

Environmental Objective 10B: Reduce the extent and density of established noxious weeds and invasive exotics and restore native habitats (see assessment section 3.1 and Table 3-1).

Strategies:

- 10B1. Identify and prioritize noxious weed infestations for treatment at a finer scale than presented in this plan using section 6.2 as a guide. Cooperate with existing Cooperative Weed Management Areas (CWMA) in the subbasins and integrate new information with existing inventories and management efforts from each CWMA in the subbasins (South Fork of the Boise CWMA, Boise Basin CWMA, Upper Payette CWMA, Lower Payette CWMA, Lower Weiser CWMA, and Adams County CWMA) (see section 4.1 about data gaps).
- 10B2. Treat weed infestations according to the areas and species identified in strategy 1 (see Table 14 in section 4.3 about monitoring and evaluation).
- 10B3. Reestablish appropriate native plant communities after successful weed eradication efforts (see Table 14 in section 4.3 about monitoring and evaluation).
- 10B4. Monitor and evaluate efforts to reduce weeds. Integrate new information into strategy 10B1 and modify implementation strategies as necessary.

Discussion: Noxious weeds and exotic plant species are spreading within the BPW subbasins (see assessment section 1.7.5 and Figure 1-19). European purple loosestrife (*Lythrum salicaria*) and Eurasian watermilfoil (*Myriophyllum spicatum* L.) are exotic plant species having negative impacts on riparian/wetland habitats in the subbasins (see assessment section 3.2.2.2). The invasion of cheatgrass is fueling larger and more frequent fires in shrub-steppe habitats that are out-competing sagebrush as well as the associated forb and grass species that are native components of that ecosystem. Spotted knapweed (*Centaurea maculosa*) is an invasive species in the pine/fir habitats of the BPW subbasins (see assessment section 3.2.2.2).

Working to develop effective methods for reducing the prominence of noxious weeds and invasive plants in the subbasins will be an important step in preserving native biodiversity. The Idaho State Department of Agriculture (ISDA) sponsors a variety of programs that encourage collaboration and provide resources to manage noxious weeds (ISDA 2003). The Noxious Weed Cost Share Grant Program accelerates the attack on invasive weeds by supplementing local funds and resources, providing additional incentives for local landowners, officials, and citizens to work collaboratively to develop a more comprehensive and effective noxious weed management program. The ISDA Noxious Weeds Program is involved in coordinating statewide weed prevention efforts, identifying and providing funding and resources, and representing the interests of Idahoan's regarding invasive species management and control.

The Idaho Weed Summit was held by the ISDA to develop an action plan for the State. The resulting plan, *Idaho's Strategic Plan for Managing Noxious Weeds* was released in February 1999 and focused on locally led Cooperative Weed Management Areas (CWMA). Top priorities of CWMA include the involvement of all landowners in a watershed or region, development of Integrated Weed Management Plans, and defining roles and partnerships that allow for the blurring of jurisdictional lines of ownership to optimize cooperative efforts (ISDA 2003). Currently, Idaho has 32 successfully functioning CWMA that cover more than 82% of the state as a result. The Adams County, Lower Weiser River, Lower Payette, Upper Payette, Boise Basin, and South Fork of the Boise CWMA cover the vast majority of the BPW subbasins. The appropriate County Weed Superintendent in each CWMA should be contacted (ISDA 2003) prior to identification, prioritization, and treatment efforts in the subbasins.

Problem 11: The expansion of urban and rural human development has impacted native species and habitats.

Environmental Objective 11A: Minimize the potential negative impacts of current and future development on the native species and habitats of the subbasins.

Strategies:

- 11A1. Identify and prioritize for protection important habitat areas in the urban–rural interface at a finer scale than presented in section 6.2, using assessment section 3.3.2.7 about development in coordination with other protection objectives in this plan (see section 4.1 about data gaps).
- 11A2. Work with city and county governments to include consideration of important or critical habitats in the planning process. Provide information on the impacts of development on species and habitats.
- 11A3. Encourage compliance with ordinances and covenants addressing weed and pet control.
- 11A4. Protect existing functional habitats under threat of development through land purchase, fee title acquisitions, conservation easements, land exchanges and other actions (see Table 14 in section 4.3 about monitoring and evaluation).
- 11A5. Monitor and evaluate the effort to protect species and their habitats from the effects of development. Integrate new information into strategy 1 and modify implementation strategies as necessary.

Discussion: Land conversion at the urban-rural interface (also called “sprawl”) has a number of impacts on the natural environment and human activity. As farm and ranch lands, forests, and other open spaces are transformed, wildlife habitat and wetland/ riparian areas are frequently diminished. Urbanization has also been linked to stream channelization problems, riparian degradation, and downstream flooding. The resulting fragmentation of habitat has many impacts on the landscape and wildlife populations. Habitat Fragmentation affects predator–prey relationships, species composition, dispersal, density, distribution, and population genetics, as well as, microclimate variables such as sunlight penetration and temperature. Sprawl also increases road densities, which inevitably exposes previously undisturbed habitat and open space to additional development (see assessment section 3.1).

In the BPW subbasins, the majority of the human population resides in the Lower Boise, Main Payette, North Fork Payette and the Lower Weiser watersheds (see assessment section 3.1 and Figure 1-5; see also Figure 8 in Appendix 3-1 of the assessment). Much of the BPW subbasins are impacted by urban sprawl. Urban lands in Idaho grew 37% between 1982 and 1997 primarily from the conversion of cropland, pastureland, rangeland and forestland. Sprawl fragments habitat when new developments divide undisturbed habitat. The resulting fragmentation is particularly harmful to wide ranging species that rely on large territories to draw food and cover.

Areas in the BPW subbasins may still be developed, although all efforts should be made to minimize the impacts of urban and rural development on species and

habitats. This will allow development to proceed in the context of wildlife needs, rather than waiting for it to become a conflict later in the process.

Problem 12: Historic and current livestock grazing has impacted fish and wildlife habitats and populations in some areas of the subbasins (see assessment section 3.1).

Environmental Objective 12A: Reduce the negative impacts of livestock grazing on the fish, wildlife, and plant populations in the subbasins.

Strategies:

- 12A1. Identify and prioritize areas impacted by grazing for protection and restoration at a finer scale than available in section 6.2, in coordination with other objectives (see section 4.1 about data gaps). Consider 303(d)-listed streams for bacteria during prioritization exercises.
- 12A2. Reduce or eliminate grazing impacts by encouraging establishment of riparian pasture systems, exclusion fences (passable to wildlife), off-site watering areas, or riparian conservation easements. Adjust seasonal timing of livestock grazing to minimize soil compaction, erosion, noxious weed propagation and conflicts with wildlife. Water structures have resulted in mortality for bats, birds, and squirrels; use structures in a manner to reduce these impacts. In priority areas, consider eliminating grazing (e.g., retiring grazing permits) (see Table 14 in section 4.3 about monitoring and evaluation).
- 12A3. Reduce impacts of concentrated livestock feeding activities by identifying concentrated feeding areas negatively impacting water quality, and design management actions to minimize sediment and nutrient inputs to streams (see Table 14 in section 4.3 about monitoring and evaluation).
- 12A4. Monitor and evaluate the effort to protect and restore habitats from grazing impacts. Integrate new information into strategy 12A1 and modify implementation strategies as necessary.

Discussion: One of the most significant human-induced changes affecting the western landscape has been the widespread introduction of domestic livestock, as 91% of the public land in the western United States is grazed. The abundance of food, water, and shade attracts livestock to riparian wetland areas. The direct effects of livestock grazing upon the wetland riparian habitats have been summarized as follows (Harper *et al.* 2003)::

- Higher stream temperatures from lack of sufficient woody streamside cover.
- Excessive sediment in the channel from bank and upland erosion.
- A high coliform bacterium counts.
- Channel widening from hoof-caused bank sloughing and later erosion by water.

- Change in the form of the water column and the channel it flows in.
- Change, reduction, or elimination of vegetation.
- Elimination of riparian areas by channel degradation and lowering of the water table.
- Gradual stream channel trenching or braiding depending on soils and substrate composition with concurrent replacement of riparian vegetation with more xeric plant species.

Livestock grazing in shrub-steppe habitats alters the species composition of communities, disrupts ecosystem functioning, and alters ecosystem structure. The main direct impacts from cattle are the grazing of plants and trampling of vegetation and soil

It is important to recognize the positive values in regard to ranching such as reduced fuel loads if managed properly in areas where a reduction in fire frequency is desirable, preservation of rural values and lifestyle, and land use aside from development. In general, efforts should focus on riparian and wet meadow habitats, while acknowledging that some priority projects in other areas exist. Consider implications for wildlife during fencing projects that restrict access to riparian habitats.

Environmental Objective 12B: Reduce conflicts between livestock and native wildlife and plant populations.

Strategies:

- 12B1. Protect important plant populations by developing grazing management plans to limit adverse impacts to rare¹ or culturally important plant populations (see Table 14 in section 4.3 about monitoring and evaluation).
- 12B2. Prevent seed dispersal by minimizing the potential for livestock to spread noxious weeds through weed-free hay programs, quarantine requirements, and other actions in coordination with objective 10A about protecting native habitats from invasive exotics (see Table 14 in section 4.3 about monitoring and evaluation).
- 12B3. Reduce livestock and wildlife conflicts, where possible, by altering grazing management practices to minimize livestock and native species conflicts (see Table 14 in section 4.3 about monitoring and evaluation).
- 12B4. Monitor and evaluate efforts to reduce impacts of livestock on wildlife species. Modify implementation strategies as necessary.

¹ Rare is meant to be inclusive of proposed, candidate and listed species as well as those known to be locally uncommon.

Discussion: Livestock can compete with native wildlife populations for forage and/or space. Heavy browsing by big game animals may inhibit shrub and grass cover, alter the plant composition, alter vegetative structure, prevent adequate plant reproduction, or cause direct mortality. Generally, big game impacts to the habitat become significant when the animals become numerous as to exceed the carrying capacity of the habitat, which livestock contribute (Begon and Mortimer 1986).

Grazing/browsing was considered highly limiting to terrestrial resources in the South Fork Boise, Lower Boise, Main Payette, and Weiser River Watersheds (assessment section 3.1 and Table 3-2).

Dietary overlap between big game animals and livestock is subject to the specific forage components required by the animals and the timing of ungulate use. Dietary overlap between elk and cattle is most likely to occur on fall cattle range that is used by elk later in the year as winter range. Dietary overlap between elk and domestic sheep occurs during the summer when both species rely heavily on forbs. The degree of diet overlap between cattle and mule deer is relatively small. The diets of domestic sheep and mule deer overlap during the spring and fall when both ungulates are using browse and forbs. Winter bighorn sheep diets and summer-fall cattle diets have the greatest potential for overlap of any seasonal diet combination between these two ungulates. Under this combination, the diets of both, cattle and bighorn sheep are dominated by graminoids. However, as with elk and cattle, the differences in seasonal habitat use displayed by cattle and bighorn sheep minimizes the potential for dietary competition between these species. Dietary overlap between domestic sheep and bighorn sheep is not understood as well (Clark 2003).

Problem 13: Alteration of the natural fire regime in the BPW subbasins has negatively impacted native terrestrial focal habitats and species.

Environmental Objective 13A: Manage fire on the landscape to achieve natural ecosystem processes and succession.

Strategies:

13A1. Implement public education process.

13A2. Identify and prioritize areas for fire management needs at finer scale than presented in section 6.2 about terrestrial prioritization. This will include identifying areas for fire suppression in some areas, natural fire regime in others, prescribed burning and other management activities. The management needs to be identified to a site scale. (Other agencies and organizations are already in various stages of this process.) Consider impacts of fire on weed distribution during prioritization process (see section 4.1 about data gaps).

13A3. Assess priority areas for the management strategies necessary to achieve an appropriate distribution of seral stages. In all focal habitat types,

develop an integrated weed control and fire management strategy (see section 4.1 about data gaps).

- 13A4. After fires and other major disturbance, implement weed control strategies following objectives 10A and 10B (weed management) to control new infestations.

Discussion: The altered fire regime has been ranked as a highly limiting factor in all areas of the subbasins. It is the most consistent, high priority and widespread limiting factor identified in the assessment. Fire suppression, vegetation management and other activities have altered vegetative composition and structure in all habitat types in the subbasins. Fire is an important disturbance regime that shapes habitats and impacts species. Moving fire management towards natural regimes will address many terrestrial species and habitat issues. Fire suppression has allowed conifers to invade once suitable meadow habitats required by the Northern Idaho ground squirrel, an ESA listed species (section 5.1.2.5). This is not an objective that the Technical Team expects can be effectively dealt with in the subbasin planning arena because of the nature of fire management as it currently exists.

Problem 14: The loss or degradation of wetland and riparian habitats has negatively impacted the numerous wildlife species that utilize these habitats.

Environmental Objective 14A: Protect, enhance, or restore wetlands or create new wetlands to mitigate for permanently lost wetlands and manage for hydrologic processes that protect water quality, base flows, peak flows, and timing to ensure proper wetland function.

Strategies:

- 14A1. Prioritize protection and restoration activities at a finer scale than presented in section 6.2 about terrestrial prioritization by finalizing National Wetlands Inventory maps across the subbasins, developing protection and restoration priorities, and assessing wetland functionality (rely on work completed by the USFWS and cooperators). Use hydric soils maps to determine the location of historic wetlands where herbaceous wetlands were most common. Prioritize based on biological importance or size (see section 4.1 about data gaps).
- 14A2. Rehabilitate wetland and floodplain areas (section 6.2) to restore hydrologic function (see Table 14 in section 4.3 about monitoring and evaluation).
- 14A3. Protect wetland habitats through land acquisition, fee title acquisitions, conservation easements, land exchanges, public education, promotion of BMPs, promotion of alternative grazing strategies and the installation of alternative forms of water for livestock (see Table 14 in section 4.3 about monitoring and evaluation).

- 14A4. Restore degraded wetland function and quality where possible. Reduce roads and other land use impacts in wetland areas (see Table 14 in section 4.3 about monitoring and evaluation).
- 14A5. Collaborate with private landowners where priority wetlands exist on private land to protect or improve wetland habitat.
- 14A6. Continue effective activities, and develop new activities, that work to protect and restore wet meadow and wetland habitats.
- 14A7. Monitor and evaluate effort to protect wetlands. Integrate information into strategy 1 and modifying activities under strategies 14A2, 14A3, and 14A4 as necessary based on new information.

Discussion: Wetlands cover only a small portion of the subbasins, but offer some of the most diverse and unique habitats available. Wetlands occur as small ponds filled by spring runoff, wet meadows, springs and seeps, bogs, small lakes, and riverine and streamside riparian areas. Many wetland communities in the subbasins have been degraded by livestock grazing, road development, land-use conversion, urban expansion, and altered hydrologic regimes. This is clear when comparing the current and historical distributions of habitat type (see assessment section 3.1 and Figures 2-16 and 2-17).

Given the weakness of current data on wetlands in these subbasins, and a lack of political resolve, it is impossible at this historic moment to determine exact acreage needing protection and restoration. Collecting the data necessary as a basic starting point for prioritization is an important first step. The Technical Team chose not to speculate on quantitative goals at this time, while emphasizing the importance of continuing with wetland protection and restoration while data collection proceeds. The Technical Team also believes any further loss of this habitat from the current situation is unacceptable.

Environmental Objective 14B: Protect, enhance, or restore riparian habitats and manage for hydrologic processes that protect water quality, base flows, peak flows, and timing to ensure proper riparian function.

Strategies:

- 14B1. Identify and prioritize riparian habitats for protection and restoration at a finer scale than presented in section 6.2 about terrestrial prioritization (see section 4.1 about data gaps).
- 14B2. Restore prioritized (strategy 14B1), degraded riparian areas in coordination with existing plans and programs addressing riparian habitats, when possible (see Table 14 in section 4.3 about monitoring and evaluation).

- 14B3. Protect riparian communities through land purchase, fee title acquisitions, conservation easements, land exchanges, promotion of BMPs, land stewardship, promotion of alternative grazing strategies, and the installation of alternative forms of water for livestock in coordination with objective 12A to reduce negative impacts of grazing (see Table 14 in section 4.3 about monitoring and evaluation).
- 14B4. Minimize road and other land use impacts in riparian areas in coordination with objective 8A (see Table 14 in section 4.3 about monitoring and evaluation).
- 14B5. Protect and restore riparian communities in agricultural lands through increased enrollment by landowners in the Continuous Conservation Reserve Program (CCRP), conservation easements and other agricultural land programs (see Table 14 in section 4.3 about monitoring and evaluation).
- 14B6. Work with water users to improve irrigation equipment and/or methods that result in increased efficiency and decreased consumption in the subbasins, including the urban environment (see Table 14 in section 4.3 about monitoring and evaluation).
- 14B7. Reduce the impacts of vegetation conversion projects (e.g., timber harvest, agriculture) on hydrologic regimes (see Table 14 in section 4.3 about monitoring and evaluation).
- 14B8. Increase stewardship by increasing public understanding of the importance of riparian habitat through education programs for the general public, land owners and land managers.
- 14B9. Monitor and evaluate efforts to protect and restore riparian habitats to address objective 14B. Integrate new information into strategy 14B1 and modify implementation strategies as necessary.

Discussion: Adjacent to many streams, rivers, and wetlands, riparian habitats are water-dependent systems that are strongly associated with stream dynamics and hydrology. Riparian habitats may reduce stream temperatures by providing shade, reduce sediments through channel stabilization and filtration, increase channel habitat diversity, and improve floodwater retention and groundwater recharge. These habitats consistently support greater diversity and abundance of wildlife species than other habitat types and are often important breeding habitats or seasonal ranges for a variety of fish and wildlife species (assessment section 2.3.1, Figure 2-18). Riparian areas are also used as migration corridors for many species in the BPW subbasins, including the lynx (ESA listed species) (Ruediger et al. 2000). The focal species associated with riparian/herbaceous wetland habitats in the BPW subbasins are the Columbia spotted frog, willow flycatcher, bald eagle, American beaver (assessment section 2.3.1). Table 3-1 in assessment

section 3 describes the expression of limiting factors and their causes (grazing/browsing, timber harvest, altered fire regime, altered hydrologic regime, invasive exotics, and land use conversion). The TT believes any further loss of this habitat from the current situation is unacceptable.

Problem 15: The loss and degradation of shrub-steppe habitat in the BPW subbasins has negatively impacted numerous native plant and animal species dependent on these habitats.

Environmental Objective 15A: Protect, enhance, or restore shrub-steppe habitat and increase stand density and diversity.

Strategies:

- 15A1. Assess existing condition and extent of shrub-steppe habitat in the BPW subbasins (see Table 12 in section 4.2 about research needs).
- 15A2. Restore fragmented and degraded sagebrush habitats (see Table 14 in section 4.3 about monitoring and evaluation).
- 15A3. On private lands, when possible, assist private landowners in restoring native vegetation (see Table 14 in section 4.3 about monitoring and evaluation).
- 15A4. Maintain or restore historical disturbance patterns that result in some early seral communities (see Table 14 in section 4.3 about monitoring and evaluation).
- 15A5. On public lands, decrease encroachment by conifer species (see Table 14 in section 4.3 about monitoring and evaluation).
- 15A6. Maintain or restore a healthy bunchgrass community; maintain adequate ground cover of non-senescent grasses and forbs to conceal ground nests and support an adequate food base for terrestrial species (see Table 14 in section 4.3 about monitoring and evaluation).
- 15A7. Monitor and evaluate actions to achieve objective 15A. Update strategies accordingly.

Discussion: Alteration of fire regimes, fragmentation, livestock grazing, and the addition of exotic plant species have changed the character of shrub-steppe habitat. Sagebrush steppe ecosystems of the Great Basin in the western United States are examples of fire prone ecosystems. Many wildlife species depend on sagebrush steppe ecosystems for survival. A change in the natural fire regime is decreasing the extent of sagebrush ecosystems, and the populations of wildlife species that depend on sagebrush are undergoing steep declines because of habitat loss. Invasion of cheatgrass is fueling larger and more frequent fires that are outcompeting sagebrush as well as the associated forb and grass species that are

native components of that ecosystem. More than half of the Pacific Northwest shrub-steppe habitat community types listed in the National Vegetation Classification are considered imperiled or critically imperiled (see assessment section 3.1).

Livestock grazing can negatively impact species composition of shrub-steppe communities, disrupt ecosystem functioning, and alter ecosystem structure. The main negative impacts from cattle are the grazing of plants and trampling of vegetation and soil (assessment section 3.1).

Many factors have altered the composition and distribution of shrub-steppe habitats and the species associated with them within the BPW subbasins. This is clear when comparing the current and historical distributions of habitat type (see assessment section 3.1 and Figures 2-16 and 2-17). The Technical Team believes that any further loss of shrub-steppe habitat from the current situation is unacceptable.

Problem 16: Alterations of forest structure (including timber harvest and fire suppression) is limiting pine/fir forest habitats in some areas of the BPW subbasins.

Environmental Objective 16A: Protect mature pine/fir forest habitats by promoting ecological processes (i.e., natural fire regime) that lead to late seral stages while protecting meadow habitats from pine/fir encroachment. This includes processes that lead to forest stability in this habitat type.

Strategies:

- 16A1. Inventory and map existing mature ponderosa pine/Douglas-fir forest habitats at a finer scale than presented in assessment section 3.1 (see section 4.1 about data gaps).
- 16A2. Prioritize pine/fir forest communities for protection at a finer scale than presented in section 6.2 about terrestrial prioritization. Give higher priority to larger remnants and those with highest potential to be lost (see section 4.1 about data gaps).
- 16A3. Protect existing mature ponderosa pine communities through land purchase, fee title acquisitions, conservation easements, land exchanges or other strategies. Encourage the planting of ponderosa pine during existing state, federal and tribal reforestation efforts where appropriate to habitat type (see Table 14 in section 4.3 about monitoring and evaluation).
- 16A4. Protect pine/fir forest communities, where appropriate to the habitat type, using prescribed burning and/or understory removal (timber management) to restore the natural fire regime, while protecting mature stands from stand-replacing fire events. Manage timber harvest by protecting large, old trees and, promoting succession to late seral stages (see Table 14 in section 4.3 about monitoring and evaluation).

- 16A5. Continue existing programs that work to acquire and restore low elevation pine/fir forests. Develop new programs to acquire and restore mature ponderosa pine forests.
- 16A6. Monitor and evaluate effectiveness of protection activities to reduce negative impacts to wildlife species. Integrate new information into strategies 16A1 and 16A2. Modify implementation strategies as necessary.

Discussion: The loss of pine/fir forest is primarily a result of timber harvest, grazing pressure, conversion to agriculture, and encroachment by other species following fire suppression. Under historic fire regimes, stands were usually maintained in a late seral single layer structure. This forest type is maintained by fire and is vulnerable to fire exclusion. Reductions in pine/fir habitats, has negatively impacted native focal wildlife species (see assessment section 2.3.1 about pine/fir forests). The current distribution of dry, mature pine/fir forests in the BPW subbasins is illustrated in assessment Figure 2-20. This can be compared to the historical distribution of this habitat type in assessment Figure 2-16.

Needles, cones, buds, pollen, twigs, bark, seeds, and associated fungi and insects provide food for many species of birds and mammals. This forest type provides important breeding and nesting habitat for rare white-headed woodpeckers and flammulated owls (see assessment section 2.3.3.2). Pine/fir forests provide numerous species of birds and mammals with shelter at each stage of growth but is particularly valuable in mature stands and as snags, where it provides spacious housing for numerous cavity-dwelling species and valuable perch trees. This xeric, open canopy forest type also provides ungulate winter range and serves as movement corridors in winter. Carnivores benefit from concentrated ungulate prey populations on winter range in this type (assessment section 2.3.3.2).

Protection of stands of pine/fir forests in areas where the habitats were historically dominant will help to preserve wildlife dependent on the various pine/fir forest habitat types. The Technical Team believes that protection of mature stands is important. Thinning and prescribed burns of smaller trees are two methods suggested for protecting mature stands. Restoration of the natural fire regimes to historic norms should be long-term goal. Reestablishment of natural ecological processes will also create the habitat features found in earlier seral stages used by wildlife, such as the northern Idaho ground squirrel, known to occur in shallow, dry rocky meadows usually surrounded by ponderosa pine and Douglas-fir forests at elevations of about 915 to 1,650 meters (3,000 to 5,400 feet) (USFWS 2003). The focus on mature seral stages does not imply other seral stages aren't important, only that the mature stage is the most limited seral stage in this habitat type at this time.

The northern Idaho ground squirrel is primarily threatened by habitat loss due to forest encroachment into former suitable meadow habitats (USFWS 2003). Forest encroachment results in habitat fragmentation, eliminates dispersal

corridors, and confines the northern Idaho ground squirrel populations into small isolated habitat islands. Fire exclusion and the dense regrowth of conifers resulting from past logging activities have significantly reduced meadow habitats suitable for these ground squirrels over the past 40 years (USFWS 2003).

3.5 Socioeconomic Components

These social and economic objectives are designed to provide operational guidance for implementing the terrestrial and aquatic protection and restoration objectives and strategies outlined in the *Boise, Payette, and Weiser Subbasins Plan*. They are operational objectives and strategies essential to the short- and long-term success of overall efforts in the subbasins. The problem statements and socioeconomic objectives in Table 8 were developed to address factors limiting the successful implementation of the vision in the BPW subbasins. They are not meant to be optional or to be implemented to the detriment of aquatic and terrestrial objectives and strategies, but are process-oriented objectives and strategies that should be addressed whenever possible as part of all planning and implementation activities. They address important aspects of the context within which aquatic and terrestrial protection and restoration occur. The successful management of fish and wildlife in the subbasins is partially dependent on implementing the strategies detailed in this section. A demographic and economic summary for the BPW subbasins is presented in Appendix D to support implementation of socioeconomic objectives in this plan.

The following objectives and strategies were developed by the Planning Team during regular subbasin planning meetings. These objectives, strategies and discussions were developed within a collaborative, consensus-based discussion. All changes and revisions were reviewed and approved by the Planning Team.

Table 8. Problems statements and socioeconomic objectives in the BPW subbasins. These must be taken in context with associated strategies and discussion comments in this section about socioeconomic components.

Problem Statements		Socioeconomic Objectives	
17	As reflected in the inventory, numerous agencies and entities are implementing programs and projects in the subbasins. Insufficient coordination and integration limit the economic, social, cultural, and biological benefits of aquatic and terrestrial protection and restoration in the subbasins.	17A	Develop programs and project proposals that are compatible with existing community needs and that integrate with local watershed protection, restoration, and management objectives and activities.
18	The management of both public and private lands in the BPW subbasins impacts local economies.	18A	Balance negative impacts and benefits to local communities with benefits to fish and wildlife.
19	In the past, projects have not been successful in conditions where the local groups are not supportive. Long-term program implementation is more successful where projects are developed in cooperation with local entities. Lack of stakeholder and management understanding of issues, problems, and solutions continues to limit the effectiveness of implementation efforts in these subbasins.	19A	Increase resource information and education delivery regarding fish and wildlife needs and projects in these subbasins.
20	Many important cultural uses of the BPW subbasins are impacted by fish and wildlife activities. Indian tribes are continually losing opportunities to practice long-standing traditions that keep their cultures alive, traditions related to and contingent on responsible natural resource management. Non-Indian users also face difficulty in maintaining cultural uses. Traditional uses, hunting and fishing, river floating, backpacking, and other activities are uses important to all users of the subbasins. Local industries that support these users suffer or benefit from impacts on these uses.	20A	Protect and foster both Indian and non-Indian cultural uses of natural resources in the BPW subbasins.

Problem 17: As reflected in the inventory, numerous agencies and entities are implementing programs and projects in the subbasins. Insufficient coordination and integration limit the economic, social, cultural, and biological benefits of aquatic and terrestrial protection and restoration in the subbasins.

Socioeconomic Objective 17A: Develop programs and project proposals that are compatible with existing community needs and that integrate with local watershed protection, restoration, and management objectives and activities.

Strategies:

- 17A1. Involve communities and finer scale efforts in subbasin planning, and in program and project planning.
- 17A2. Coordinate plan implementation with federal, tribal, state, local, private and other interests, and avoid program and project duplication.
- 17A3. Seek formal local support for programs and project proposals.
- 17A4. Encourage Watershed Advisory Groups (WAGs) to organize projects addressing water quality issues outlined in this plan.
- 17A5. Develop a group to coordinate project development and planning for each subbasin.
- 17A6. Assist Soil and Water Conservation Districts, Watershed Advisory Groups, and other existing groups to organize project goals and implementation strategies.
- 17A7. Assist interested groups with organizing local watershed programs.
- 17A8. Facilitate networking of these groups with technical assistance in the subbasins.

Discussion: Systematic coordination of programs and plans in the BPW subbasins will achieve benefits beyond the value of an individual program or project, and will promote the application of ecosystem management principles. Existing programs and projects are listed in the Inventory. Current activities occur at a variety of scales, many of them finer scales than subbasin planning. Implementation of this plan will be more effective over the long run if it is coordinated with subbasin planning efforts. Subbasin-scale coordination will enable the development and coordination of synergistic benefits as well as providing the communication necessary to identify and avoid duplication of efforts and allow for more efficient and effective use of limited resources.

Better integration of efforts will require further involvement of communities in subbasin planning. This will improve coordination of local efforts with subbasin-

scale efforts and enable the development of projects with cultural, social and economic benefits to local communities.

The Watershed Advisory Groups were formed to provide a local forum for developing and directing implementation of TMDLs in the State of Idaho. The subbasins plan provides a useful synthesis of information and objectives for the WAGs to refine at a finer scale during TMDL implementation. Many of the objectives of this plan directly address water quality problems and objectives identified in these subbasins. Coordination needs to take place between existing and future efforts in the WAGs and the subbasin-scale effort.

Implementation of this plan will be complex and time intensive, requiring efforts at multiple scales and in multiple political and funding forums. To be successful, over the long run, a coordinator will be needed to spearhead the effort. The Planning Team expressed the need to develop an organization to represent a broad cross section of stakeholders and agencies active in the BPW. The Resource Conservation and Development (RC&D) coordinators already provide a forum for the integration of efforts at federal, state, tribal and local levels. The RC&D could coordinate efforts in the subbasins, coordinate prioritization, make recommendations for funding, and coordinate the technical and financial resources necessary to implement this plan. The RC&D has a compatible mission and is active across the BPW subbasins. The Planning Team recommends that the RC&D spearhead the effort to form this group.

Implementation of the subbasins plan will require efforts at multiple scales including subbasin, fish and wildlife populations, watershed, and finer scales. This effort will require coordination between various agencies and organizations that work on public and private lands. If possible, multiple roles and efforts should be underway at once.

Problem 18: The management of both public and private lands in the BPW subbasins impacts local economies.

Objective 18A: Balance negative impacts and benefits to local communities with benefits to fish and wildlife.

Strategies:

- 18A1. Minimize negative economic impacts on the communities in the BPW.
- 18A2. Maximize benefits to the communities by achieving sustainable fish and wildlife populations in the BPW subbasins (while implementing the biological and environmental objectives in this plan).
- 18A3. Minimize impacts on local community culture and custom.
- 18A4. Whenever possible, utilize local labor forces, contractors, and suppliers when implementing habitat improvement projects.

- 18A5. Maximize economic benefits of plan—for protection and enhancement, efforts should be made to minimize loss of local community revenues.
- 18A6. Evaluate the economic efficiency and impacts of projects as part of prioritization processes in the subbasins.
- 18A7. For land purchases or easements, every effort should be made to avoid impacts caused by shifts in the tax burden to the private sector.

Discussion: Healthy fish and wildlife populations provide economic and cultural benefits. Social values, in addition to economics, need to be considered when implementing activities. The economic impacts and benefits of activities outlined in this plan were highly important to Planning Team members. The goal is to implement this plan, as much as possible, to benefit the economics of this area while minimizing negative economic impacts (see Appendix D about socioeconomics). The social and cultural values associated with fish and wildlife activities and natural resource activities are important in all counties in the subbasins.

The social and economic factors important to gauging benefits and impacts of restoring and protecting fish and wildlife in the BPW subbasins need to be developed. Low cost economic analysis tools need to be developed for use at the subbasin scale. Trend information is particularly important to understanding benefits and impacts that may take decades to manifest. Baseline data needs to be collected or augmented to allow for development of trend analysis. This analysis needs to be targeted towards the specific economic and social factors affecting resource decision making. These tools are needed throughout the Columbia Basin and should be developed at a regional level to provide consistency and efficiencies across multiple subbasins. Once these tools have been developed, a baseline established and an evaluation of current conditions made, this information needs to be integrated into other socioeconomic objectives.

One strategy for protecting areas is to purchase them for management by an agency or tribe. A concern that needs to be addressed when private land is converted into public ownership is that its designation on the county tax roles changes and the amount of annual property tax paid on those lands is nearly always eliminated. The tax burden is then shifted to the remainder of the private lands, thereby increasing their tax burden. This can negatively impact counties and local services. This impact needs to be considered and mitigated if possible during the land acquisition or trade process.

Whenever possible, involve local labor and resources in protection and restoration efforts to provide direct participation in the process and work and economic benefits to local areas. The Planning Team acknowledges that many agencies do not have the ability to direct projects to local contractors, but for those that do, when possible, resources should be directed to benefit local labor forces, contractors, and suppliers.

Problem 19: In the past, projects have not been successful in conditions where the local groups are not supportive. Long-term program implementation is more successful where projects are developed in cooperation with local entities. Lack of stakeholder and management understanding of issues, problems and solutions continues to limit the effectiveness of implementation efforts in these subbasins.

Socioeconomic Objective 19A: Increase resource information and education delivery regarding fish and wildlife needs and projects in the subbasins.

Strategies:

- 19A1. Promote stewardship of natural resources through enhanced local involvement and support.
- 19A2. Implement information and education actions identified in this management plan.
- 19A3. Provide information and assistance to the RC&Ds, Soil and Water Conservation Districts, Watershed Advisory Groups, watershed groups, and other interested parties for information and education programs.
- 19A4. Provide opportunities for subbasinwide information distribution, such as periodic public meetings, newsletters, web sites, etc.

Discussion: Over the long run, it is important to develop broad public understanding and commitment to fish and wildlife efforts in the BPW subbasins. This effort needs to involve individuals as well as agencies. Current local groups should attempt to coordinate with the subbasin-scale effort and coordination needs to work both ways. Information and resources from the agencies, tribes, and subbasin-scale efforts need to be provided to local groups, while local data, information and priorities need to be integrated into the subbasin-scale effort. A sustained, long-term effort to provide information to communities and residents of the subbasins needs to be maintained indefinitely. This effort should be woven into projects and programs when possible and multiple roles and efforts should be underway at once.

Problem 20: Many important cultural uses of the BPW subbasins are impacted by fish and wildlife activities. Indian tribes are continually losing opportunities to practice long-standing traditions that keep their cultures alive, traditions related to and contingent on responsible natural resource management. Non-Indian users also face difficulty in maintaining cultural uses. Traditional uses, hunting and fishing, river floating, backpacking, and other activities are uses important to all users of the subbasins. Local industries that support these users suffer or benefit from impacts on these uses.

Socioeconomic Objective 20A: Protect and foster both Indian and non-Indian cultural uses of natural resources in the BPW subbasins.

Strategies:

- 20A1. Integrate information and education on important Indian and non-Indian culture, treaty rights, and historic and current resource use into project selection and implementation. Provide such information to land managers, regulatory agencies, policymakers, and the public.

Discussion: Healthy habitats and fish and wildlife populations provide cultural survival for tribes, and economic and other cultural benefits to users of the BPW subbasins. The BPW subbasins is also the homeland of the Shoshone-Paiute Tribes, with unrelinquished land title and rights to hunt and fish. The Planning Team believes that urban areas of the subbasins distort the social and economic data and mask the importance of natural resource and recreation sectors of the economy in most areas of the subbasins. The economies of areas of the BPW subbasins depend highly on natural resources, although this dependency has changed over time. In the past, the focus was on natural resource-based uses, while more recently, recreation and other uses have increased to be closely balanced with continued natural resource use. The Planning Team believes that it is important to protect and foster continued natural resource use into the future. This need provides context for fish and wildlife planning and implementation.

In addition to economics, social values need to be incorporated when implementing activities. The protection of treaty rights is a key component of public land management. The living culture of the Indian Tribes and nontribal citizens in the BPW subbasins relies heavily on continued opportunities to harvest the natural resources managed on public and private lands. Through the protection of federally managed lands comes the protection of treaty rights and fulfillment of the trust obligations of federal agencies.

General changes to natural resource and public land management in the BPW subbasins impact traditions and cultural uses. The abuse of private lands by outside users has led to the posting of lands and loss of access. This situation will continue until recreationists develop a respect for private and public lands that eliminates the current abuse of private and public property by recreationists.

4 Research, Monitoring, and Evaluation Plan

This section describes conditions identified in the *Boise, Payette, and Weiser Subbasins Management Plan* that will require research, monitoring, and evaluation (RM&E) activities to aid in resolving management uncertainties. This RM&E section is closely related to the vision, objectives and strategies described in sections 2 and 3 of this subbasins management plan, which were developed to address limiting factors identified in the *Boise, Payette, and Weiser Subbasins Assessment*.

The need for adaptive management, monitoring, and evaluation of project implementation was an issue of focus during the development of objectives and strategies. Each objective has a set of strategies to either gain further understanding of limiting factors or take actions toward correcting limiting factors. Objectives also have a strategy focused on evaluating the effectiveness of implementation strategies in achieving desired objectives, modifying where necessary. In order to assess the effectiveness of a strategy, the measurable impact of implementing the strategy on environmental conditions will need to be collected throughout implementation activities. This section seeks to guide the collection of the most appropriate data to allow for effective adaptive management.

Successful adaptive management begins with stakeholder gatherings following a policy planning process that begins with goal identification, an understanding of uncertainties, and culminates in model simulations to understand potential management policies (Aldridge et al. 2004). This subbasin planning process has supported most of these efforts. Two key components of adaptive management are 1) to conduct management as an experiment with sound experimental design, and 2) maintain a direct feedback loop between science and management (Aldridge et al. 2004). The result is the incorporation of the scientific method (experiments) into a management framework (policy decisions), a substantial step above traditional trial and-error or learn-as-you-go management. A major flaw that often leads to a failure in adaptive management is the breakdown of progress from the development stage to the design and implementation of field experiments (Aldridge et al. 2004).

A series of meetings with technical personnel representing various tribal, federal, state, and county agencies involved in management of fish and wildlife resources in the BPW subbasins guided development of this RM&E section. The group reviewed guidance in *A Technical Guide for Subbasin Planners* (NPPC 2001) and incorporated elements they considered appropriate and feasible based on the project timeline, the needs of the subbasins, and the current state of knowledge in the subbasins. The group attempted to develop an integrated and iterative monitoring and evaluation plan that is consistent with the three-tiered system advocated by the ISRP (2003) and the Columbia Basin Fish and Wildlife Authority's (CBFWA) Collaborative Systemwide Monitoring and Evaluation Project (CSMEP). The three tiers integral to this type of RM&E plan are described below as they were defined by CBFWA. The three tiers and their relationship to adaptive management are illustrated in Figure 1.

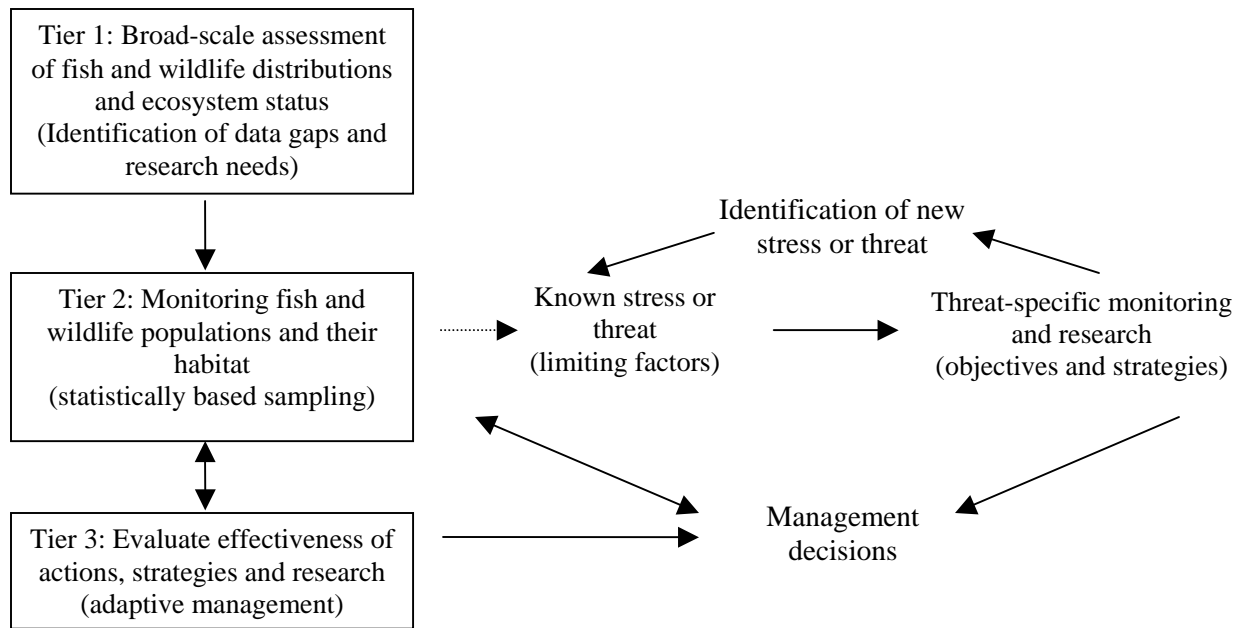


Figure 1. Ecological framework for research, monitoring, and evaluation in the BPW subbasins.

Both terrestrial and aquatics sections of the management plan describe RM&E needs. Needs include research or monitoring that fills existing knowledge or data gaps, answers questions critical to successfully managing species or communities, tests or develops innovative restoration/management techniques, or allows evaluation of the relative success of continuing restoration/management activities. Other needs are defined as programs for gathering data or conducting research to further understanding of specific populations, their habitats and ecosystems. All RM&E projects must provide a clear linkage to adaptive management processes that improve the direction of future actions.

In the context of a subbasin plan, RM&E is needed to 1) ensure strategies selected and implemented are addressing limiting factors as anticipated and 2) verify that the limiting factors identified in the assessment are, in fact, elements limiting the environmental expression and biological performance desired. Three main types of strategies were identified for achieving the objectives and improving the limiting factors in the subbasins: strategies focused on filling data gaps, addressing research needs, or implementing actions to improve or preserve conditions. The types of data that needs to be collected to assess the successfulness of each strategy in contributing to meeting the objective will vary among the three above-mentioned types of strategies. Additionally, the amount of information available to the Technical Teams to make these recommendations varied among the three types of strategies.

Tier 1 monitoring and analyses will provide broad-scale assessments of aquatic and terrestrial focal species distributions and status of focal habitats across the subbasins (trend monitoring) filling data gaps and supporting research needs identified in the objectives and strategies.

Research requires the use of experimental designs incorporating “treatments” and “controls” randomly assigned to study sites (ISRP 2003).

Addressing data gaps and conducting research contribute to an overall assessment of conditions and trends in the subbasins and, potentially, ecosystem. Additional monitoring of fish and wildlife populations and habitat (Tier 2) entail a monitoring component that provides measurable outcomes.

The effectiveness of specific actions taken (strategies) will be measured in the evaluation component (Tier 3). An evaluation of information collected through monitoring should assess any deviation of monitoring results from target goals or anticipated results. Three levels of evaluation are necessary: 1) an objective and independent scientific evaluation that interprets the strengths and weaknesses of available information, 2) a decision-making evaluation where contractors responsible for conducting monitoring projects coordinate with management agencies or entities to adaptively modifying management activities accordingly, and 3) a public evaluation where opportunity exists for comments. Recommendations to modify policy or management activities should follow evaluation.

The following topics were discussed during RM&E development:

1. Existing data gaps limiting management decisions or prioritization of activities.
2. Conditions in the subbasins requiring research to help resolve management uncertainties. Hypothesis testing. The spatial and temporal scale at which research be conducted.
3. The short-term indicator variables to measure during M&E activities to determine the success of strategies in achieving the desired objective. The predicted long-term biological outcome of successful strategy implementation.

4.1 Data Gaps

Fisheries and Terrestrial Technical Teams compiled a list of data gaps needed for management in the subbasins (Table 9 and Table 10). Data gaps represent areas where limited baseline data are a hindrance to effective management of the fish and wildlife resources of the subbasins. In most cases, these gaps are related to a basic understanding of species or habitat distribution, condition and trends. While it would be possible, and probably worthwhile, to develop research projects focused on closing many of these data gaps, they do not generally fit the criteria of a classic research need.

Table 9. Data gaps identified as strategies to achieve aquatic biological and environmental objectives.

Strategy	Data Gap
2A3	Consider supplementation of bull trout in suitable depressed (less than 50 adults) local population watersheds. Prioritize based on connectivity to a migratory population and/or strong refugia population and presence of suitable habitat.
2C2	Identify and eradicate isolated populations of brook trout where feasible and limiting to bull trout.
2C6	Prioritize additional areas impacted by hybridization and brook trout eradication projects at a finer scale than presented in this plan.
3A1	Continue with the Native Salmonid Assessment (NSA), including activities aimed at identification of stocks endemic to BPW subbasins and introgressed populations.
3A2	Expedite analysis of archived and/or additional necessary genetic samples to facilitate achievement of strategy 3A1.
3A3	Evaluate the need for focused restoration activities within core areas that will facilitate maintenance or increases in current population levels.
3B1	Continue evaluation of redband population structure and limiting factors (e.g., NSA).
3B2	Evaluate restoration feasibility in priority areas identified in assessment section 2.2.1.2 and move forward with habitat restoration where feasible.
3B3	Where unidentified in assessment section 2.2.1.2, establish restoration priority and feasibility for satellite population areas.
3C2	Prioritize protection on unimpacted redband trout populations and restoration on impacted populations based on strategy 3C1.
3D1	Determine extent of isolation problems by developing a population monitoring plan that integrates and includes existing information and interpretation of the natural interaction between resident and migratory redband trout. Use data to evaluate the extent of limitation posed by isolation.
3D2	If limitation is significant, prioritize protection and restoration opportunities based on predicted or expected biological response and socioeconomic feasibility.
4A1	Assess current stock status and population trends of native fish and their habitat.
4A2	Identify, describe, and measure stream habitat and landscape-level characteristics at fish sampling sites assessed following strategy 4A1
4A5	Provide additional data for models that explain the occurrence and abundance of native fish based on measurable characteristics of stream habitat and landscape features (continuing effort: USFS Rocky Mountain Research Station). Results will identify populations at risk and in need of recovery strategies, and will guide study design for strategy 4A7.
6A2	Inventory and identify additional barriers to fish migration (culverts, bridges, stream crossings, water diversion structures, etc.). Integrate data from all sources to refine priorities, using 4th field HUC boundaries.
6A3	Prioritize barriers for removal or modification based on connection of habitats in useable condition by focal species, the availability of population sources for genetic diversity, and/or the prevention of species migration into irrigation diversion.
6A4	Identify and implement additional opportunities to screen other diversions.

Strategy	Data Gap
6B2	Prioritize flow problems and activities for protection and restoration at a finer scale than presented in this plan. These problems have a long history and a complex legal and social context that must be taking into account while planning and implementing activities. Prioritize activities based on cost-effectiveness and expected biological response, taking account of and working with social and economic complexity and its constraints in the subbasins.
6C2	Use 303(d)-listed streams as guidance to further identify and prioritize areas where temperature amelioration would most benefit focal species. Prioritization should consider cost effectiveness and potential biological responses. This prioritization will determine the sequencing of activities in strategies 6C2 and 6C3.
6C4	Continue TMDLs, Ecosystem Analysis at the Watershed Scale (EAWS), and other watershed-scale assessments to define factors negatively influencing temperature regimes at a finer scale than presented in this plan. Differentiate between natural and human influences.
6D1	Continue development of TMDLs, EAWS, and other watershed-scale assessments designed to define both localized sediment sources and opportunities to reduce impacts. Begin assessments in areas illustrated in assessment section 1.7.1 and Figure 1-16.
6D2	At a finer scale than available in this plan, inventory and prioritize areas known to be limiting aquatic focal species or habitats where sediment reductions would be most beneficial.
6E1	Inventory nutrient-poor headwater streams and map all potential augmentation sites.
7A2	Prioritize additional habitat improvement projects for protection and restoration using information generated in strategy 4A2 to identify, describe, and measure stream habitat and landscape-level characteristics at the fish sampling sites.

Table 10. Data gaps identified as strategies to achieve terrestrial biological and environmental objectives.

Strategy	Data Gap
5A1	Develop a subbasinwide survey program and database for terrestrial focal, ESA-listed, and culturally important species.
5A2	Support the efforts of the Idaho Conservation Data Center (IDCDC) to document populations and sightings of aquatic and terrestrial species of interest.
10A2	Identify and prioritize native plant communities for protection from exotic weeds using information in section 6.2 in addition to other plans (CWMA plans, county weed boards, or other sources) that provide information to be used in prioritization. Prioritize by cost effectiveness and expected biological response.
10B1	Identify and prioritize noxious weed infestations for treatment at a finer scale than presented in this plan using section 6.2 as a guide. Cooperate with existing Cooperative Weed Management Areas (CWMA) in the subbasins and integrate new information with existing inventories and management efforts from each CWMA in the subbasins (South Fork of the Boise CWMA, Boise Basin CWMA, Upper Payette CWMA, Lower Payette CWMA, Lower Weiser CWMA, and Adams County CWMA).
11A1	Identify and prioritize for protection important habitat areas in the urban–rural interface at a finer scale than presented in section 6.2, using assessment section 3.3.2.7 about development in coordination with other protection objectives in this plan.

Strategy	Data Gap
12A1	Identify and prioritize areas impacted by grazing for protection and restoration at a finer scale than available in section 6.2, in coordination with other objectives. Consider 303(d)-listed streams for bacteria during prioritization exercises.
13A2	Identify and prioritize areas for fire management needs at finer scale than presented in section 8.1: Prioritization
13A3	Assess priority areas for the management strategies necessary to achieve an appropriate distribution of seral stages. In all focal habitat types, develop an integrated weed control and fire management strategy.
14A1	Prioritize protection and restoration activities for wetlands at a finer scale than presented in section 6.2 about terrestrial prioritization by finalizing National Wetlands Inventory maps across the subbasins, developing protection and restoration priorities, and assessing wetland functionality. Use hydric soils maps to determine the location of historic wetlands where herbaceous wetlands were most common. Prioritize based on biological importance or size.
14B1	Identify and prioritize riparian habitats for protection and restoration at a finer scale than presented in section 6.2.
16A1	Inventory and map existing mature ponderosa pine/Douglas-fir forest habitats at a finer scale than presented in assessment section 3.1.
16A2	Prioritize pine/fir forest communities for protection at a finer scale than presented in section 6.2 about terrestrial prioritization. Give higher priority to larger remnants and those with highest potential to be lost.

4.2 Research Needs

Addressing data gaps will provide a strong foundation for the design of research projects. Determining the status of focal species and their habitats will require determination of sampling frequencies, sampling protocols, experimental design, and statistical analysis appropriate for the species of interest and the scope of research. Such details should be included at the proper scale in project proposals. Objectives and strategies, hypotheses for testing, and the spatial and temporal scale at which research should be conducted provide a guide for research efforts in the subbasins (Table 11 and Table 12). The hypotheses given should be considered examples to begin research, not a complete list.

Table 11. Aquatic research needs identified as strategies to achieve biological and environmental objectives (sections 3.3.1 and 3.4.1).

Strategy	Research Needs	Spatial Scale	Temporal Scale
1A1	Participate in province and basinwide coordinated studies and water management forums to manage out-of-subbasin impacts. Out-of-subbasin factors require allocation of water for summer augmentation flows. This impacts reservoir operations and resident fish populations in the BPW subbasins. Conduct research within the context of identifying out of subbasin water allocation. Work with other entities to ameliorate and mitigate limiting factors.	subbasin	Variable
1A2	Evaluate effects of lost anadromous components on the aquatic ecosystems in the subbasins.	BPW subbasins	5-10 years
1A3	Continue to investigate the feasibility of restoring anadromous fish runs above Hells Canyon Dam.	Upstream HC complex	Continuing
2C3	Compile and synthesize existing bull trout and brook trout survey data. Determine additional populations and areas impacted by hybridization problems by continuing and expanding surveys of both brook and bull trout that are underway, including standardized genetic sampling, to determine levels of hybridization. Use phenotypic/morphometric characteristics in the field using, when possible, genetic sampling for validation. H _a for hybridization research: If the invader is removed, native species will positively respond.	Populations in Arrowrock and Anderson Ranch Core Areas as well as known areas of overlap in local populations	Minimum of two life cycles of invaded species at the population scale (Peterson and Fausch 2003)
2C4	Determine the effects of brook trout on bull trout related to hybridization, competition, and habitat.	same as 2C3	Same as 2C3
2C5	Determine the scale, if any, at which brook trout are invasive.	Basinwide	Years
2C7	Develop and test methods to prevent the spread of brook trout, thereby reducing the spread of impacts of hybridization on bull trout.	Local source populations	Depends on method of eradication
3C1	Determine extent of hybridization problems by sampling redband trout at historical rainbow trout stocking locations for evidence of genetic introgression. Develop a genetics protocol and monitoring plan that integrates past genetics work and includes documentation and interpretation of natural or hatchery influenced genetic interaction between hatchery rainbow and redband trout.	Local source populations	Minimum of two life cycles of invaded species at the population scale

Strategy	Research Needs	Spatial Scale	Temporal Scale
4A4	Use bull trout survey data from strategy 2C3 (genetic sampling of brook and bull trout) and add data from surveys of other native fish. Include standardized genetic sampling to determine levels of hybridization, the purity of populations, and the degree of genetic variability among and within populations.	Population	Time needed for sample and data analysis
4A7	Based on results from strategies 4A1 through 4A6, initiate studies to identify major limiting factors, life history, and habitat needs for native fish populations throughout the BPW subbasins, especially for populations most at risk of extirpation.	Subbasin	At appropriate scales to capture population dynamics.
6B1	Research adequate flows for native aquatic fauna. Identify problems and opportunities for improvement once adequate flows are determined.	Aquatic community	3-5 years
6B3	Determine appropriate flow regimes/flow requirements for specific stream reaches within 15 years.	Stream reach	15 years
6E2	Implement pilot nutrient supplementation study in bull trout local population watersheds.	Local population	12 years for residents, 8 years for migrants
9A1	Collect or compile population data in reservoirs believed to be negatively affecting focal species. Continue data collection in Arrowrock Reservoir. Determine the extent and nature of limitation that reservoir operations are having on focal species.	Project	Project
9A2	Complete fish and wildlife loss assessments to establish mitigation responsibility for habitat and prevention of critical habitat loss (see discussion regarding Lost Valley Reservoir and ESA-listed species) for federal projects at Lucky Peak, Arrowrock, Cascade, and Deadwood.	Suggest project watershed level for federal reservoir projects	2 years

Table 12. Terrestrial research needs in the BPW subbasins identified as strategies to achieve biological and environmental objectives (sections 5.3.2: Terrestrial Species and 5.4.2: Terrestrial Ecosystem).

Strategy	Research Needs	Spatial Scale	Temporal Scale
5A3	Research life history requirements, population demographics, abundance, distribution, and genetic integrity of species, as well as habitat associations, quantity, and quality of the terrestrial species of the BPW subbasins. Focus efforts on focal, ESA-listed, and culturally important species and focal habitats.	As appropriate to species	By end of planning process, R, M and E activities will be implemented for all focal species
10A1	Continue identification of invasive or noxious plant species in the BPW subbasins.	All of subbasins	Underway
15A1	Assess existing condition and extent of shrub-steppe habitat in the BPW subbasins.	All shrub-steppe habitat in subbasins, with focus on prioritized watersheds	Underway, after disturbance, repeat complete survey every 5 years

4.3 Monitoring and Evaluation

The RM&E plan proposed below is not intended to be a field-ready program; rather, it represents a first step in program development. The focus is on the strategy level, not on the project level. Current RM&E programs (as described in the Inventory) likely incorporate many of the RM&E needs identified in this section. Development of any new plans will therefore be coordinated with existing programs to maximize effectiveness and reduce redundancy. Technical Teams designed the RM&E plan in response to recommendations by the NPCC (2001) in consideration of time limitations and the scale of planning activities.

Objectives and strategies that entail a monitoring component are outlined in Table 13 (aquatic) and Table 14 (terrestrial). A list of short-term indicators to measure the successful implementation of strategies that achieve desired objectives, and the expected long-term biological outcome, are provided to guide monitoring in the BPW subbasins.

Table 13. Indicators and expected biological outcome used to evaluate success of implemented strategies in achieving aquatic objectives.

Objective	Strategy	Short-Term Indicators to Measure Success	Long-Term Biological Outcome
2A: Maintain and increase bull trout distribution and abundance (greater than or equal to 500 adults) within historic range in the local population watersheds identified in the assessment.	2A1: Maintain existing self-sustainable local populations by protecting existing water temperature, stream flows, habitat quality, connectivity, and invasion from non-native species.	self-sustaining local populations where they currently exist stable habitat conditions required by bull trout	Long-term population persistence
	2A2: Increase depressed local populations to at least 500 adults by following environmental objectives 6A through 6E, 7A, and 9A to restore habitat where limiting.	Defined under environmental objectives 6A through 6D, 7A, and 9A	Increased population abundance Possibly expanded distribution
2B: Meet criteria in Draft Bull trout Recovery Plan	2B1: Maintain current distribution of bull trout in the 54 local populations identified and expand distribution by establishing local populations of bull trout in areas identified, by the recovery plan, as potential spawning and rearing habitat (see discussion).	Relative abundance Spawner counts Redd counts-abundance and distribution	Expanded population distribution and possibly increased abundance
	2B2: Maintain or increase the estimated abundance of adult bull trout in the BPW subbasins to at least 17,600 individuals	Estimated adult abundance at or above 17,600	Long-term population persistence
	2B3: Ensure that adult bull trout exhibit stable or increasing trends in abundance in the Southwest Idaho Recovery Unit.	Estimated adult abundance stable or increasing	Long-term population persistence
	2B4: Remove specific barriers to bull trout migration in the Southwest Idaho Recovery Unit (BPW subbasins)	Successful bull trout movement or establishment in former blocked area	Increased population size, occupied habitat, long-term population persistence
2C: Reduce and prevent impacts of brook trout on bull trout.	2C1: Prevent introduction and expansion of brook trout into bull trout habitats without compromising connectivity for bull trout.	Non-expanding distribution of brook trout in bull trout areas during surveys	Decreased hybridization/competition, increased population viability

Objective	Strategy	Short-Term Indicators to Measure Success	Long-Term Biological Outcome
3C: Evaluate hybridization between hatchery rainbow trout and redband trout, where it occurs, within 10 years.	3C3: Eliminate stocking or stock only sterile rainbow trout where stocking continues to be desired and adverse impacts to native species are a concern to reduce future threats of hybridization.	Trend in stocking rates and/or sterile fish	Reduced hybridization and less dilute gene pool
4A: Increase data collection and prioritization of restoration efforts to protect and rebuild populations of native fishes in the BPW subbasins to self-sustaining, harvestable levels to the extent possible.	4A6: Protect quality habitat and restore degraded habitat to promote self-sustainable populations of native fishes in coordination with environmental objectives 6A through 6E, following established priorities.	<p>In quality habitat: continued existence of moderate to high density populations where they exist</p> <p>In degraded habitat: improve low and moderate density populations</p> <p>Increased acres and/or stream miles of habitat protected or restored</p>	Long-term population persistence
6A: Significantly reduce number of artificially blocked streams or unscreened water diversions by 2005.	6A1: Restore connectivity at known, prioritized artificial barriers and screen diversions where impairment is known, especially those negatively affecting listed species.	<p>Successful fish movement or establishment of focal fish species in former blocked area</p> <p>Increased stream miles opened to fish access/number of diversion areas screened</p>	Increased population size, or occupied habitat, long-term population persistence

Objective	Strategy	Short-Term Indicators to Measure Success	Long-Term Biological Outcome
6B: Restore flows in limited reaches to support resident fish needs (especially spawning, rearing, and migration).	6B5: Provide adequate flows where hydrographs have been altered and are limiting production), continue and expand efforts aimed at increasing base flows and restoring natural flow timing through riparian, floodplain and wetland enhancement, and implementation of forest and agricultural BMPs. Collaborate with local, state, tribal, federal, water users, and other relevant agencies/entities to provide adequate flow requirements.	Definition, then increased stream miles with adequate flows for aquatic species	Improved population productivity and abundance.
	6B6: Where hydrographs have been altered (see assessment section 3.1 and Table 3-3), work to develop cooperative efforts to provide adequate flows through water conservation.	Establishment of adequate flows for aquatic species	Improved population productivity and abundance.
6C: Reduce water temperatures to levels that meet applicable water quality standards for life stage-specific needs of aquatic focal species and, by 2019, establish an upward trend in the number of stream miles meeting those standards.	6C1: Begin riparian and flow restoration activities in spawning and rearing areas where temperature has been identified as limiting to aquatic focal species, followed by migration corridors.	Pre and post project temperature monitoring with downward trend in temperature Increased stream miles meeting temperature water quality standards	Improved abundance and distribution of limited species
	6C3: Continue efforts aimed at increasing riparian functions where they have been reduced by human and fire activities, and restoration is feasible.	Pre and post project temperature monitoring, downward trend in temperature if successful	Increased quality and quantity of habitat for aquatic focal species

Objective	Strategy	Short-Term Indicators to Measure Success	Long-Term Biological Outcome
6D: Reduce instream and bedload sedimentation to levels meeting applicable water quality standards for life stage-specific needs of aquatic focal species. Establish an upward trend in the number of stream miles meeting such criteria by 2019.	6D3: Reduce sediment inputs within the natural range of variability for a particular system. Cooperatively implement BMPs that address soil erosion and sediment delivery from roads, logging, fire, floods, mining, agriculture, grazing, and other historic and natural, current, and future activities.	Stable or downward trend in fine sediment and increasing trend in particle size Increased number of stream miles meeting sediment water quality standards	Increased spawning success
6E: Develop a nutrient allocation plan for the subbasins that investigates the potential benefits to fish and wildlife of nutrient additions to replace lost marine-derived nutrients without negative impacts to reaches with excess nutrients.	6E4: Monitor effectiveness of nutrient supplementation by bull trout population response without impacts in downstream reaches where nutrients are in excess.	Increased aquatic productivity Increased growth and condition factors	Increased productivity and abundance Population viability
7A: Improve aquatic habitat diversity and complexity in tributary systems where focal species populations are limited.	7A3: Restore habitat complexity in priority areas with protection and restoration activities designed to promote development of more complex and diverse habitats through improved watershed conditions and function. Monitor biological response to habitat improvements at the project level.	Increasing trend of habitat complexity measures. Pre and post habitat measures every 5 years (e.g., significant increases in pool-rifle ratios, LWD, canopy cover, etc.)	Increased density and distribution of aquatic focal species

Objective	Strategy	Short-Term Indicators to Measure Success	Long-Term Biological Outcome
	7A4: Design restoration projects to incorporate upland, wetland, and floodplain processes.	<p>Reestablishment of floodplain connectivity, and wetland function</p> <p>Increased organic inputs from riparian zone</p> <p>More natural temperature regime from groundwater inflow</p>	Improved desirable invertebrate production
	7A5: Monitor long-term effectiveness of cumulative habitat improvement efforts at the scale of the subbasin or priority 4th field HUC boundary.	Increased connectivity of quality habitat	Increased abundance and distribution of focal species
8A: Reduce the impact of the transportation system on fish and wildlife populations and habitats.	8A1: Reduce road impacts by implementing road closure and decommissioning programs (not critical for transportation, recreation, and land management activities) in areas most limiting focal or listed species and habitats.	Decreased road densities and stable or downward trend in fine sediment with increasing trend in particle size	Increased spawning success, increased quality and quantity of habitat for aquatic focal species
	8A2: Protect high-quality habitats with diverse communities in existing roadless areas.	Stable trend in area of roadless habitat	Maintenance of population strongholds

Table 14. Indicators and expected biological outcome used to evaluate success of implemented strategies in achieving terrestrial objectives.

Objective	Strategy	Short-term Indicators to Measure Success of Strategy	Long-term Biological Outcome
10A: 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	10A3: Prevent new infestations by minimizing ground-disturbing activities in habitats highly susceptible to weed invasion through local cooperation and revegetate following disturbance.	Reduction in the number of new infestations, decreasing number of acres that need to be treated each year. Reduction of acreage of incidents of invasive exotic plant infestations related to fire impacts.	Native plant communities without invasive exotic plant problems.
	10A4: Prevent dispersal by encouraging the use of weed-free seeds and feeds. Limit the transportation of weed seeds and other propagules from vehicles and livestock.	Programs implemented and policies enacted, such as establishment of weed-free regulation, posting of signs regarding weed-free seed use, and others.	Fewer opportunities for introductions.
10B: Reduce the extent and density of established noxious weeds and invasive exotics and restore native habitats	10B2: Treat weed infestations using the area and species identified in prioritization	Number of infested acres treated. Number of infestations treated.	Reduced number of infestations. Reduced acreage of infestations.
	10B3: Reestablish appropriate native plant communities after successful weed eradication efforts	Acres of restored native habitats.	Increase in native plant communities without invasive exotic plant problems.
11A: Minimize the potential negative impacts of current and future development on the native species and habitats of the subbasins	11A4. Protect existing functional habitats under threat of development through land purchase, fee title acquisitions, conservation easements, land exchanges and other actions	Acres of existing functional habitats that are protected.	Increase in number of protected acres.

Objective	Strategy	Short-term Indicators to Measure Success of Strategy	Long-term Biological Outcome
12A: Reduce the negative impacts of livestock grazing on the fish, wildlife, and plant populations in the subbasins	12A2: Reduce or eliminate grazing impacts by encouraging establishment of riparian pasture systems, exclusion fences (passable to wildlife), off-site watering areas, riparian conservation easements, or consider retirement of grazing permits in priority areas. Adjust seasonal timing of livestock grazing to minimize soil compaction, erosion, noxious weed propagation and conflicts with wildlife.	Updates to allotment management plans to address grazing on public lands. Number of cooperators participating in conservation practices on private lands.	Increased number of livestock operations compatible with resource objectives.
	12A3: Identify concentrated feeding areas negatively impacting water quality, and design management actions to minimize sediment and nutrient inputs to streams	Number of concentrated feeding operations in existence. Management actions taken to reduce impacts.	Improved water quality
12B: Reduce conflicts between livestock and native wildlife and plant populations	12B1: Protect important plant populations by developing grazing management plans to limit adverse impacts to rare or culturally important plant populations.	Updates to allotment management plans on public lands. Number of cooperators participating in conservation practices on private lands.	Maintenance or restoration of rare or culturally important plant populations.
	12B2: Prevent seed dispersal by minimizing the potential for livestock to spread noxious weeds through weed-free hay programs, quarantine requirements, and other actions	Special-use permits on federal lands incorporate weed-free information. Completion of the plan by the Idaho Invasive Species Council.	Fewer opportunities for introductions.
	12B3. Alter grazing management to minimize livestock and native species conflicts	Updates to allotment management plans and, if necessary, removal of grazing conflicts (such as with native sheep).	Increased number of livestock operations compatible with resource objectives.

Objective	Strategy	Short-term Indicators to Measure Success of Strategy	Long-term Biological Outcome
13A: Manage fire on the landscape to achieve natural ecosystem processes and succession	13A4. After fires and other major disturbance implement weed control strategies to control new infestations	Number of infested acres treated. Number of infestations treated.	Reduced number of infestations, reduced acreage of infestations.
14A: Protect, enhance, or restore wetlands or create new wetlands to mitigate for permanently lost wetlands and manage for hydrologic processes that protect water quality, base flows, peak flows, and timing to ensure proper wetland function	14A2. Rehabilitate wetland and floodplain areas (section 6.2) to restore hydrologic function	Number of acres of restored wetland habitat.	Increase in number of acres of functioning-quality wetlands.
	14A3. Protect wetland habitats through land acquisition, fee title acquisitions, conservation easements, land exchanges, public education, promotion of BMPs, promotion of alternative grazing strategies and the installation of alternative forms of water for livestock	Decreasing trend in number of acres of wetland habitat lost.	Increase in number of protected acres of wetland habitat.
	14A4. Restore degraded wetland function and quality. Reduce road and other land-use impacts in wetland areas.	Number of acres of restored wetland habitat.	Increase in number of acres of functioning-quality wetlands.
14B: Protect, enhance or restore <u>riparian</u> habitats and manage for hydrologic processes that protect water quality, base flows, peak flows, and timing to ensure proper riparian function	14B2: Restore prioritized degraded riparian areas in coordination with existing plans and programs addressing riparian habitats, when possible	Number of acres of restored riparian habitat.	Increase in number of acres of functioning-quality riparian habitat.
	14B3. Protect riparian communities through land purchase, fee title acquisitions, conservation easements, land exchanges, promotion of BMPs, land stewardship, promotion of alternative grazing strategies, and the installation of alternative forms of water for livestock in coordination with Objective 12A to reduce negative impacts of grazing	Number of acres of protected riparian habitat Decreasing trend in number of acres of riparian habitat lost.	Increase in number of protected acres of riparian habitat.

Objective	Strategy	Short-term Indicators to Measure Success of Strategy	Long-term Biological Outcome
	14B4. Minimize road and other land use impacts in riparian areas in coordination with Objective 8A: Reduce negative impacts of transportation system	Miles of roads in riparian areas.	Improved water quality
	14B5. Protect and restore riparian communities in agricultural lands through increased enrollment by landowners in the Continuous Conservation Reserve Program (CCRP), conservation easements and other agricultural land programs	Number of landowners participating in agricultural land programs.	Increase in the number of protected acres of riparian habitat.
	14B6. Work with water users to improve irrigation equipment and/or methods that results in increased efficiency and decreased consumption in the subbasins, including the urban environment	Increased number of irrigation systems using more efficient water conservation equipment and methods resulting in decreased consumption.	Increase flows and/or lower water temperatures.
	14B7. Reduce the impacts of vegetation conversion projects (e.g., timber harvest, agriculture) on hydrologic regimes	Number of projects implemented.	Increased flows in habitat areas.
15A: Protect, enhance, or restore shrub-steppe habitat and increase stand diversity	15A2. Restore fragmented and degraded sagebrush habitats	Number of acres of restored shrub-steppe habitat.	Increase in number of acres of functioning-quality shrub-steppe habitat.
	15A3. On private lands, when possible, assist private landowners in restoring native vegetation	Number of landowners and acres participating in agricultural land programs.	Increase in the number of protected acres of shrub-steppe habitat.
	15A4. Maintain or restore historical disturbance patterns that result in natural distribution of seral communities.	Number and scale of projects addressing seral community diversity.	Natural distribution of seral communities.
	15A5. On public lands, decrease encroachment by conifer species	Number and scale of projects addressing conifer encroachment.	No disclimax of conifers in shrub-steppe habitat types.

Objective	Strategy	Short-term Indicators to Measure Success of Strategy	Long-term Biological Outcome
	15A6. Maintain or restore a healthy bunchgrass community; maintain adequate ground cover of non-senescent grasses and forbs to conceal ground nests and support an adequate food base for terrestrial species	Number and scale of projects maintaining or restoring bunchgrass communities.	Increase in healthy bunchgrass communities and number of acres restored, resultant increase in terrestrial species diversity.
16A: Protect mature pine/fir forest habitats by promoting ecological processes (i.e., natural fire regime) that lead to late seral stages while protecting meadow habitats from pine/fir encroachment. This includes processes that lead to forest stability in this habitat type	16A3. Protect existing mature ponderosa pine communities through land purchase, fee title acquisitions, conservation easements, land exchanges or other strategies	Acres of existing ponderosa pine communities that are protected.	Increase in number of protected acres of ponderosa pine communities.
	16A4: Protect pine/fir forest communities, where appropriate to the habitat type, using prescribed burning and/or understory removal to protect mature stands from stand-replacing fire events. Manage timber harvest to protect large, old trees and to promote succession to late seral stages	Acres of prescribed fire in pine/fir forest communities. Acres of understory removal in pine/fir forest communities.	Restored historical functioning of pine/fir forest communities.

We encourage collaboration between University scientists and relevant entities (e.g., state and federal agencies, tribal, private landowners) for the development of sampling design and setting of performance standards. Because the scope of this plan is broad, experts in relevant fields are most qualified to design individual projects addressing monitoring objectives. For well studied habitats and species (e.g., sage grouse), performance standards may be available in peer reviewed literature. Building on existing knowledge established across the range of a focal habitat or species is encouraged.

Data management and information dissemination are critical for an effective monitoring program. The Idaho Conservation Data Center (ICDC) (<http://fishandgame.idaho.gov/>) serves as a central repository and provider of information on rare terrestrial species. For many of monitoring objectives, the ICDC will most effectively manage the data. StreamNet (<http://www.streamnet.org/>) is a repository for regional fisheries data. Monitoring projects will likely span multiple jurisdictions and cover objectives that do not necessarily pertain to rare species. The development of an interagency database would facilitate consistency in data entry and allow access by multiple stakeholders to monitoring data. Interagency Species Management System (ISMS) was developed to “achieve efficiencies in implementing the Northwest Forest Plan by facilitating the sharing of species data among survey and management, watershed analysis, monitoring, and other cooperating agency programs” (see <http://www.reo.gov>). This system can serve as a model for the development of a central database for the BPW subbasins. In the development of all research and monitoring projects, technical reports and peer reviewed publication preparation should be included in the budgets and timelines. Availability and use of research and monitoring results are the ultimate measure of success for this RM&E plan.

5 Coordination with Existing Programs

For a subbasin plan to be adopted by the NPCC, the plan must conform to existing federal guidelines of the Endangered Species Act (ESA) and Clean Water Act (CWA). The status of listed species and water quality conditions is discussed in assessment sections 2 about biological resources and 1.7.1 about water quality. Planning must be reflective of, and integrated with, recovery plans for listed species within the subbasins, and the Water Quality Management Plan within that particular state (NPPC 2001). Following is a description of ESA and CWA considerations and of how recommended objectives and strategies conform to these federal guidelines.

5.1 Endangered Species Act Considerations

The BPW subbasins contains species listed as threatened or endangered under the Endangered Species Act (ESA) (16 U.S.C. §§ 1531–1544). The ESA, amended in 1988, establishes a national program for the conservation of threatened and endangered species of fish, wildlife, and plants and the habitat on which they depend. Section 7(a)(2) of the ESA requires Federal agencies to consult with USFWS and NMFS, as appropriate, to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or to adversely modify or destroy their designated critical habitats.

Section 7 of the ESA also makes it clear that all federal agencies should participate in the coordination of programs that involve endangered species. Under this provision, federal agencies often enter into partnerships and memoranda of understanding with the USFWS for implementing and funding conservation agreements, management plans, and recovery plans developed for listed species. The development of these types of partnerships are encouraged as such planning efforts enable proactive approaches for managing listed species.

The U.S. Fish and Wildlife Service (USFWS) are developing, or have developed, recovery plans for species listed under the ESA. Actions called for in the *Boise, Payette, and Weiser Subbasins Management Plan* should be coordinated, consistent, and integrated with these recovery plans as well any applicable performance measures from the Federal Columbia River Power System Biological Opinion (BiOp) (NPPC 2001).

5.1.1 Consistency with Applicable Performance Measures in Biological Opinion

As the BPW subbasins are blocked from anadromous fish runs, coordination with the federal BiOp shall be limited to habitat actions and ecological objectives generally associated with tributary systems in the Columbia River Basin (N. Berwick, NOAA, personal communication, April 4, 2004). Habitat actions described in the BiOp are intended to accelerate efforts to improve survival in priority areas in the short term, while laying a foundation for long-term strategies through subbasin assessment and planning (NMFS 2000). The long term habitat strategy in the BiOp has three overarching objectives: 1) protect existing high quality habitat, 2) restore degraded habitats on a priority basis and connect them to other functioning habitats, and 3) prevent further degradation of tributary and estuary habitats and water quality. These are

consistent with rules developed by Technical Team members during prioritization (section 6) as well as objectives for focal habitats in the BPW subbasins (section 3.4.2).

The following objectives were more specifically described in the BiOp (NMFS 2000) as necessary for tributary habitat efforts (related objectives in *Boise, Payette, and Weiser Subbasins Management Plan* are referenced):

- Water quantity—increase tributary water flow to improve fish spawning, rearing, and migration (environmental objective 6B).
- Water quality—comply with water quality standards, first in spawning and rearing areas, then in migratory corridors (environmental objective 6C).
- Passage and diversion improvements—address in-stream obstructions and diversions that interfere with or harm listed species (environmental objective 6C, strategy 6A1).
- Watershed health—manage both riparian and upland habitat, consistent with the needs of the species (all environmental objectives).
- Mainstem habitat—improve mainstem habitat on an experimental basis and evaluate the results (environmental objective 6E, Discussion).

In the long term, habitat recovery and watershed restoration for non-federal public, tribal, and private lands require state and local stewardship. An overall framework for this stewardship can be created through subbasin plans and related recovery plans which establish goals, objectives, and priority actions that are coordinated across federal and nonfederal ownerships and programs (NMFS 2000). The *Boise, Payette, and Weiser Subbasins Management Plan* provides an important context for classifying and prioritizing areas for protection and restoration. The management plan also provides a foundation for ESA recovery planning.

Performance standards and measures are described in the “All H Strategy,” which is the “umbrella” under which the BiOp falls (Federal Caucus 2000). The only measures applicable in the blocked BPW subbasins are related to habitat (N. Berwick, NOAA, personal communication, April 4, 2004). Habitat performance standards are to 1) prevent habitat degradation, 2) restore high-quality habitat, and 3) restore/increase habitat complexity. Below are associated performance measures (related sections in the *Boise, Payette, and Weiser Subbasins Management Plan* are referenced):

- Increased stream miles meeting water quality standards (temperature and sediments) (environmental objectives 6C and 6D; see Table 13 in section 4.3 about monitoring and evaluation).
- Increased stream miles with adequate instream flows (environmental objective 6B; see Table 13 in section 4.3 about monitoring and evaluation).
- Increased stream miles opened to fish access (environmental objective 6A; see Table 13 in section 4.3 about monitoring and evaluation).

- Increased number of diversion areas screened (environmental objective 6A; see Table 13 in section 4.3 about monitoring and evaluation).
- Increased acres and/or stream miles of habitat protected or restored (environmental objectives 4A, 10A, 11A, 14A, 14B, 15A, and 16A; see Table 13 and Table 14 in section 4.3 about monitoring and evaluation).

The ultimate performance standard for habitat is fish productivity. However, this will be difficult to establish for habitat because survival improvements from habitat actions cannot be measured in the short term. Even in the long term, measuring progress toward a biologically based standard will be challenging and expensive. Based on our current understanding of the associations between ecosystem processes and salmonid populations, four habitat factors will influence performance measures throughout the basin (Federal Caucus 2000):

- Instream flows
- Amount and timing of sediment inputs to streams
- Riparian conditions that determine water temperature, bank integrity, wood input, maintenance of channel complexity
- Habitat access

The management plan addresses each of these measures with detailed objectives and strategies (sections 3.4.1 and 3.4.2), as well as research, monitoring, and evaluation plans (section 4).

5.1.2 Consistency with Existing Recovery Plans

Bull trout are the only fish species listed under the Endangered Species Act (ESA) currently present in the BPW subbasins. Steelhead (*O. mykiss*), Chinook salmon (*O. tshawytscha*), and sockeye salmon (*O. nerka*) are listed under the ESA but have been extirpated from the subbasins and critical habitat was not designated above Hells Canyon Dam (assessment section 1.5). Other threatened or endangered species in the subbasins include a population of wolves (*Canis lupis*), federally designated as “non-essential, experimental” under section 10(j) of the ESA; the Northern Idaho ground squirrel (*Spermophilus brunneus brunneus*); bald eagle (*Haliaeetus leucocephalus*); lynx (*Lynx canadensis*), Spalding’s catchfly (*Silene spaldingii*); and MacFarlane’s four o’clock (*Mirabilis macfarlanei*) (assessment section 2.3.5).

Of the focal species in the BPW subbasins, one aquatic species (the bull trout) and two terrestrial species (the bald eagle and northern Idaho ground squirrel) are listed as threatened under the ESA (assessment section 2 and Table 2-2). The remaining species (lynx, wolf, Spalding’s catchfly, MacFarlane’s four o’clock) listed under the ESA in assessment Table 2-2 were not included as focal species for the priority habitat types, but are included in the assessment (assessment section 2.3.5 on threatened and endangered species) as they effect future management actions or projects.

There are also 46 wildlife species of concern in addition to the federally listed threatened or endangered species (assessment section 1.5.2). These species could be future candidates for listing, and as such, it is important to document their presence. Table 1-3 in assessment section 1.5 on biological descriptions summarizes documented occurrences of threatened, endangered, or otherwise rare animal species within the major watersheds of the BPW subbasins.

5.1.2.1 Bull Trout (*Salvelinus confluentus*)

Bull trout were listed under ESA as threatened on November 1, 1999 (64 FR 58910). The Bull Trout Recovery Team (BTRT) developed a draft recovery plan that provided a framework for implementing recovery actions for the species (USFWS 2002). The bull trout draft recovery plan was also used as the principal basis for identifying critical habitat for the species. The proposed designation of critical habitat was published on November 29, 2002 (67 FR 71236) (assessment section 2.2.1.1). The BPW subbasins are part of the Southwest Idaho Bull Trout recovery unit, which is divided into three subunits and nine core areas (assessment section 2.2.1.1, Table 2-4, and Figure 2-12). Core areas boundaries generally reflect isolation by one or more dams. Historically no barriers to fish migration existed between the subbasins and the Snake River. Currently, bull trout populations are upstream of reservoirs and unsuitable habitat (assessment section 2.2.1.1 and Figure 2-13).

Biological objective 2B (section 3.3.1) is to meet criteria in the draft bull trout recovery plan (USFWS 2002). Strategies include maintenance of the current distribution of local populations in the BPW subbasins, maintenance or increased abundance of adult bull trout in the subbasins, stable or increasing trends in overall abundance in the subbasins, removal of barriers limiting bull trout migration, as well as rigorous monitoring and evaluation activities to determine biological response of bull trout to recovery efforts.

5.1.2.2 Bald Eagle (*Haliaeetus leucocephalus*)

Bald eagles were listed under ESA as threatened July 12, 1995 (60 FR 35999), but are being considered for de-listing by USFWS as of July 4, 1999 (64 FR 128). Bald eagles have been documented in the North Fork Payette watershed of the BPW subbasins (assessment section 1.5.2 and Figure 1-8) and exist within riparian herbaceous wetland habitats in the subbasins (assessment section 2.3.1.2). The BPW subbasins are in the Pacific Recovery region for the bald eagle (USFWS 1986).

Their population status is described as in recovery, with the breeding population doubling every 6-7 years (assessment section 2.3.1.2 and Table 2-8). Bald eagle are considered to be generalists in the BPW subbasins, and more resilient to changes in their environment (assessment section 2.1.1.2). Objectives 14A and 14B (section 3.4.2) aim to protect and restore riparian and wetland habitats will support the needs of bald eagles. Strategy 8A2 to protect roadless areas will also support bald eagles.

5.1.2.3 Canada Lynx (*Lynx canadensis*)

On March 24, 2000, the North American lynx (*Lynx canadensis*) was federally listed as threatened (65 FR 16051) under the ESA. Lynx have been documented in the South, North, and Middle Fork Boise watersheds, as well as in the South and North Fork Payette watersheds (assessment section 1.5.2 and Figure 1-8). No recovery plan currently exists for lynx; however, the *Canada Lynx Assessment and Strategy* (Ruediger et al. 2000) describes conservation measures and objectives (M. Hemker, USFWS, personal communication, April 6, 2004).

In the Intermountain West, lynx prefer spruce (*Picea* spp.)–subalpine fir (*Abies lasiocarpa*) and lodgepole pine (*Pinus contorta*) dense climax forests at elevations above 1,200 m, but they also use early seral stage communities bordering dense forests. Lynx can be managed by managing

for snowshoe hare (*Lepus americanus*), their primary prey. Hare populations increase dramatically following disturbance, particularly fire that creates hare cover and food, generally benefiting lynx (assessment section 2.3.5).

Restoring fire as an ecological process was listed in the *Canada Lynx Assessment and Strategy* as a conservation measure addressing risk factors affecting lynx productivity. It was suggested that fire be used to move toward landscape patterns consistent with historical succession and disturbance regimes using mechanical pretreatment and management ignitions as necessary. Objective 13A and associated strategies (section 3.4.2) are consistent with these measures.

Lynx usually do not cross openings greater than 90 m and use travel corridors with tree densities of 450 per hectare. Therefore, fires or logging operations that create large openings without leaving travel corridors between pockets of dense forest may be detrimental to lynx (assessment section 2.3.5). Timber management modifies the vegetation structure and mosaic of forested landscapes and can be used as a disturbance process to create and maintain lynx habitat, and that of their prey (red squirrel and snowshoe hare). Greater emphasis has been placed on retention of live and dead trees and coarse woody debris, important habitat components (Ruediger et al. 2000). Dense horizontal cover of conifers, just above the snow level in winter, is critical for snowshoe hare habitat. This structure may occur either in regenerating seedling/sapling stands, or as an understory layer in older stands. Relatively few snowshoe hares are found in large openings, and thus lynx do not spend much time hunting in open areas, especially in winter. Clearcuts, shelterwood cuts, seed tree cuts, and diameter-limit prescriptions that result in distance to cover greater than 100 m (325 feet) may restrict lynx movement and use patterns until forest regeneration occurs. It may take approximately 15 to 30 years following forest management practices or fire for conifers and/or brush species to regenerate to heights sufficient to extend above average winter snow levels and create high quality habitat for snowshoe hare (Ruediger et al. 2000). Environmental objective 16A and associated strategies to protect pine/fir forest habitats and promote ecological processes leading to late seral stages support needs for lynx; however, the Technical Team choose to focus on lower elevation ponderosa pine/Douglas-fir forests in the BPW subbasins.

Plowed roads and groomed over-the-snow routes may allow competing carnivores such as coyotes and mountain lions to access lynx habitat in the winter, increasing competition for prey. Planning objectives in the *Canada Lynx Assessment and Strategy* (Ruediger et al. 2000) suggest the following to manage for recreational activities while protecting the integrity of lynx habitat:

- a) Maintain the natural competitive advantage of lynx in deep snow conditions by minimizing snow compaction in lynx habitat.
- b) Concentrate recreational activities within existing developed areas, rather than developing new recreational areas in lynx habitat.
- c) On federal lands, ensure that development or expansion of developed recreation sites or ski areas and adjacent lands address landscape connectivity and lynx habitat needs.

Environmental objective 8A is to reduce the impact of the transportation system on fish and wildlife populations and habitats (section 3.4.1). This objective generally supports lynx

management objectives as strategies include road closure and decommissioning programs in areas most limiting focal or listed species. In addition, restoration priorities (strategy 8A1) include areas that are critical habitat for listed species and protection priorities (strategy 8A2) include quality habitat in existing roadless areas. Unless other information becomes available, remain consistent with standards and guidelines in Canada Lynx Assessment and Strategy. As most lynx habitat is in headwater systems, management should also be consistent with recommendations in the Sawtooth National Forest Land Management Plan (USFS 2000) (M. Robertson, USFWS, personal communication, May 14, 2004).

5.1.2.4 Wolf (*Canis lupus*)

The gray wolf (*Canis lupus*) was listed as endangered under ESA on March 9, 1978 (43 FR 9607). On November 22, 1994, areas in Idaho, Montana and Wyoming were designated as non-essential experimental populations in order to initiate gray wolf reintroduction projects in central Idaho and the Greater Yellowstone Area (59 FR 60252, 59 FR 60266). Special regulations for the experimental populations allow flexible management of wolves, including authorization for private citizens to take wolves in the act of attacking livestock on private land (assessment section 2.3.5). Recovery criteria for wolves in the Central Idaho Recovery Area is a minimum of 10 breeding pairs (or about 100 wolves) for a minimum of three successive years (USFWS 1987).

Wolves reintroduced in Idaho traveled widely and generally northward, but most remained on public land within the core reintroduction area (Bangs and Fritts 1996). The BPW subbasins are in the Central Idaho Recovery Area (USFWS 1987). Wolves have been documented in the North, Middle and South Fork Payette watersheds as well as the North and Middle Fork Boise watersheds (assessment section 1.5.2 and Figure 1-8). As of August 1, 1996, an estimated 31 (or more) adults and 40 (or less) pups may be in Idaho. No livestock were killed by wolves in 1995, but 3 calves were killed by a wolf in June 1996. While an attempt was being made to capture that wolf, it accidentally drowned. No Idaho wolves have been captured or moved in other management actions and no land-use restrictions have been imposed (Bangs and Fritts 1996).

Biological objective 5A to increase understanding of the composition, population and habitat trends, and habitat requirements of the terrestrial communities of the BPW subbasins (section 3.3.2) and associated strategies support the actions or “tasks” needed to recover the Northern Rocky Mountain Wolf (USFWS 1987). Recommended actions are to determine the present status and distribution of gray wolves in the Northern Rocky Mountains and devise a systematic approach for compiling observations and other data on the wolf (USFWS 1987), which is consistent with strategies 5A1, 5A2, and 5A3 in this management plan. Specific tasks are to 1) determine the size of home range for packs, pairs, and lone wolves; 2) estimate the numbers of packs, pairs, and individuals in each area; 3) estimate pup/adult ratios; 4) estimate numbers of litters and litter sizes; 5) determine population trends over time; and 7) further understanding of wolf ecology by evaluating prey requirements, habitat requirements, and interactions with other carnivores (USFWS 1987). It is likely that general habitat management actions in this plan (weeds, fire, etc.) will have little effect on wolves themselves. Effects on their main prey source, elk and deer, should be considered (M. Robertson, USFWS, personal communication, May 14, 2004).

5.1.2.5 North Idaho Ground Squirrel (*Spermophilus brunneus brunneus*)

The northern Idaho ground squirrel was federally listed as a threatened species on April 5, 2000 (65 FR 17779) (assessment section 2.3.3.2 and Table 2-10). This subspecies is known to exist only in Adams and Valley counties of western Idaho. Adams and Valley counties make up about half of the Weiser and approximately one-third of the Payette subbasins (assessment Figure 1-10). The ground squirrel has largely been documented in the Upper Weiser watershed (assessment section 1.5.2 and Figure 1-8).

The entire range of this subspecies of ground squirrel is about 32 by 108 kilometers (20 by 61 miles), and as of 2002, 34 of 40 known population sites were extant. The subspecies declined from an estimated 5,000 individuals in 1985, to less than 1,000 by 1998, when it was proposed for listing (USFWS 2003). By the year 2000, preliminary surveys indicated that only about 350 individuals remained at known population sites. Based on more extensive census data collected in the spring of 2002, the population was estimated to be 450 to 500 animals (USFWS 2003). Delisting may be considered when recovery criteria have been met. Namely, when 10 of the 17 potential metapopulations have been identified within the probable historical distribution, each maintaining an average effective population size of greater than 500 individuals for 5 consecutive years (USFWS 2003).

The northern Idaho ground squirrel is known to occur in shallow, dry rocky meadows usually associated with deeper, well-drained soils and surrounded by ponderosa pine and Douglas-fir forests at elevations of about 915 to 1,650 meters (3,000 to 5,400 feet). Similar habitat occurs up to at least 1,830 meters (6,000 feet). Consequently, ponderosa pine/shrub-steppe habitat association with south-facing slopes less than 30 percent at elevations below 1,830 meters (6,000 feet) is considered to be potentially suitable habitat (USFWS 2003). Northern Idaho ground squirrels are considered specialists but capable of adapting to changes in their environment (assessment section 2.1.2). Environmental objective 16A will support recovery criteria by protecting mature pine/fir forest habitats, promoting ecological processes (i.e., natural fire regime) that lead to late seral stages and protection of meadow habitats from pine/fir encroachment (section 3.4.2).

The northern Idaho ground squirrel is primarily threatened by habitat loss due to forest encroachment into former suitable meadow habitats. Forest encroachment results in habitat fragmentation, eliminates dispersal corridors, and confines the northern Idaho ground squirrel populations into small isolated habitat islands. The subspecies is also threatened by land-use changes, recreational shooting, poisoning, genetic isolation and genetic drift, random naturally occurring events, and competition from the larger Columbian ground squirrel (*S. columbianus*) (USFWS 2003).

The primary cause of habitat loss is meadow invasion by conifers. Fire suppression has allowed conifers to invade once suitable meadow habitats. The dense regrowth of conifers resulting from past logging activities have also significantly reduced meadow habitats for ground squirrels over the past 40 years. As the amount of meadow habitat has been reduced, ground squirrel dispersal corridors have been reduced or eliminated, further constricting the subspecies into smaller isolated areas (USFWS 2003). Environmental objective 13A and associated strategies (section 3.4.2) to manage fire on the landscape to achieve natural ecosystem processes and succession supports Northern Idaho ground squirrel recovery efforts.

For the past 70 years, agricultural conversion and rural housing developments near the communities of Round Valley, New Meadows, and Council, Idaho, have fragmented some suitable habitat formerly occupied by the northern Idaho ground squirrel. Various other types of developments continue to threaten remaining occupied sites in Adams and Valley Counties. Following completion of a golf course and associated housing development, ground squirrels were eradicated due to their impacts to the fairways and golf greens (USFWS 2003). Environmental objective 11A to minimize the potential negative impacts of current and future development on native species and habitats in the BPW subbasins will support recovery criteria for ground squirrels. Strategy 11A2 will be especially helpful (work with city and county governments to include consideration of critical habitats in the planning process, while providing information on the impacts of development on species and habitats).

There is local interest in enlarging the dam and pool size of the Lost Valley Reservoir (North of Council in the Weiser subbasin) from 1,233.5 hectare/meters to 3,700.5 hectare/meters (10,000 acre/feet to 30,000 acre/feet) for irrigation (USFWS 2003). If this expansion occurs, it would likely flood key habitat currently occupied by northern Idaho ground squirrels at Slaughter Gulch, the largest known population site. Environmental objective 9A (section 3.4.1) to collaborate with reservoir operation managers to reduce the negative impacts of operations on aquatic and terrestrial species draws attention to the need for fish and wildlife loss assessments (strategy 9A2) to establish mitigation responsibility and prevent the loss of critical habitat.

Some activities or lack of management on private property appear to pose a threat to northern Idaho ground squirrels. Of the 34 extant population sites, 13 are entirely on private property, 2 are on both private and federal property, and 1 is on both private and state property. Implementing management or survey activities for northern Idaho ground squirrels requires cooperation from private landowners making consideration of socioeconomic objectives (section 3.5) of considerable importance. Controlled burning and reseeded with suitable native forbs and grasses is important to establish appropriate food sources for ground squirrels and other animals. These are factors crucial to the continued survival and recovery of northern Idaho ground squirrels, but are often difficult to implement on private lands (USFWS 2003).

5.1.2.6 Spalding's Catchfly (*Silene spaldingii*)

Spalding's catchfly, a member of the pink or carnation family, was listed as a Threatened species on October 10, 2001 (66 FR 51598, USFWS 2001) (Hill and Gray 2004). A recovery plan is in early stages of development and has not yet been released. However, the 2004 Conservation Strategy for Spalding's catchfly (*Silene spaldingii* Wats.) (Hill and Gray 2004) is a useful interim guide for describing limiting factors, protection and restoration priorities, and additional survey needs (M. Hemker, USFWS, personal communication, April 6, 2004).

In Idaho, Spalding's catchfly is currently known to occur in three counties: Nez Perce, Idaho, and Lewis, none of which are in the BPW subbasins. However, 98% of plants in Idaho occur within Canyon Grasslands, while remaining Spalding's catchfly occurrences in Idaho are small and isolated Palouse Grassland remnants (Hill and Gray 2004). The presence of the second largest population of Spalding's catchfly rangewide within Idaho Canyon Grasslands strongly suggests the species occurs in other portions of the Canyon Grasslands.

Spalding's catchfly is typically associated with grasslands dominated by native perennial grasses such as Idaho fescue (*Festuca idahoensis*) or rough fescue (*F. scabrella*). Scattered individuals of ponderosa pine may also be found in or adjacent to Spalding's catchfly (assessment section 2.3.5). As 1,849 km² of fescue grassland or fescue grassland with conifer exists in the BPW subbasins, additional surveys may result in documented occurrences of Spalding's catchfly in the subbasins (assessment section 1.5.3 and Table 1-4). Therefore, objectives and strategies recommended in this management plan shall be consistent with Spalding's catchfly needs.

Weed invasion is the major cause of Spalding's catchfly habitat degradation. Disturbances to soil and vegetation, both natural (fire, soil slumps, animal burrowing and trailing, etc.) and anthropogenic (livestock grazing and trampling, cultivation, road-building, fire suppression activities, off-road recreational use, etc.) are major contributing factors (Hill and Gray 2004). Environmental objective 10A is to 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. Environmental objective 10B supports this effort by recommending strategies to reduce the extent and density of established noxious weeds and invasive exotics and restore native habitats (section 3.2.4).

Livestock grazing has major negative effects on Spalding's catchfly and its habitat (Hill and Gray 2004). Prolonged heavy grazing pressure from domestic livestock in some areas has resulted in major alterations of the structure, function and composition of the fescue bunchgrass communities that support Spalding's catchfly and has also promoted weed invasion. Environmental objective 12A and associated strategies to reduce the negative impacts of livestock grazing on fish, wildlife, and plant populations in the BPW subbasins (section 3.4.2) will support Spalding's catchfly needs.

Life histories of native plant species are often fine-tuned to a particular regime of fire frequency, intensity and seasonal distribution (Hill and Gray 2004). Alterations of fire regimes, including fire suppression, increasing fire severities and frequencies, and out-of-season fires, have potential to degrade Spalding's catchfly habitat. Environmental objective 13A and associated strategies to manage fire on the landscape in a manner that would allow for natural ecosystem processes and succession are consistent with Spalding's catchfly needs.

Fifty-two percent of Spalding's catchfly populations occur on private lands; not including the 12% of populations in which a private individual or corporation is a part-owner (Hill and Gray 2004). As a result, integration of socioeconomic objectives and associated strategies in section 3.5 are necessary for successful implementation of Spalding's catchfly protection and restoration activities.

The conservation recommendations for Spalding's catchfly focus on protection of existing populations and habitat, and maintenance of potential habitat (Hill and Gray 2004). The following recommendations were summarized by Hill and Gray (2004) to reduce the most imminent and pervasive threats to Spalding's catchfly and its habitat. In order of priority, recommendations (additional details can be found in Hill and Gray 2004) address the following issues: 1) habitat degradation from non-native invasive plants, and major contributing disturbance factors, livestock grazing and fire (see additional guidelines for effective weed, livestock, and fire management and habitat restoration), 2) inventory of potential unsurveyed

habitat (specific recommendations identify areas with immediate survey needs), 3) habitat fragmentation (specific recommendations are given to help protect pollinators, reduce further habitat fragmentation, protect small populations on isolated habitat fragments, retain genetic diversity of threatened small populations, and suggest areas that would allow protection of groups of small populations), 4) monitoring (recommendations identify priority monitoring needs and provide suggestions of appropriate monitoring methodology), and 5) reporting and record-keeping (recommendations are made to help standardize and improve reporting and record-keeping across the four-state region of Spalding's catchfly known distribution). Aquatic and Terrestrial priorities (section 4.1 and 6.2) in the BPW subbasins are to protect existing habitat and build from strength, consistent with recommendation's for Spalding's catchfly conservation.

5.1.2.7 MacFarlane's Four o'clock (*Mirabilis macfarlanei*)

The MacFarlane's four o'clock, a long-lived herbaceous perennial, was first listed as an endangered species on October 26, 1979 (44 FR 61912). Only three populations were known at the time of the listing, with a total of 20 to 25 individual plants. The species was threatened by several factors, including trampling, collecting, livestock grazing, disease, and insect damage. Afterward, additional populations were discovered and populations on public lands were actively managed and monitored. Consequently, the plant was downlisted to a threatened status on March 15, 1996 (61 FR 10693) (assessment section 2.3.5).

MacFarlane's four o'clock occurs in habitats that are characterized by regionally warm and dry conditions. Habitat for the MacFarlane's four o'clock generally consists of bunchgrass communities dominated by bluebunch wheatgrass (*Agropyron spicatum*), in river canyon grasslands.

The MacFarlane's four o'clock is endemic to portions of the Snake, Salmon, and Imnaha River canyons in Wallowa County in Oregon, and adjacent Idaho County in Idaho. There are currently 11 populations in Idaho and Oregon (USFWS 2000). Three of these populations are found in the Snake River canyon area (Idaho County, Idaho, and Wallowa County, Oregon), six in the Salmon River area (Idaho County), and two in the Imnaha River area (Wallowa County, Oregon) (Federal Register, Vol. 61, No. 52:10693–10697). All of these populations are located north of the BPW subbasins.

MacFarlane's four o'clock and its habitat have been and continue to be threatened by a number of factors, including herbicide and pesticide spraying, landslide and flood damage, disease and insect damage, exotic plants, livestock grazing, off-road vehicles, and possibly road and trail construction and maintenance. The collecting of MacFarlane's four o'clock has also been determined to be a limiting factor, as have mining, competition for pollinators, and inbreeding depression. Care should be taken to protect MacFarlane's four o'clock during noxious weed or other invasive exotic treatments.

5.2 Clean Water Act Considerations

Formed in 1970, the U.S. Environmental Protection Agency (USEPA) administers the federal Clean Water Act (CWA), requiring enforcement of water quality standards by states. These standards are segregated into *point* and *nonpoint* source water pollution, with point sources

requiring permitting. Although controversial, this segregation means that most farming, ranching, and forestry practices are considered nonpoint sources and thus do not require permitting by the USEPA. A TMDL, or total maximum daily load, is a tool for implementing water quality standards where impairment of beneficial uses exists (section 5.2.2) (USEPA 2004). The USEPA provides funding through section 319 of the CWA for TMDL implementation projects. Section 319 funds are administered by IDEQ in Idaho (USEPA 2004).

The Idaho Nonpoint Source Management Program is an “umbrella” under which all CWA activities in Idaho are consistent. Objectives and strategies in the BPW Plan shall be consistent and integrated with the water quality management plans in the state (NPPC 2001).

5.2.1 Consistency with Idaho State’s Water Quality Management Plan

The revised 1999 Idaho Nonpoint Source Management Program Plan outlines the state’s strategy to meet the EPA’s revised Clean Water Act 319 program guidance dealing with nonpoint source pollution (IDEQ 1999). The primary purpose of the Nonpoint Source Assessments and Management Programs is to provide the states and tribes with a new blueprint for implementing integrated programs to address priority nonpoint source water quality problems. The focus is needed in order to identify innovative funding opportunities and to effectively direct limited resources toward the highest priority issues and water bodies.

The Idaho Nonpoint Source Management Program (1999) seeks to incorporate nine elements identified as necessary components for nonpoint source programs:

1. Explicit short and long-term goals, objectives and strategies to protect surface and groundwater.
2. Strong working partnerships and collaboration with appropriate state, tribal, regional, and local entities, private sector groups, citizens’ groups, and federal agencies.
3. A balanced approach that emphasized both statewide nonpoint source programs and on-the-ground management of individual watersheds where waters are impaired or threatened.
4. The program (a) abates known water quality impairments resulting from non-point source pollution, and (b) prevents significant threats to water quality from present and future activities.
5. An identification of waters and watersheds impaired or threatened by nonpoint source pollution and a process to progressively address these waters.
6. The State reviews, upgrades, and implements all program components required by §319 of the Clean Water Act and establishes flexible, targeted, interactive approaches to achieve and maintain beneficial uses of waters as expeditiously as practicable.
7. Identification of Federal lands and objectives which are not managed consistently with State program objectives.

8. Efficient and effective management and implementation of the State's nonpoint source program, including necessary financial management.
9. A feedback loop whereby the State reviews, evaluates, and revises its nonpoint source assessment and its management program at least every five years.

General long-term goals were developed by incorporating these elements. These goals were meant to focus implementation efforts and measures identified in approved TMDL and Watershed Restoration Action Strategies (WRAS) to protect and restore beneficial uses. Additional efforts were to prevent significant threats from present and future activities from degrading water quality. Finally, long-term goals were to target nontraditional partners and incorporate their roles into planning and implementation activities, such as; Idaho Cattle Association, irrigation and canal districts, etc. (IDEQ 1999). The following are goals for nonpoint source management in Idaho (IDEQ 1999):

1. Develop and implement coordinated restoration and water quality improvement plans (TMDL/WRAS/ or other implementation plans) which include appropriate BMP design, implementation, monitoring, and maintenance schedules for nonpoint source impacted surface and ground waters that help to restore, protect, or remediate (where appropriate) existing or designated beneficial uses of the State's surface and ground waters (#/yr).
2. Implement nonpoint source BMPs to meet approved TMDLs, TMDL implementation plans, and ground water standards.
3. Provide technical assistance in the development of surface and ground water BMPs and pollution prevention strategies for nonpoint source categories which are not currently listed as approved in the water quality standards.
4. Confirm that all agencies are implementing the nonpoint source management feedback loop in a manner consistent with the nonpoint source management program and, where appropriate, are revising and/or maintaining BMP catalogs and effectiveness protocols.
5. Support ground or surface water monitoring efforts which provide needed data for contaminant transport modeling and investigation work.
6. Integrate ground and surface water quality concerns within basins and watersheds to provide for better protection and restoration (where appropriate) of ground and surface water beneficial uses.
7. Develop and implement pollution trading approaches.
8. Implement measures to protect drinking water from the effects of nonpoint source activities.
9. Update and maintain the Nonpoint Source umbrella Memorandum of Understanding and appendices.

The vision of the Idaho Nonpoint Source Management Program is that all long-term goals and short-term objectives be implemented in a manner to protect or restore (where possible) the

beneficial uses of the State's surface and ground water (IDEQ 1999). The continuing focus for the State of Idaho within the foreseeable future will be to develop and implement TMDLs for 303(d)-listed water bodies. The State of Idaho has committed to the completion of TMDL implementation plans within an 18-month period following the EPA approval of a TMDL (IDEQ 1999).

The vision and guiding principles (sections 2.1 and 2.2), environmental objectives (section 3.4), and socioeconomic objectives (section 3.5) are consistent and integrated with the Idaho Nonpoint Source Management Program. Long- and short-term goals have been established. Monitoring and evaluation activities (section 4.3) describe measurable short-term outcomes and expected biological response of implementation strategies. Working partnerships and collaborative efforts have been developed during subbasin planning and public involvement meetings and outlined (sections 5.3 and 1.2.3). Local involvement during activities in impaired watersheds has been recommended. Data gaps, research needs and monitoring activities are recommended and a feedback loop for adaptive management described.

5.2.1.1 303(d)-Listed Segments

Section 303(d) of the CWA requires that water bodies violating state or tribal water quality standards be identified and placed on a 303(d) list. Water bodies that do not meet water quality standards with implementation of existing management measures are listed as impaired under §303(d) of the CWA. It is each state's responsibility to develop its respective 303(d) list and establish a TMDL for the parameter(s) causing water body impairment (USEPA 2004).

Within the BPW subbasins, there are 62 water quality limited water bodies. Existing pollution controls or requirements are inadequate to provide for the attainment and maintenance of water quality standards (i.e., impaired or threatened by pollution) for these streams (or stream segments). In total, nearly 1,448 km (900 miles) of rivers and streams, excluding reservoirs, are currently water quality limited in the BPW subbasins (assessment section 1.7.1 and Figure 1-16).

5.2.2 TMDLs in BPW Subbasins

A TMDL, or total maximum daily load, is a tool for implementing water quality standards and is based on the relationship between pollution sources and in-stream water quality conditions. The TMDL establishes the allowable loadings or other quantifiable parameters for a water body and thereby provides the basis to establish water quality-based controls. These controls should provide the pollution reduction necessary for a water body to meet water quality standards

Assessments of total maximum daily loads (TMDL) have been completed for sediment and bacteria in the Lower Boise River and are in review for phosphorous, sediment, bacteria and temperature in the Weiser River. TMDL assessments are currently underway in the North Fork Payette, South Fork Payette and Payette watersheds. No TMDL assessments are in place for the North/Middle Boise or South Fork Boise watersheds (assessment section 1.7.1).

Environmental objectives 6C, 6D, and 6E address temperature, sediment, and nutrient impairment in coordination with existing TMDL assessments. Impairment due to bacteria will largely be addressed using strategies associated with environmental objective 12A regarding grazing impacts.

5.3 Coordination with Federal, State, Tribal, and Local Entities

A detailed assessment of programs, projects, and activities that relate to the management of natural resources in the BPW subbasins is detailed in the *BPW Subbasins Inventory* portion of the *Boise, Payette, and Weiser Subbasins Plan*.

Coordination with federal, state, tribal, and local entities in the subbasins will be important for successful implementation of the *Boise, Payette, and Weiser Subbasins Plan*. The following describes the method of project coordination and facilitation that will be utilized for implementation of the subbasins plan.

The Resource Conservation and Development (RC&D) councils are federally recognized nonprofit 501(c)3 organizations that may play a special facilitation role in subbasin plan implementation:

Resource Conservation and Development (RC&D) Councils play an important role in the conservation, development, and utilization of natural resources. RC&D Councils work to improve the general level of economic activity and to enhance the environment and standard of living in all communities. Councils provide a system of rural development to encourage the wise use of natural resources and improve the quality of life in America.

Congress created this public/private partnership as a way of engaging local leaders to promote their local economy by leveraging limited federal dollars. Councils provide a focal point of local leadership and bring together private citizens and local, state and federal agencies to improve the economic, social and environmental well-being of their area. RC&D Councils have proven ability and strength of leadership to engage and accomplish projects from the local to the national level (NARCDC 2003).

The nine RC&D areas in Idaho provide assistance to the entire state. Nearly half of the RC&D council members are locally elected officials such as mayors, judges, or commissioners. All council members serve as volunteers. RC&D councils activate community support for over 180 million people in all 50 states. RC&D councils successfully leveraged the RC&D appropriation 5 to 1 to directly support conservation and economic development in local communities across the nation. All RC&D councils have area plans defining their goals and objectives. They serve as a conduit for federal, state, local, and private foundation programs that assist in area plan implementation. The Natural Resources Conservation Service (NRCS) administers this USDA program, providing a full-time coordinator for each authorized RC&D council. The RC&D councils provide an opportunity to utilize an existing structure that is appropriate for managing and facilitation of projects in subbasin planning.

At the local level, to implement a project, sponsors (cities, counties, Soil Conservation Districts, tribal governments, and other entities) identify needs and opportunities then present assistance need proposals to the RC&D council. This request is then evaluated by the council as to its relationship to the RC&D area plan goals and objectives. If the project fits within these parameters it is adopted. Adopting a project provides authorization for the RC&D council,

coordinator, and assistant to dedicate the time and resources necessary to assist the sponsor in completing the project.

6 Prioritizations

The purpose of the subbasin plan is to use an assessment of existing conditions for fish and wildlife and gaps in current management efforts to determine a plan of recommended actions over the next five years that will mitigate and improve conditions. The species of importance, along with ESA and CWA considerations, have been detailed. Limiting factors in the subbasins have been identified, as well as gaps in existing management that do not adequately address these factors. The following is a prioritization of needed actions, followed by recommendations for implementing the actions

The scale of limiting factors impacting species and habitats in the BPW subbasins dwarfs the financial resources available over the short-term for protection and restoration efforts. Clearly, as not all problems can be fixed immediately with existing and potential resources, the limited resources available must be used as efficiently and effectively as possible. The number of issues and diversity of species and habitats impacted make prioritization a major task that must be periodically repeated and fine-tuned based on new information. Filling key data (see section 4.1) will further improve the accuracy of prioritization processes.

Data is constantly being collected to fill data gaps and to show that activities improve problems. This data must be integrated into an continual process of evaluation and improvement of implementation activities. Implementation activities should not be stalled until this prioritization takes place. The limited resources available need to be used as efficiently as possible. The great diversity of issues and factors that need to be considered make prioritization a large task that will need to be frequently repeated and fine-tuned based on new information.

The objective of this repeated, continued prioritization process is to identify high priority habitat areas requiring protection or restoration. To do this, a prioritization process must continue to fulfill multiple objectives, values, and benefits. These include cost-efficiency, multiple species benefits, ESA, economic and social impacts, and expected biological response. The best way to develop local buy in and assistance with implementing subbasin-scale prioritization activities is to involve local communities in the process as fully as possible. Prioritization of activities that achieve maximum fish and wildlife benefits with least negative impacts to humans will allow projects to proceed without opposition. This continued prioritization process will serve as a focus point for integration and collaboration of efforts in the subbasins. Multiple groups and interests need to be involved in future prioritization efforts, including federal, tribal, state, and local policy makers.

6.1 Aquatic Prioritizations

Prioritization for the aquatic components of the *Boise, Payette, and Weiser Subbasins Management Plan* was carried out collaboratively by the Fisheries Technical Team. The Qualitative Habitat Assessment (QHA; Mobrand Biometrics 2003) tool provided by the Council for use in subbasin planning was not used to assess habitat limitation to aquatic species in the BPW subbasins. Time constraints and limited knowledge of some areas in the subbasins prevented the model from being completed. Current and reference conditions in the Middle Fork Boise River and South Fork Boise River were rated in QHA and have been provided separately

in electronic format for those who wish to view model input (file names: BPW_QHA-MF Boise River.xls and BPW_QHA-SF Boise River.xls).

The Technical Team developed a list of rules for prioritization, based on reviews of other subbasin planning efforts and a brainstorming exercise. From this list, the Technical Team chose a structure most appropriate for prioritization of activities in the BPW subbasins. Little effort to develop a quantified prioritization method was attempted due to lack of time and interest of the Technical Team as prioritization is not considered strictly a technical issue and generally has social constraints outside the realm of science. For example, the constraints of this project rule out some options, such as removal of hydrosystem dams. The Technical Team did not wish to prioritize strategies; rather, activities should be implemented as they present themselves, in the context of this prioritization scheme.

The BPW Fisheries Technical Team developed the following rules for prioritization activities in the BPW subbasins:

- Do not prioritize between subbasins or 4th field HUC boundaries to avoid prioritizing one species over another.
- Prioritize within each subbasin, using 4th field HUC boundaries.
- Determine priorities for each focal species within each 4th field HUC boundary.
- Designate priority for protection or restoration efforts (or both) within each 4th field HUC boundary.
- Prioritize limiting factors to address during restoration projects for each species within each 4th field HUC boundary.
- Protect and restore connectivity in Core Areas (USFWS 2002) first. Then build from strength by improving habitat and connectivity outward from Core Areas.
- Priority should be placed on projects where potentially identifiable benefits for multiple species (e.g., fixing culverts will not only help bull trout, but other species as well).

The following structure provided a guide during prioritization discussions:

1. Subbasin
 - a. Boise
 - b. Payette
 - c. Weiser
2. 4th field HUC boundaries within each subbasin
 - a. Lower Boise
 - b. Boise-Mores
 - c. North and Middle Fork Boise
 - d. South Fork Boise

- e. Main Payette
 - f. Middle Fork Payette
 - g. North Fork Payette
 - h. South Fork Payette
 - i. Weiser
3. Focal species in each 4th field HUC boundary
 - a. Bull trout
 - b. Redband trout
 - c. Kokanee
 4. Protection and/or restoration priority for each species in each 4th HUC boundary
 5. The limiting factor for restoration efforts to address, in order of priority, for each species in each 4th HUC boundary
 6. Comment section to add detail and clarification where needed

BOISE SUBBASIN

Lower Boise:

Comments: The Lower Boise watershed is heavily populated, with highly degraded habitat, not a high protection or restoration priority.

Boise-Mores

Bull trout

Protect (Mores Creek)

Potential Limiting Factors: Connectivity

Comments: Protect the resident population of bull trout at high elevations in the headwaters of Mores Creek. Fix the culvert in the mainstem of Mores Creek (Hay Fork Campground Culvert) to open habitat since it is a seasonal barrier. Monitor the Upper Mores bull trout population. This 4th field HUC is not a high priority for restoration as it is highly degraded.

Arrowrock Core Area (includes the Boise River watersheds upstream of Arrowrock Dam, including the North Fork Boise River, Middle Fork Boise River, and South Fork Boise River downstream of Anderson Ranch Dam as defined in the 2002 Bull trout Draft Recovery Plan (USFWS 2002).

Bull trout

Protection is first priority, then *restoration*

Potential Limiting Factors: connectivity, sediment, illegal harvest, and reservoir operations

Redband trout

Protection is first priority, then *restoration*

Potential Limiting Factors: connectivity, sediment

Comments: The Bull trout Core Area extends between 4th field HUCs; the BPW Technical Team preferred to change the structure of priorities to accommodate this important area. Protect habitat and maintain migration corridors for bull trout and redband trout as a first priority. Connectivity and sediment related issues limit both bull trout and redband trout in the Core Area. Restore passage at Kirby Dam (first priority) by addressing reservoir operations such as spill location (not spilling close enough to ladder to adequate attraction flow to ladder) and total flow through ladder. The Roaring River culvert is also a major passage barrier (insufficient for passage by individuals of average size and vigor) that should be fixed second. Generally, areas with spawning and rearing bull trout have no roads. Road density issues and their associated sediment contribution are a large scale problem in the entire Arrowrock Core Area. The Technical Team doubts that illegal harvest is limiting bull trout populations, but is a potential limiting factor in terms of being additive to existing stressors. Hybridization issues may be a problem for redband trout. The impact of stocked hatchery rainbow trout on redband trout is currently unknown.

Reservoir operations at Arrowrock Dam are likely limiting or constraining bull trout populations, causing entrainment when high volume discharge occurs near surface levels. Additionally, bull trout have been documented to use the lower South Fork Boise River section of the reservoir and the main reservoir pool year round and may have limited habitat available to them in July through September. Reservoir pool volumes less than 40,000 acre feet from late September to late June may allow increased mortality through predation. Boise State University is currently working with USBR to determine if operations are limiting bull trout (M. Dare, BSU, personal communication, April 20, 2004).

Anderson Ranch Core Area: (includes the South Fork Boise River watershed upstream of Anderson Ranch Dam as defined in the 2002 Bull trout Draft Recovery Plan (USFWS 2002).

Bull trout

Protection is first priority, then *rehabilitation*

Potential Limiting Factors: culverts, illegal harvest (potential)

Redband trout

Protection is first priority, then *restoration*

Potential limiting Factors: culverts

Comments: Culvert connectivity issues in Bear, Dog, and Steel creeks are limiting. Big Water Gulch and Shake Creek (South Fork Boise) may hinder reestablishment of bull trout in these streams (D. Kenney, personal communication, April 14, 2004). Also, there is restoration potential on Little Smokey Creek (tributary to South Fork Boise). Cattle grazing and the road going through the middle of the watershed have impacted riparian areas. Restoration here will likely improve habitat conditions in the lower main stem of Big Smokey Creek and the South Fork Boise, especially in terms of water temperature and sediment. Another big problem is a historic placer mine that has channelized the stream (Little Smokey Creek) and allows it to warm up faster (D. Kenney, personal communication, April 14, 2004). However, the Roaring River culvert in the Middle Fork Boise is a higher restoration priority. Reservoir operations are not limiting in Anderson Ranch (T. Salow, USBR, personal communication, April 13, 2004). Boise State University is starting a project in August studying spawning habitat downstream of Deadwood Dam (M. Dare, BSU, personal communication, April 20, 2004).

PAYETTE SUBBASIN

Main Payette:

Bull trout:

Protect and *restore* headwaters of 4th field HUC first (Squaw Creek)

Potential Limiting Factors: connectivity, irrigation diversions

Redband trout

Restore (not a high priority as habitat is highly degraded)

Potential Limiting Factors: irrigation diversions.

Comments: Start protection and restoration efforts in the headwaters of Squaw Creek first (from the confluence of Second Fork with Squaw Creek, upstream). There are three populations of bull trout in Squaw Creek that are limited by internal connectivity issues from culverts. Culvert modification is a priority restoration need in the headwaters of the Main Payette. Unscreened irrigation diversions and low flow issues are limiting factors lower in the Main Payette watershed. These protection and restoration efforts will benefit both bull trout and redband trout.

Middle Fork Payette:

Bull trout

Protection is first priority, then *restoration* (focus in headwaters: Bull Creek)

Potential Limiting Factors: connectivity, sediment (in Lower MF Payette)

Redband trout

Restore (Lower MF Payette)

Potential Limiting Factors: riparian degradation and sediment

Comments: Restoring internal connectivity in the headwaters (Bull Creek) of the Upper Middle Fork Payette is a priority. There are riparian and sediment issues on the Lower Middle Fork Payette.

North Fork Payette:

Bull trout:

Restoration priority

Potential Limiting Factors: connectivity, habitat quantity and quality, road density (sediment and connectivity), brook trout

Redband trout:

Restoration priority

Potential Limiting Factors: connectivity

Kokanee:

Protect

Potential Limiting Factors: None

Comments: A small population of bull trout is currently known to exist in Gold Fork Creek, restoration efforts should focus there. However, the population in Gold Fork is extremely depressed as of 2002 and population transport will probably be necessary to rebuild the

population following improvements in connectivity. Gold Fork River and Lake Fork Creek should be resurveyed to confirm status in the next 5 to 10 years. Culvert and other passage issues are a problem for bull trout and redband trout.

Redband and bull trout could benefit from passage modification and increased flows through Gold Fork Diversion. Need fish screens in Lake Fork Creek (between Little Payette Lake and Cascade Reservoir) to prevent entrainment. Sediment issues occur in the lower tributaries. Many natural and unnatural factors contribute to sediment issues in this HUC; prioritization of sediment reduction efforts at this time is data limited. Sediment issues need to be examined. Many other issues exist in this 4th field HUC, priorities should be reexamined during the next iteration of this plan.

The absence of sockeye has changed the nutrient dynamics of the lake. Protect spawning habitat for kokanee and monitor predator levels in Payette Lake.

South Fork Payette:

Bull trout:

Protection is first priority, then *restoration*

Potential Limiting Factors: connectivity, brook trout, sediment (Clear Creek)

Redband trout:

Protection is first priority, then *restoration*

Potential Limiting Factors: connectivity, sediment

Kokanee:

Monitor

Potential Limiting Factors: introduced species in altered habitat (Deadwood)-management

Comments: An adfluvial population of bull trout exists upstream of Deadwood Reservoir. Connectivity and sediment issues negatively impact both bull trout and redband trout. Unknown impacts from hatchery rainbow trout may affect native redband trout stocks. Brook trout eradication projects are generally expensive and not very successful. Efforts to eradicate brook trout populations should receive lower priority than efforts to prevent their establishment in bull trout areas. Research innovative methods for brook trout eradication projects. A good way to spend money would be to identify and prioritize areas where local eradication project might be effective at removing brook trout.

Kokanee are in the Deadwood system. They are a non-native food source for bull trout serving as mitigation for lost anadromous fish runs. Kokanee play an important supplementary role in the currently altered system. The Technical Team did not wish to classify protection or restoration activities as priority in Deadwood Reservoir. Population monitoring efforts were recommended instead. Kokanee in Deadwood are a brood stock egg source for state stocking program.

WEISER SUBBASIN

(Start in headwaters and work down)

Bull trout

Protection is first priority to stabilize populations, then *restoration*

Potential Limiting Factors: connectivity, brook trout, habitat quality (complexity and bank stability), road density

Redband trout

Restoration priority

Potential Limiting Factors: connectivity, riparian, road density, and associated sediment

Comments: Priority is not a culvert inventory. Many known problems exist, fix them first focusing on connection of existing populations. Start high in watershed because better habitat is available. Priority is to stabilize populations by keeping them from hybridizing with brook trout, while providing connectivity between existing populations. Brook trout eradication projects are usually very expensive and not very successful. Eradication should be lower priority than prevention of invasion (T. Salow, personal communication, March 14, 2004). Restore habitat by providing riparian cover to reduce temperatures, making habitat more suitable for bull trout than for brook trout. Prioritization between potential limiting factors is a challenge considering the interactions between factors and the wide range of problems. For bull trout in the Upper Weiser the Technical Team considers brook trout, habitat, and connectivity of equal priority. However, degraded habitat conditions may be increasing issues with brook trout because degraded conditions favor brook trout over bull trout. Habitat restoration efforts in this area should focus on improving riparian conditions.

6.2 Terrestrial Prioritizations

Prioritization for the terrestrial components of the *Boise, Payette, and Weiser Subbasins Management Plan* was carried out collaboratively by the Terrestrial Technical Team. The Technical Team developed a list of rules for prioritization, based on examples given in technical guidance, reviews of other subbasin planning efforts, and through a brainstorming exercise. From this list, the Technical Team chose a subset of rules most appropriate for prioritization of activities in the BPW subbasins. The Technical Team then proceeded by discussing management plan objectives and strategies in terms of each rule. This discussion was systematic (in terms of discussing each rule) and cumulative (in terms of discussing outcomes of simultaneous application of multiple rules). This exercise proved to be a valuable heuristic that enabled the Technical Team to develop a consensus statement outlining terrestrial priorities for the BPW subbasins. No attempt to develop a quantified prioritization method was attempted due to lack of time and limited resources and data for prioritization.

6.2.1 Rules for the Entire Subbasin

The BPW Terrestrial Technical Team applied the following rules in determining priorities for the BPW subbasins.

- Prioritize areas for restoration by focal habitat type—It is too expensive and impractical to address a particular limiting factor across the entire subbasin so the potential limiting factors will be addressed by watershed. Figures from the assessment were used to start discussion about which limiting factor was most important in each watershed for each focal habitat.
- Build from strength—Work from the areas in the best condition outward. Efforts to improve the status of fish and wildlife populations in the basin should protect habitat that supports

existing populations that are relatively healthy and productive. Next, efforts should expand to adjacent habitats that have been historically productive or have a likelihood of sustaining healthy populations by reconnecting or improving habitat. The efforts should try to conserve the best areas of the subbasins and then build into areas with high need.

- Prioritize for multiple species and benefits—Projects that benefit multiple species in single or multiple habitat types should receive priority.
- Prioritize by importance of limiting factors to be addressed—Efforts should address priorities established in the assessment for limiting factors.
- Prioritize according to expected biological benefits—Choose projects that get the most “bang for the buck.”
- Maximize overlap between terrestrial and aquatic benefits—Efforts should address areas and limiting factors that provide the greatest benefit to both terrestrial and aquatic species and habitats.
- Prioritize projects that benefit fish and wildlife **and** local communities—When selecting among projects that offer similar biological benefit, choose projects that provide the most benefit to local communities.
- Prioritize strategies and activities that are practical and possible—Consider where a project or strategy is cost-efficient, whether it has beneficial or acceptable economic and social impacts, and whether it is likely to provide significant benefits within the scale of the limiting factors.
- Prioritize strategies that address programs such as ESA recovery goals and species conservation agreements—Projects that benefit ESA targeted species and habitat should be prioritized over projects that do not. This often will serve as an additional layer when prioritizing projects that benefit multiple species, with ESA benefits adding additional weight to particular options.

Application of these rules generated a suite of decisions that provide a prioritized framework for efforts in the BPW subbasins.

- Prioritize areas for restoration by focal habitat type—The Terrestrial Technical Team determined that **riparian/herbaceous wetland and shrub-steppe habitats are the most important to protect and restore in the BPW subbasins**. Other habitat types were determined to be of lesser priority because there is less that can be done to improve them within the context and resources of subbasin planning.

Since application of our first prioritization step identified riparian/herbaceous wetland and shrub-steppe habitats as the most important to protect and restore, the remaining prioritization steps are applied separately to both habitat types.

6.2.2 Rules for Riparian/Herbaceous Wetlands

- Build from strength—The riparian areas with greatest current strength in the subbasins have been identified in the SF Payette and Middle Fork Payette watersheds and therefore are high priority areas for protection. The distribution of riparian/herbaceous wetlands in the BPW subbasins is illustrated in assessment section 2 and Figure 2-18.
- Prioritize for multiple species and benefits—Projects in riparian habitats have the potential for multiple benefits for both terrestrial and aquatic species and were considered a priority by both Technical Teams. Develop range maps of aquatic and terrestrial focal species and identify where the greatest overlap occurs. Protecting or restoring these overlapping ranges would provide for multiple species benefits.
- Prioritize by importance of limiting factors to be addressed—The priority limiting factors for this habitat type are grazing/browsing, altered hydrologic regime, land-use conversion and invasive exotics. High priority projects should address one or more of these limiting factors.
- Prioritize according to expected biological benefits—Riparian habitats in shrub-steppe communities are the most impacted by the limiting factors and most in need of restoration, and these habitats are very responsive to restoration activities. The Technical Team determined that riparian/wetland habitat within shrub-steppe in the lower portions of the subbasins is the area most in need of restoration efforts. The Technical Team also believes efforts in these areas will provide the greatest biological benefits to multiple habitats and species.
- Maximize overlap between terrestrial and aquatic benefits—Use range maps of both aquatic and terrestrial focal species and identify where the greatest overlap occurs. Protecting or restoring these overlapping areas would provide for multiple species benefits.
- Prioritize projects that benefit fish and wildlife **and** local communities—By successfully implementing projects in riparian/wetland habitats, local communities will benefit. These benefits include improved water quality, improved recreational and tourism opportunities, scenic value, and restored fire regime (including reduced fire impacts on communities and increased protection from fire).
- Prioritize strategies and activities that are practical and possible—The Technical Team determined that it is both practical and possible to restore riparian/herbaceous wetland habitats in many areas of the subbasins. Riparian condition is a long-standing problem that is continuously being addressed through various means by numerous local, state and federal agencies.
- Prioritize strategies that address programs such as ESA recovery goals and species conservation agreements—Projects that address multiple species, including federally listed species, are considered high priorities.

6.2.2.1 Rules for Shrub-Steppe Habitats

- Build from strength—Shrub-steppe exists throughout the subbasins (assessment section 2 and Figure 2-19). The Technical Team determined that the most important watersheds for protection and restoration work in the subbasins include the Weiser, Middle Fork Payette, Main Payette, Lower Boise, and South Fork Boise river watersheds. Within these watersheds, high quality areas for shrub-steppe are limited to small pockets. These pockets are surrounded by areas of degraded or altered shrub-steppe habitats. Protection and restoration efforts that work outward from high quality areas are considered higher priority than efforts starting with low quality areas. Larger contiguous patches are higher priority than smaller fragments.
- Prioritize for multiple species and benefits—Shrub-steppe habitat offers multiple species benefits, including but not limited to focal species. Restoring shrub-steppe habitat will have major multiple species benefits in the subbasins. This habitat type contains the highest percentage of potentially listed species of all habitat types in the subbasins. The Terrestrial Team indicated that this habitat type is on the verge of unraveling, and that a timely effort to protect and restore portions of this habitat may have important long-term benefits that will be much harder to achieve in the future. Use range maps of both aquatic and terrestrial focal species and identify where the greatest overlap occurs. Protecting or restoring these overlapping ranges would provide for multiple species benefits.
- Prioritize by importance of limiting factors to be addressed—Priority factors limiting species and habitat in these watersheds include altered fire regime, grazing/browsing, land use conversion, and invasive exotics. High priority projects should address one or more of these limiting factors.
- Prioritize according to expected biological benefits—Riparian habitats in shrub-steppe habitats are the most impacted by limiting factors and most in need of restoration, and these habitats are very responsive to restoration activities. The Technical Team determined that riparian/wetland habitat within shrub-steppe in the lower portions of the subbasins is the area most in need of restoration efforts. The Technical Team also believes that efforts in these areas will provide the greatest biological benefits.
- Maximize overlap between terrestrial and aquatic benefits—Focusing restoration efforts on riparian/wetlands within shrub-steppe habitat would maximize overlap between terrestrial and aquatic benefits. Projects that focus on these areas are considered high priority.
- Prioritize projects that benefit fish and wildlife **and** local communities—Benefits to local communities of restoring shrub-steppe habitat include improved water quality, improved recreational and tourism opportunities, scenic value, and restored fire regime (reduced fire impacts on communities, more cost efficiency, increased protection from fire). An additional benefit will be improved diversity and stability of native plant communities.
- Prioritize strategies and activities that are practical and possible—Factors limiting shrub-steppe are a very large scale problem. Protecting and restoring shrub-steppe is practical at present only on a small scale. Any on-the-ground restoration work will have to be limited,

but it is critical that it take place to prevent further loss of plant and animal species from this habitat. The shrub-steppe habitats contain many potentially contentious issues and any work that protects or improves the habitat has the potential to reduce the severity of problems (such as loss of species or habitat) in the future. Protection and restoration efforts need to target finer scale areas prioritized by a suite of processes coming out of efforts for focal species.

- Prioritize strategies that address programs such as ESA recovery goals and species conservation agreements—Prioritize strategies that address programs such as ESA recovery goals and species conservation agreements. Projects that address multiple species, including federally listed species, would be considered high priority.

The Technical Team concluded that the highest priority habitat type is shrub-steppe in the lower elevation areas of the subbasins (Weiser, Middle Fork Payette, Main Payette, Lower Boise and South Fork Boise watersheds). Within the shrub-steppe habitat, the highest priority areas for protection and restoration are riparian/herbaceous wetland habitats and the largest remaining high quality patches. At this time, the most sensible approach to finer scale prioritization (to project level) within shrub-steppe and riparian/herbaceous wetland habitats within shrub-steppe areas will be to follow the prioritizations that have been developed from efforts to protect and restore focal species.

The highest priority strategies to implement are those outlined in the objectives and strategies under problem statements 14 and 15 that address limiting factors in shrub-steppe and in riparian areas in shrub-steppe areas. Given the potential resources available these objectives and strategies can be implemented to meaningfully address limiting factors. One limiting factor that the Technical Team thought was outside the scope of the resources available was altered fire regime. The Technical Team thought that changes addressing this limiting factor would take place in other political forums, and that implementing other strategies, such as addressing noxious weeds, will address problems associated with altered fire regimes. But, altered fire regimes should not be the sole focus of projects through this process.

7 Recommendations and Conclusions

The Planning Team developed the following recommendations to help guide implementation of this plan in the BPW subbasins.

7.1 General Recommendations

The purpose of this process is to mitigate the impacts of the federal hydropower system on fish and wildlife resources. The purpose of this plan is to provide a strategy to achieve healthy, productive ecosystems with diverse aquatic and terrestrial species, which will support sustainable resource-based industries that provide goods and services and other activities for a growing human population (BPW vision statement). The Planning Team desires to achieve this goal in a manner that minimizes adverse impacts to stakeholders and maximizes local public support.

7.2 Summary and Synthesis of Plan Conclusions

Problem statements were developed with the Fisheries and Terrestrial Technical Teams, and reviewed by the Planning Team, using factors defined as limiting the potential of focal species or habitats in the assessment (assessment section 3). Socioeconomic problem statements were developed by the Planning Team to address potential factors limiting successful implementation of this plan. Objectives and associated strategies were then developed to address each problem statement.

Biological objectives (section 3.3) were designed to address the needs of focal species, while environmental objectives (section 3.4) are generally meant to address habitat for fish and wildlife populations. Objectives were developed to address problems defined for each focal habitat. Socioeconomic objectives (section 3.5) are designed to provide operational guidance for implementing the terrestrial and aquatic protection and restoration objectives and strategies outlined in the plan.

Research, monitoring, and evaluation activities (section 4) are closely related to the vision, objectives and strategies described in sections 2 and 3 of this plan. This section summarizes additional research, monitoring, and evaluation (RM&E) activities needed to aid in resolving management uncertainties. Data gaps and research needs were outlined by the Technical Teams. Monitoring and evaluation activities were described as well as the expected short- and long-term outcomes. Adaptive management is emphasized in this plan. To achieve each objective, strategies require a feedback loop for integration of additional information and modification of future activities.

Recommended actions to mitigate and improve conditions for fish and wildlife, over the next 5 years, were developed during prioritization exercises with the Technical Teams and available for review by the Planning Team (section 6). The Fisheries and Terrestrial Technical Teams each developed a list of rules for prioritization, based on reviews of other subbasin planning efforts and a brainstorming exercise. From this list, the Technical Teams chose a structure most appropriate for prioritization of activities in the BPW subbasins. The Technical Teams did not wish to prioritize strategies; rather, activities should be implemented as they present themselves,

in the context of the prioritization scheme described in sections 6.1 and 6.2. Common rules for prioritization are to 1) build from strength by protecting areas in the best condition, 2) restore outwardly from areas of strength, 3) prioritize for multiple species benefits, 4) prioritize according to importance of limiting factors to be addressed, and 5) prioritize for maximum overlap between terrestrial and aquatic benefits. Connectivity was most often defined as limiting during aquatic prioritization exercises. The Terrestrial Technical Team determined that riparian/herbaceous wetland and shrub-steppe habitats are the most important to protect and restore in the BPW subbasins.

7.3 Social Impact Conclusions

The Planning Team believes that maintaining viable natural resource based industries such as agriculture and timber is critical to sustaining communities in the rural areas of the BPW subbasins.

Livestock—Grazing is an important land use in the BPW subbasins involving important economic and multigenerational cultural traditions. A number of the terrestrial and aquatic objectives include recommendations that would alter current grazing management practices (objectives). Appropriate Best management Practices for grazing are identified in the USDA–NRCS Field Office Technical Guide and the Idaho Agricultural Pollution Abatement Plan.

How BMPs are implemented is a concern among livestock producers in the subbasins. The timetable for implementing BMPs needs to be realistic and achievable, and should be jointly developed with livestock producers. Livestock producers are not opposed to reasonable grazing BMPs; they are troubled, however, by rapid, unplanned policy shifts that do not allow them time to revise operations with a minimum of disruption and economic consequences. New BMPs should be implemented reasonably to allow time for producers to find alternative grazing locations without incurring major operational impacts.

Farming—A number of aquatic objectives (i.e., restore flows, reduce temperature, decrease sedimentation, etc.) include recommendations that impact practices related to irrigated agriculture. Goals for BMP implementation related to these recommendations not only need to be realistic and achievable, but also must be developed in concert with agricultural producers with enough time to allow successful transitions, without major operational impacts. These recommendations need to be economically feasible for producers to implement. The economic and cultural base of the BPW subbasins relies heavily on irrigated agriculture. The wide variety of irrigated croplands, vineyards, orchards, and pasturelands produced within the subbasins enhances both local and statewide economies while supporting multigenerational cultural traditions.

Forest Lands—Active management of the forest lands is critical to achieving the goals of the *Boise, Payette, and Weiser Subbasins Management Plan*.

The private and state lands in the BPW subbasins have generally been selectively harvested since the early years of the 19th century. These open stands provide the best habitat for elk and deer and for the many species of birds and animals.

Timber management practices utilizing the forestry BMPs developed by the Idaho Department of Lands, audited by the DEQ for implementation and effectiveness, and revised when necessary by the Forest Practice Advisory Committee will positively support the forest land objectives, vision and strategies of this plan.

In general, the exclusion of fire over the past century and the current passive forest management prescriptions in the National Forest's Forest Management Plans have transformed forests that originally consisted of open stands containing 10 to 20 large trees per acre and a forest floor covered with grasses, forbs and low brush. Currently, the unmanaged forest stands contain 600 to 1000 stems per acre of regeneration, poles and small trees, little vegetation on the forest floor and few of the original large trees. The majority of the stands in the various habitat types, due to decades of fire suppression, are now susceptible to catastrophic wildfires.

In other areas of the subbasins, active timber management has resulted in a reduction of forest stand cover to the point that USFS Forest Plan objectives for elk security cover are not being met.

Dense, overstocked, stagnant stands do not produce forage for deer and elk or provide habitat for bird and animal species that live in open stands. The dense stands utilize a high percentage of the limited water supply. The result is reduced stream flow and higher stream temperatures, with negative impacts on both aquatic and terrestrial species. The dense stands do contain a limited number of species that require snags and large trees for their existence.

The stands are at high risk of catastrophic fires that burn at extremely high temperatures. These fires can have many deleterious effects:

- Hydrophobic soils may result from high temperature fires where a wax-like surface forms that sheds water, producing high erosion and catastrophic floods from normal rain fall.
- Destroyed riparian areas and vegetation.
- Increased erosion and sedimentation into streams.
- Noxious weed and other invasive exotic invasion following disturbed sites

To achieve the objective of returning existing unmanaged pine/fir forest stands to their historic conditions will require repeated entries that gradually reduce the existing dense stands to their original open park land status.

Active management of the national forest lands leading to a healthy forest with all seral stages within the BPW basins will return a viable economic industry to the BPW basins by

- Providing employment and living wages for the residents in the forest and workers in nearby communities.
- Utilizing valuable natural resources to make products demanded by consumers.

- Providing a renewable energy source to supplement BPA hydropower and reduce use of fossil fuels.
- Increased recreational opportunities for a growing human population.
- Increasing tax bases for the counties.
- Achieving the objectives of guiding principles 4, 6, 7, and 8.

Noxious weeds and other invasive exotics invade habitats after fire and other disturbances. Their intrusion impacts agriculture, water quality, recreationists, ranchers, and other people, and native terrestrial and aquatic species and habitat. A need exists for more effective management of noxious weed programs in the subbasins. The entire scale of the current invasive exotic plant control efforts needs to grow; a need exists for more funding for projects and programs to address current problems. Implementing the objectives and strategies in this plan addressing invasive exotic plants will benefit all stakeholders without negative impacts.

Recreation—Currently hunting, fishing and other wildlife related recreation is a billion dollar industry in the state of Idaho (USFWS 2000). Successful implementation of this plan will benefit anglers, hunters and wildlife watchers by helping preserve and/or improve fish and wildlife populations and habitats. This will also benefit the local economies that support such recreational activities.

Development—The Planning Team is concerned about the irreversible adverse effects on habitats and species of converting agricultural and timberlands into commercial and residential developments. In the BPW subbasins, the most heavily populated subbasins in Idaho, the impacts of municipalities has important effects on species and habitats. The impacts of increased growth need to be managed by municipalities and counties in concert with other activities called for in this management plan.

The Planning Team is concerned that future comments generated by reviewers and the public are incorporated into this plan through a process that includes Planning Team involvement and oversight. This will include funding for Planning Team involvement, facilitation and to review and update of the plan. The timeline for this process has been too limited. Planning Team members had little time to review assessment and plan products. Insufficient time existed for this to be a fully integrated planning process that allowed policy makers and public to integrate with the technical committees.

The Planning Team believes this process has provided positive interaction with stakeholders and has resulted in information to direct future implementation activities in the subbasins. This plan provides the rationale for increasing BPA funding to activities in the BPW subbasins. This plan provides an adequate foundation for prioritization and implementation of activities in the subbasins while pointing towards the need to develop additional information and planning to refine future activities.

The Planning Team intends that this plan will provide a structure for implementation and future research and planning in the BPW subbasins. This plan will streamline the process for project

selection and implementation. The Planning Team also thinks that BPA funds should be more equitably distributed among subbasins in proportion to losses, which would result in more BPA funding for the BPW subbasins. The BPW subbasins are one group of subbasins that have been most impacted (Appendix C: Statements of Loss) but least compensated for impacts of the hydropower system on anadromous aquatic species.

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9 Technical Appendices

Appendix A—Participation Summary

Planning Team Recruitment and Participation

The NPCC directed that subbasin planning include local elected officials, property owners and land managers from the private sector along with the federal, state, and tribal fish and wildlife managers.

As part of the public involvement process, the Idaho Council on Industry and Environment (ICIE) actively recruited a wide variety of stakeholders and local elected officials to participate in the process as members of the Planning Team. In addition, the Technical Teams also welcomed participation by the private sector. Both Technical and Planning Team meetings were open to the public, as well.

ICIE used mail, fax and e-mail invitations to recruit Planning Team members.

- County commissioners for each county within the Boise, Payette, and Weiser (BPW) subbasins received a letter asking that they participate as a member of the Planning Team and a packet of introductory material on the subbasin planning process with the date and location of the first meeting.
- Counties included Ada, Adams, Boise, Camas, Canyon, Elmore, Gem, Payette, Valley, and Washington.
- ICIE identified a number of groups, associations, landowners, and businesses who would be interested in subbasin planning and requested names of individuals who might serve on the Planning Team.
- Groups, associations, and businesses included Idaho Association of Soil Conservation Districts, Idaho Water Users Association, Idaho Cattle Association, Idaho Farm Bureau Federation, Idaho Power, Boise Cascade, and individual landowners.
- ICIE also identified sportsmen and environmental groups with members in the BPW subbasins and contacted them with the same request for participation. These groups included the Idaho Conservation League, Idaho Rivers United, Nature Conservancy, Idaho Wildlife Federation, Concerned Sportsmen of Idaho, Ducks Unlimited, Idaho Chapter of the Sierra Club, Wilderness Society, Foundation for North American Wild Sheep, Idaho Snowmobile Association, and Idaho Chapter of Safari Club.
- Federal and state agencies operating within these subbasins were contacted about participation as well. Agencies included the Bureau of Reclamation, Payette and Boise National Forests, Bureau of Land Management, U.S. Fish and Wildlife Service, Idaho Department of Fish and Game, Idaho Department of Environmental Quality, and Idaho Department of Water Resources.

Many of the organizations contacted supplied names of potential members or agreed to participate on behalf of their members. Some groups simply ignored the invitation and the follow-up. Others responded with interest but stated that they did not have enough staff to participate in the project but were interested in being kept informed. ICIE developed a e-mail list that included all those who had been contacted as well as others who expressed interest in following the process.

The Wilderness Society was the only group that objected to process and not only refused to participate but asked that its name be removed from the e-mail lists. Attached is a letter from the Wilderness Society outlining its objections to the process and the response from ICIE on behalf of the BPW subbasins Planning Team.

Public Meetings

Three public meetings were held to introduce the *Boise, Payette, and Weiser Subbasins Plan* and provide an opportunity for input from local people and resource managers. Pat Barclay of the Idaho ICIE coordinated public meeting announcements and logistics for the BPW subbasins.

The meetings were held in different locations in an attempt to allow access to the largest number of people. Overall, not many of the general public attended these meetings.

Locations for the BPW subbasins public meetings were Boise, Emmett, and Cascade, Idaho.

The meetings were announced through local media and 200 post cards mailed to individuals as well as announcements in various association newsletters. ICIE also notified all those on its subbasin planning lists and broader e-mail list of 600 names across the state.

Daily and weekly newspaper, radio and television stations were notified in Boise, Nampa, Garden Valley, Payette, Kuna, Eagle, McCall, Cascade, Emmett, Homedale, Council, Cambridge, Weiser, Nampa, and Caldwell.

For the final meeting, flyers were sent to 350 individuals in an attempt to increase the attendance by explaining the subbasin planning process, which was not possible using postcards. In addition, Pat Barclay and Lisa Jim did a radio interview with a news organization, which was distributed to 12 radio stations in the region.

Public Meeting #1: The purpose of the first public meeting was to introduce subbasin planning to local people living, working, and using land in various ways within the subbasins. In addition, the meeting facilitator sought and documented comments and opinions on the subbasins plan. The comments were taken to the Planning Team and considered in management plan development.

On December 16, 2003, the first public meeting for the BPW subbasins was held at the J.D. Williams Building in Boise. Attendance and participation were good, especially considering the introductory nature of the first public meetings.

Public Meeting #2: The purpose of the second public meeting was to present the draft subbasins assessment and solicit comment from local land and natural resource users. The comments were used in the draft subbasins assessment.

The second public meeting was held in Emmett, Idaho on March 16, 2004.

Public Meeting #3: The purpose of the third public meeting was to present the entire subbasins plan (assessment, inventory, and management plan) and obtain comments from local people and resource managers. The comments were documented and presented to the Planning Team for incorporation into the draft plan.

The third public meeting was held in Cascade, Idaho, on April 20, 2004.

Overall, attendance at the public meetings remained small, in part because this process was not controversial. There was not enough time to educate people in the rural communities about their stake in this process. The NPCC is very well known among the tribes, groups such as electric cooperatives, federal and state fish and wildlife agencies and some sportsmen groups; however, the general public seems to have little knowledge of the NPCC's programs—especially in the areas like the BPW subbasins, which do have anadromous fish.

Appendix B—Letters of Endorsement

To be solicited by ICIE and submitted post May 28, 2004 due to time constraints.

Appendix C—Statements of Loss

SHOSHONE-PAIUTE TRIBES OF THE DUCK VALLEY INDIAN RESERVATION

An important goal of federal Indian policy has been to establish self-sufficient reservation communities. This has been interpreted by the Shoshone-Paiute as well as by various government agents to require development of various enterprises such as irrigated farming and cattle and horse ranching. Despite various projects and efforts by the federal government, there have been frequent failures in Duck Valley Indian Reservation history due to lack of investment and development of the reservations' water resources by the federal government. These failures have made the importance of various traditional food resources critical for survival in the domestic economy of many Shoshone-Paiute families who live in economic poverty. A principal impact on such families has been the blockading of anadromous fish passage to the Owyhee, Bruneau, as well as the Boise-Payette-Weiser and Middle and Upper Snake River drainages. These losses must be taken into account in any subbasin planning effort, especially in view of the previous failure to compensate or otherwise mitigate damages done to the Shoshone-Paiute by the loss of these important resources.

Research by Dr. Walker (2004) has established a baseline for determination of the extent of these losses. For example, Dr. Walker determined that before the blockading of the fish passage the Shoshone-Paiute of the Duck Valley Indian Reservation enjoyed three annual salmon runs of about ten days each. Dr. Walker determined from interviews of elders as well as from recorded interviews of tribal members born in the 19th century that these three annual salmon runs could

be expected, in normal years, to last about ten days each. The research also demonstrates that the location of the Duck Valley Indian Reservation was chosen in part because of the abundant fisheries available in the region. For example, in an interview with Federal Agent Levi Gheen, the *Territorial Enterprise* (1-3-1878) quoted saying, “The country abounds in deer, grouse, prairie chickens and other wild game, while the creeks and river[s] literally swarm with excellent fish. All in all Duck Valley is a veritable Indian paradise.” Again, it was at this time that Captain Sam first mentioned Duck Valley to Gheen as a “place . . . about seventy or eighty miles northeast of [Elko] where [the Indians] say there is plenty of game and fish and a good farming country as near as they can judge with plenty of timber [and in the mountains] water and grass” (Gheen 1875).

Using information gained from tribal fishermen as well as from comparative catch records from other related tribes (Walker 1967, 1992, 1993b), Dr. Walker estimates catches to have been about 200 fish per day, averaging 15 pounds each (for each of ten separate weirs), yielding a potential average annual catch of 90,000 pounds, or about 6,000 fish. As further verification of these numbers estimates have been derived for other important fisheries (the Boise-Payette-Weiser Valley and the Hagerman-Shoshone Falls sites) which the Shoshone-Paiute shared with other tribes of southern Idaho. It is estimated that this large area contained at least 25 traditional weir sites, and based on tribal accounts each site could produce significant catches for about ten days, three times per year. For 25 weirs the catches are estimated to have been 200 fish per day, per weir, averaging 15 pounds each, yielding an average annual catch of 2,250,000 pounds or about 150,000 fish. Of course, some of these fisheries were destroyed early by mining and agriculture as other were later destroyed by damming of the Columbia, Snake, and many of their tributaries. While these 19th century salmon catch estimates are large when compared to contemporary catches in the Columbia-Snake system, they are supported by the evidence discovered in Dr. Walker's research.

Beginning in the late 19th century, the destruction of these fisheries has been a significant blow for the Shoshone-Paiute. They have suffered not only economic and subsistence shortfalls because of it, but also have experienced declines in the quality of their diet which in various serious health problems such as diabetes that are becoming extremely common. The loss of this significant source of easily obtained protein and related nutrients cannot be disregarded in subbasin planning; neither can the fact that the Shoshone-Paiute have never been compensated for their losses.

Gheen, Levi. 1875. Correspondence to Smith 11-10-1875. San Mateo Archives, M-234, 541.

Walker, Deward E. 2004. Fishing Research for the Shoshone-Paiute of the Duck Valley Indian Reservation Relating to Subbasin Planning. Boulder, Colorado.

Appendix D—Socioeconomic Data

INTRODUCTION

This summary is intended to provide a brief description of demographic, economic, and social conditions within the Boise, Payette, and Weiser (BPW) subbasins. It provides an elementary overview of prominent economic activities in the subbasin, connections to natural resources, and levels of related income and employment as called for by the *Recommendations and Guidance for Economic Analysis in Subbasin Planning* by the Independent Economic Analysis Board (2003). This analysis has been based primarily on census data available from the Idaho Department of Commerce (2002), the *Northwest Income Indicators Project* by Washington State University (2001), and the US Census Bureau (2000); generally presented as an average of the 10 counties in (Ada, Adams, Boise, Camas, Canyon, Elmore, Gem, Payette, Valley, Washington) the subbasin, except where noted.

In addition to the subbasin averages, figures for individual counties are included because of the disparity that results from averaging Ada and Canyon counties with less populated and more rural counties in the subbasin.

DEMOGRAPHIC AND ECONOMIC SUMMARY

Population

The BPW subbasins lie entirely within the state of Idaho. Idaho ranks 39th among the states in population and 11th in size. The projected population of Idaho in 2025 is approximately 1.7 million, compared to 4.2 million in the state of Oregon, 2.3 million in Nevada, and 308 million in the United States (Figure 2).

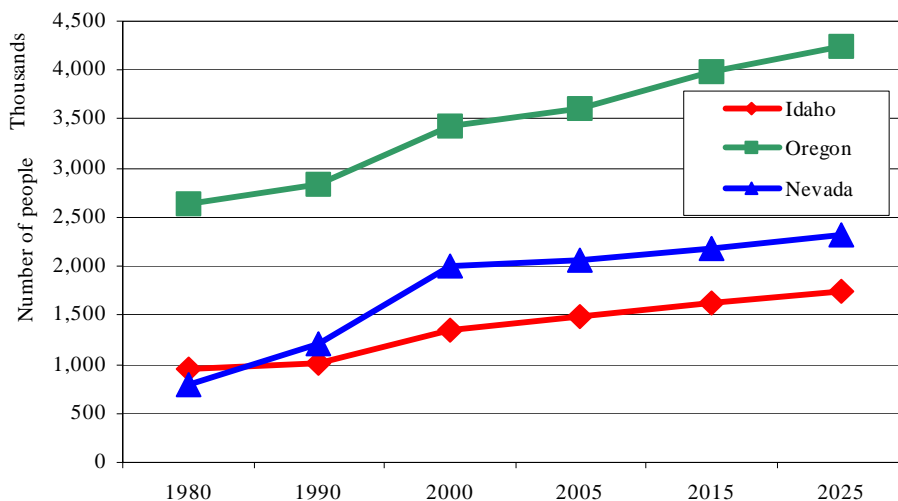


Figure 2. Past and projected population of Idaho, Nevada, and Oregon (US Census Bureau 2000a)

Economics

The federal government manages 63 percent of Idaho State. Manufacturing, agriculture and tourism are important components of Idaho’s economy.

Subbasin Summary by County

Land Area

The counties with the largest populations in the BPW Subbasin are Ada and Canyon while the counties with the greatest land area in the BPW Subbasin are Boise, Elmore, Valley, and Washington (Table 15).

Table 15. Relative land area of counties in the BPW subbasins (calculated using GIS, ESRI 1999)

County Name	Acres	% Subbasin in County
Ada	477,471	8.25
Adams	457,824	7.91
Boise	1,218,000	21.04
Camas	281,884	4.87
Canyon	294,731	5.09
Elmore	965,590	16.68
Gem	361,803	6.25
Malheur	246	0.004
Payette	203,118	3.51
Valley	848,888	14.66
Washington	679,646	11.74
Total	5,789,201	

Population

According to 2002 estimates based on the 2000 Census, the most populous counties in the subbasins are Ada and Canyon counties with 319,687 and 144,983 people, respectively. The population of Ada County generally resides in the city of Boise (189,847 people). Likewise, the cities of Caldwell and Nampa account for the majority of the population in Canyon County (Figure 3).

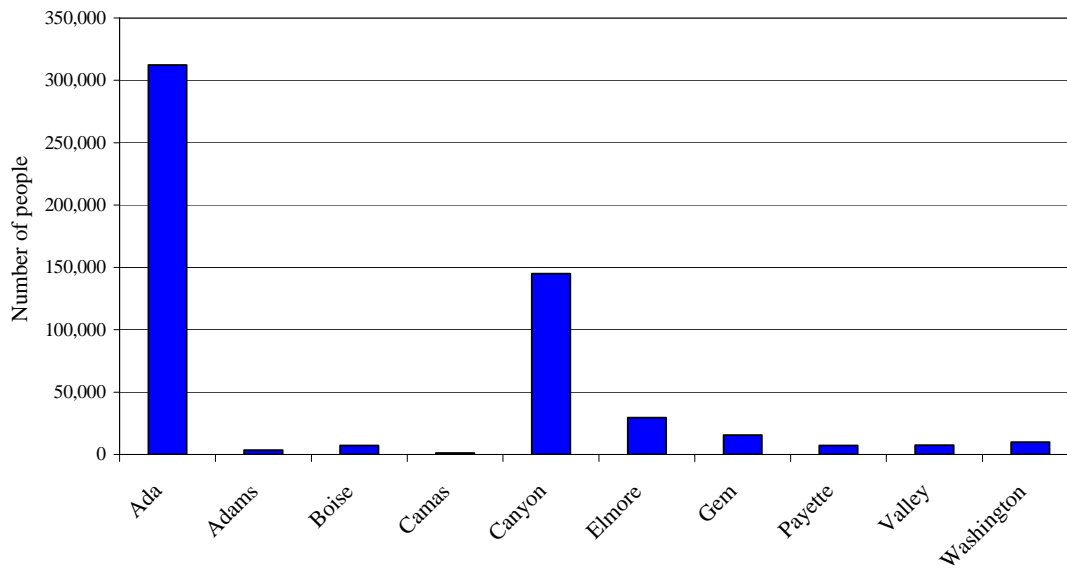


Figure 3. Population of the counties in the BPW subbasins in 2002 (IDOC 2002, NIIP 2001).

From 1980 to 2002 the populations of most counties in the subbasins remained stable. Exceptions include an increase in the population of Ada County from about 175,000 residents in 1980 to about 300,000 in 2002. Other population changes in the subbasin occurred in Canyon County where the population increased from around 85,000 people in 1980 to nearly 145,000 in 2002 (Figure 4).

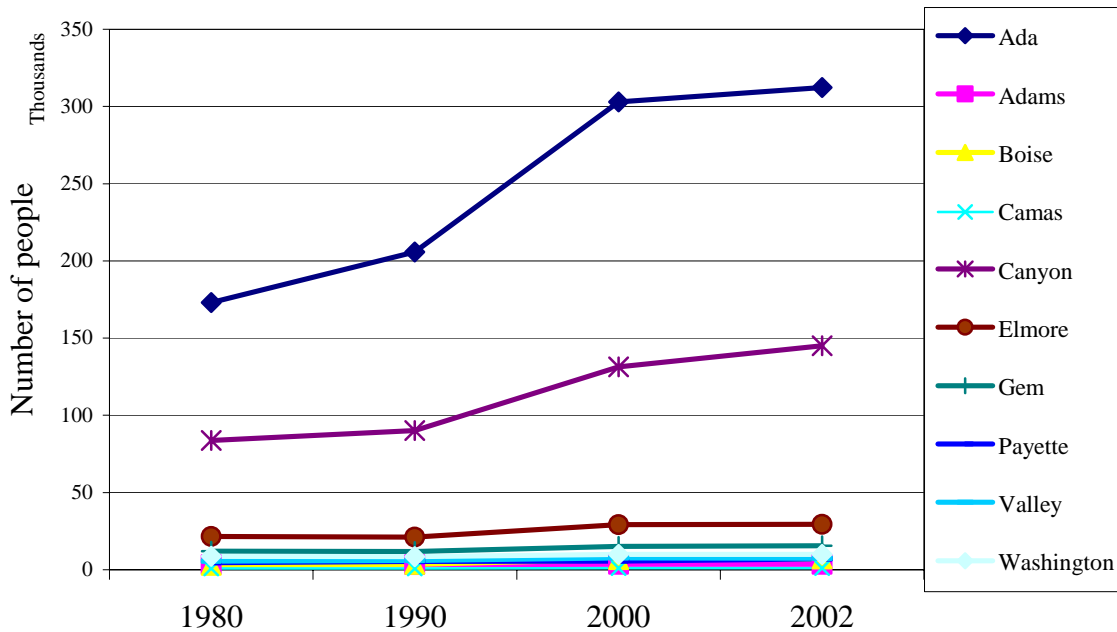


Figure 4. Population trends from 1980 to 2002 in the BPW subbasins (IDOC 2002).

Land Use

Forest and rangeland make up 79.7 percent of the land in Idaho. Agricultural land makes up 14.6 percent of the landmass in the state, while urban land use is only .4 percent. However, in heavily populated counties like Ada and Canyon, agricultural land is being developed as land values when used for development increase at a substantially higher rate than the values when the land is used for agriculture (Figure 5, Figure 6, Figure 7, Figure 8, Figure 9, Figure 10).

However, even in Idaho’s most populated and urban counties like Ada and Canyon, land is still predominantly used for agriculture and rangeland.

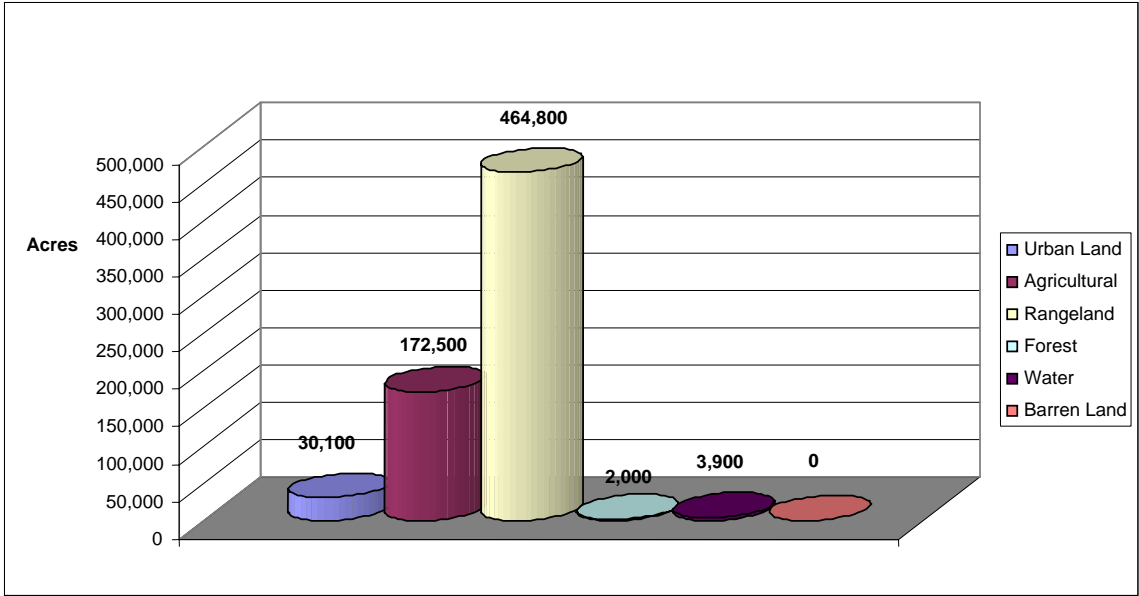


Figure 5. Ada County Land Use

Ada County is located in southwestern Idaho. It ranks 1st among Idaho counties in population and 31st in land area. The primary use of land in Ada County is for rangeland and agriculture.

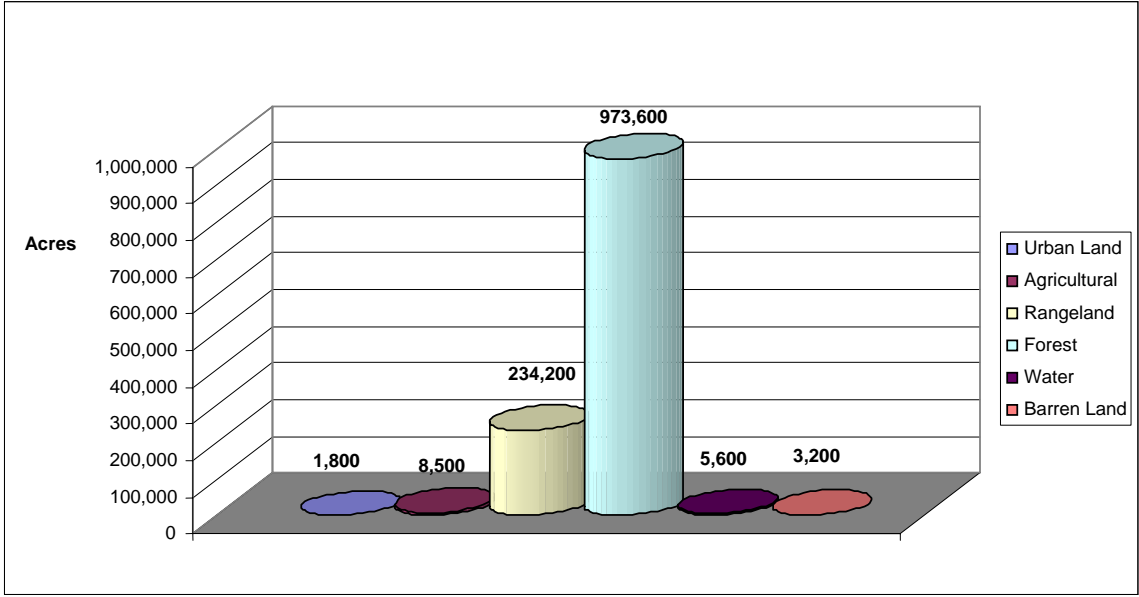


Figure 6. Boise County Land Use

Boise County is located in southwestern Idaho. It ranks 34th among Idaho counties in population and 14th in area. The majority of the land in Boise County is forest and rangeland.

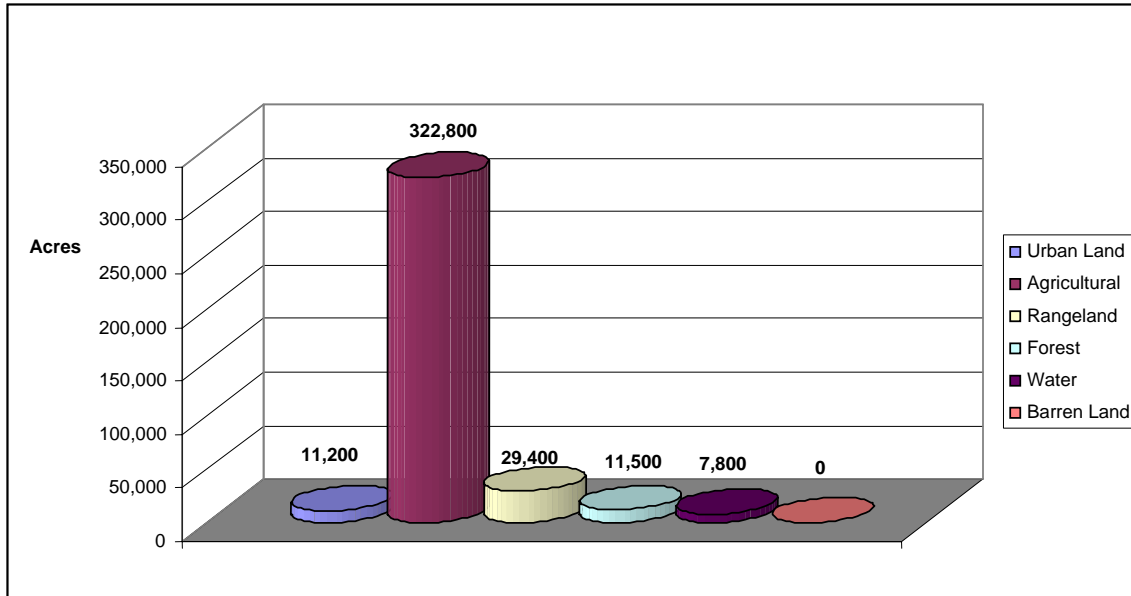


Figure 7. Canyon County Land Use

Canyon County is located in the southwestern Idaho, bordering Oregon. It ranks 2nd among Idaho counties in population and 39th in area. The primary use of land in Canyon County is for agriculture.

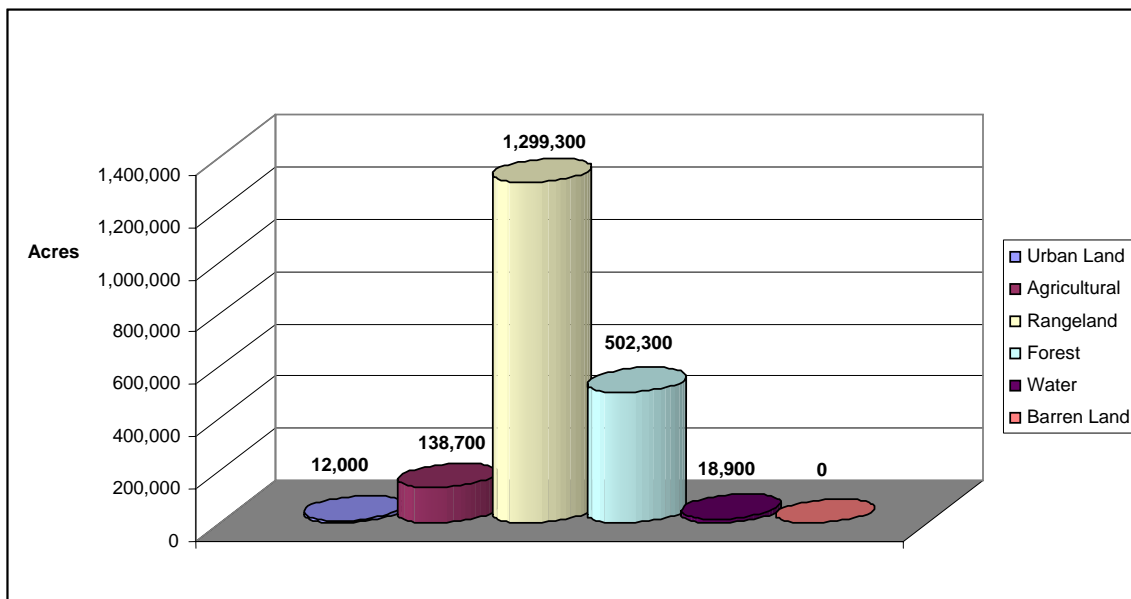


Figure 8. Elmore County Land Use

Elmore County is located in southwestern Idaho. It ranks 11th among Idaho counties in population and 6th in area. The majority of the land in Elmore County is rangeland, followed by forest, and agricultural land.

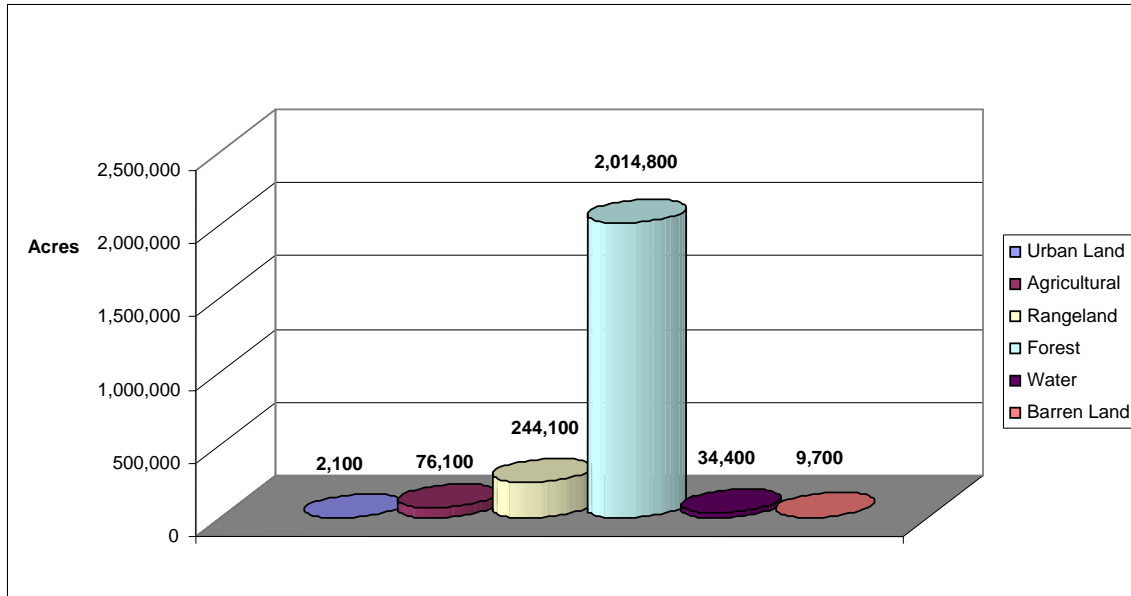


Figure 9. Valley County Land Use

Valley County is located in the west-central mountains of Idaho. It ranks 30th among Idaho counties in population and 5th in area. About 1.5 percent (or 53.8 sq. miles) of the county is water. The majority of the land in Valley County is forest.

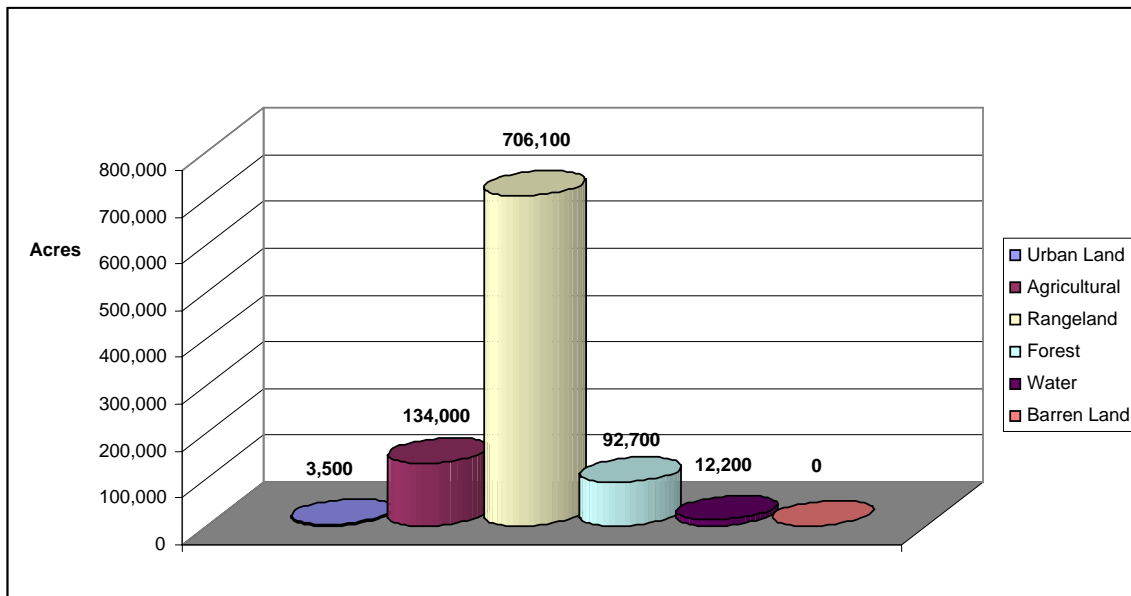


Figure 10. Washington County Land Use

Washington County is located in southwestern Idaho, bordering the Snake River and Oregon. It ranks 26th among Idaho counties in population and 20th in area. The majority of the land in Washington County is rangeland, followed by agricultural and forest.

Division of Land

The land in the Boise-Payette-Weiser Subbasin is divided into Federal, State, City and County, and Private. Below are the individual divisions for each county (Figure 11, Figure 12, Figure 13, Figure 14, and Figure 15).

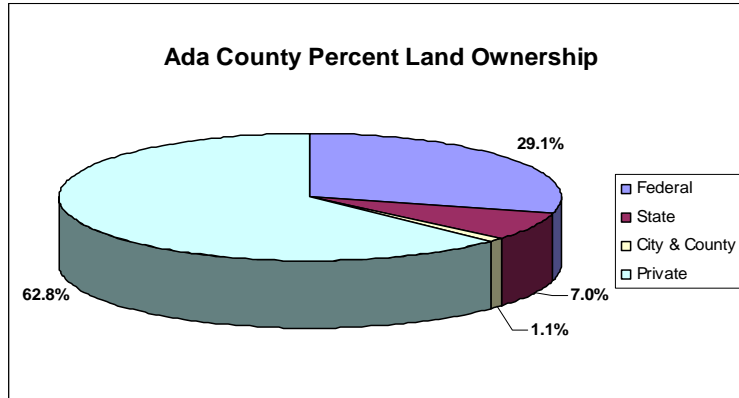


Figure 11. Ada County Land Ownership

Approximately 29 percent of Ada County is federally owned. Private landowners make up the majority of land ownership accounting for almost 63 percent.

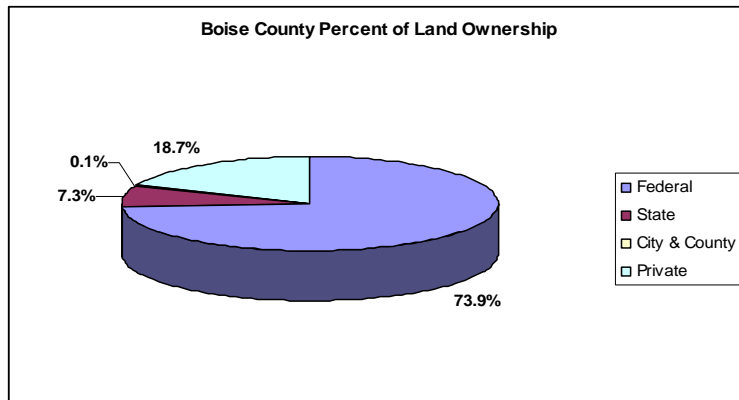


Figure 12. Boise County Land Ownership

Approximately 74 percent of Boise County is federally owned. Private ownership accounts for almost 19 percent.

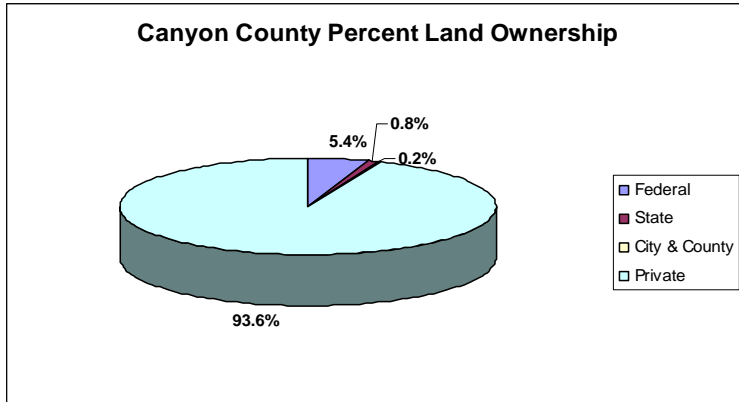


Figure 13. Canyon County Land Ownership

Unlike most Idaho counties, the vast majority of Canyon County is privately owned with private ownership accounting for almost 94 percent. Federal ownership accounts for only 5.4 percent.

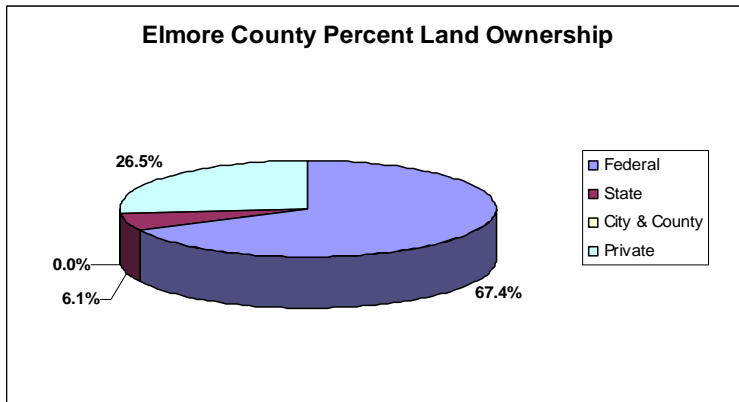


Figure 14. Elmore County Land Ownership

Approximately 67 percent of Elmore County is federally owned. Private ownership only makes up 26.5 percent.

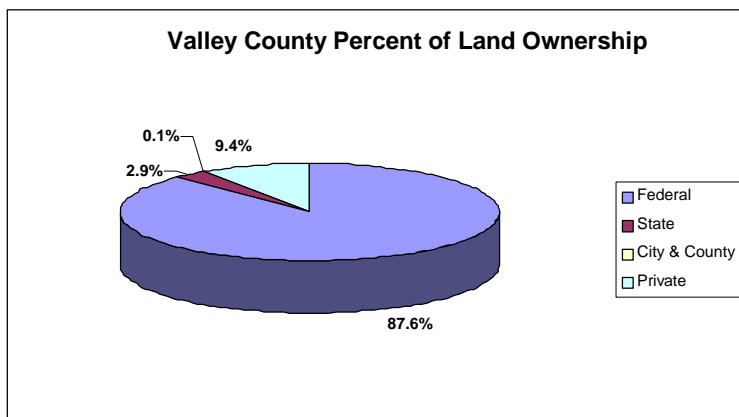


Figure 15. Valley County Land Ownership

Approximately 88 percent of Valley County is federally owned. Private ownership makes up only 9.4 percent.

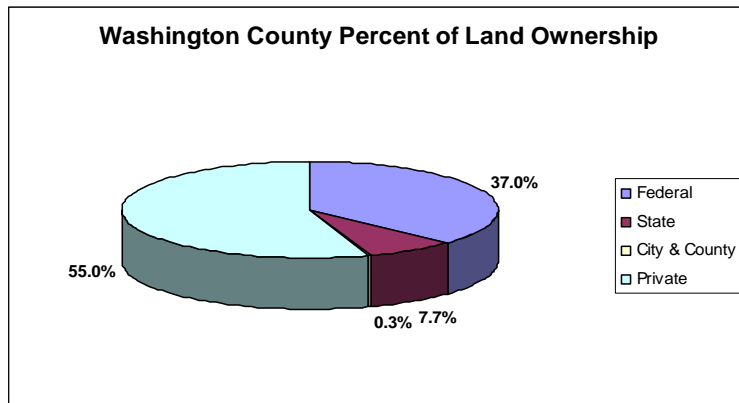


Figure 16. Washington County Land Ownership

Approximately 55 percent of Washington County is privately owned. Federal ownership accounts for 37 percent.

Employment by Industry

The main sources of employment in the subbasins (average number of jobs in counties with greater than 10% land area in the subbasins: Boise, Elmore, Valley, and Washington) are farming (543), retail trade (1,035), services (1,114), federal military (1,080), and state or local government (758). Industries in construction (47%); finance, insurance, and real estate (46%); and wholesale trade (43%) experienced the highest percentage of growth in the past decade (Figure 17). Separate graphs illustrate the sources of employment by industry for Boise, Elmore, Valley, and Washington counties (Figure 18, Figure 19, Figure 20, Figure 21). Trade, services, and government provide the major sources of employment in Boise County. Major employers include Boise County government, Bogus Basin Ski Resort, Challenger Electric, GV Construction, the U.S. Department of Agriculture, MQ Reforestation, and the local school districts. The local economy in Elmore County relies heavily on the Mountain Home Air Force Base. Government is the largest source of employment, with trade, services, food processing and construction providing additional job opportunities. Elmore County's major employers include Albertson's, Inc., Mountain Home and Glens Ferry School Districts, Elmore Medical Center, Idahoan Foods, Mountain Home Air Force Base, Wal-Mart, and Elmore County Government. Recreation and tourism are important components of the local economy in Valley County. Nearly 31 percent of all non-farm employment is with government. Another source of employment is construction as a result of the development of Tamarack Resort and related spinoffs. Major employers include McCall Memorial Hospital, Paul's Market, Ridley's, the U.S. Forest Service, the local school districts, Valley County government, and the Brundage Ski Area. Agriculture, forest products manufacturing and food products manufacturing are the basic industries in Washington County, while government and trade are other important sources of employment. Large employers include Idaho Timber Corporation, Ridley's, Hometown Ford, Weiser Memorial Hospital, Appleton Produce, Weiser Rehabilitation & Care Center, Washington County government, and Champion Home Builders.

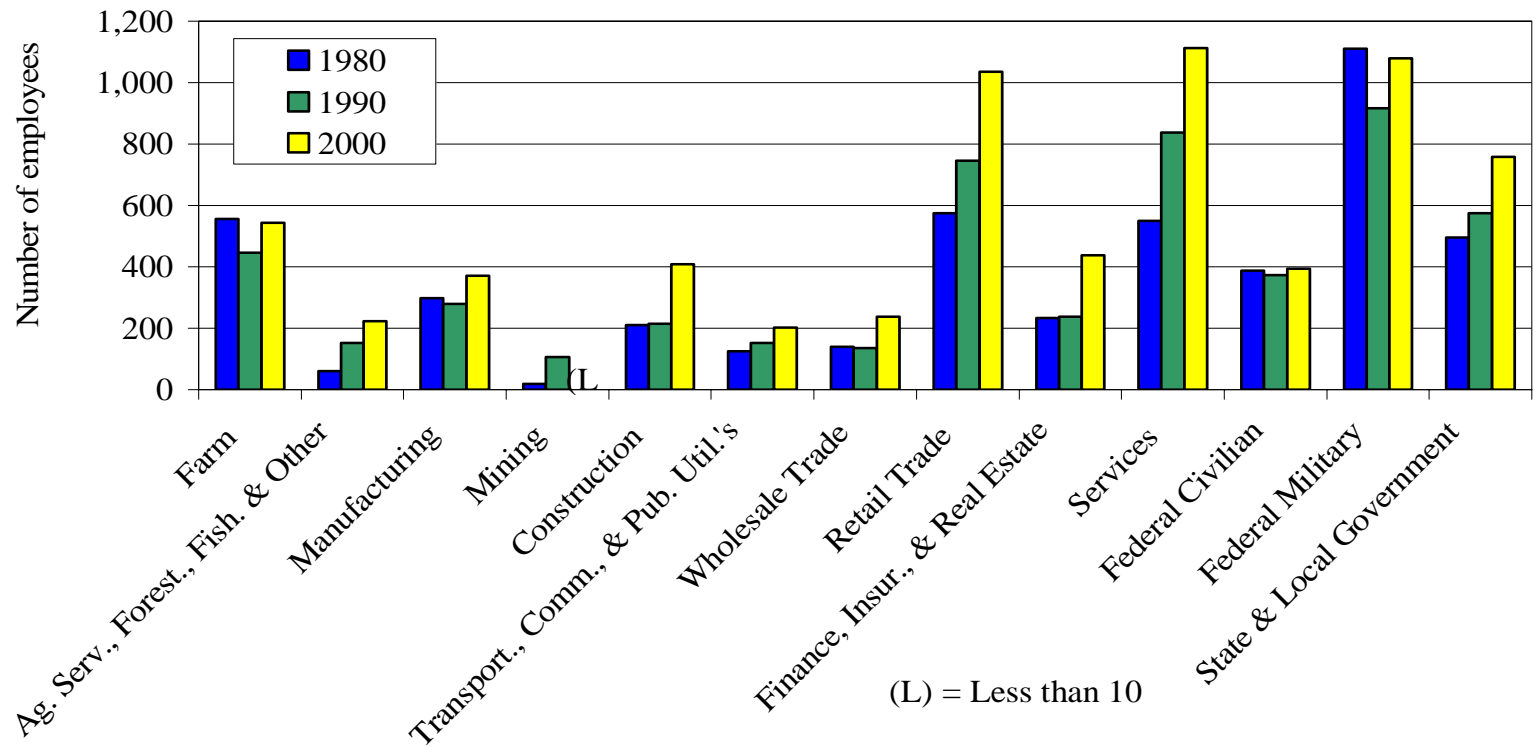


Figure 17. Average employment by industry in the BPW subbasins from 1980 to 2000, including counties with greater than 10% land area in the subbasins (IDOC 2002)

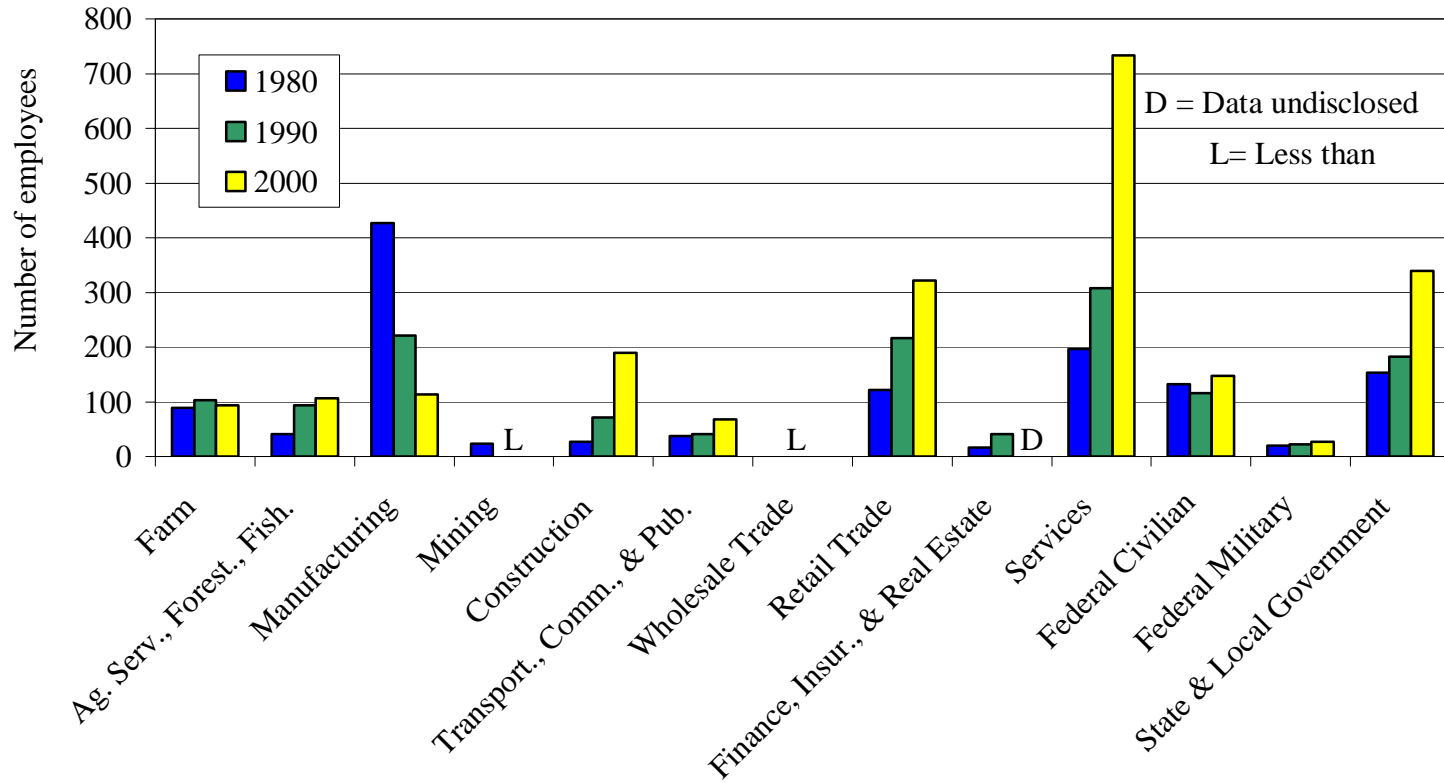


Figure 18. Employment by industry in Boise County, with 21% of the land area in the BPW subbasins (IDOC 2002)

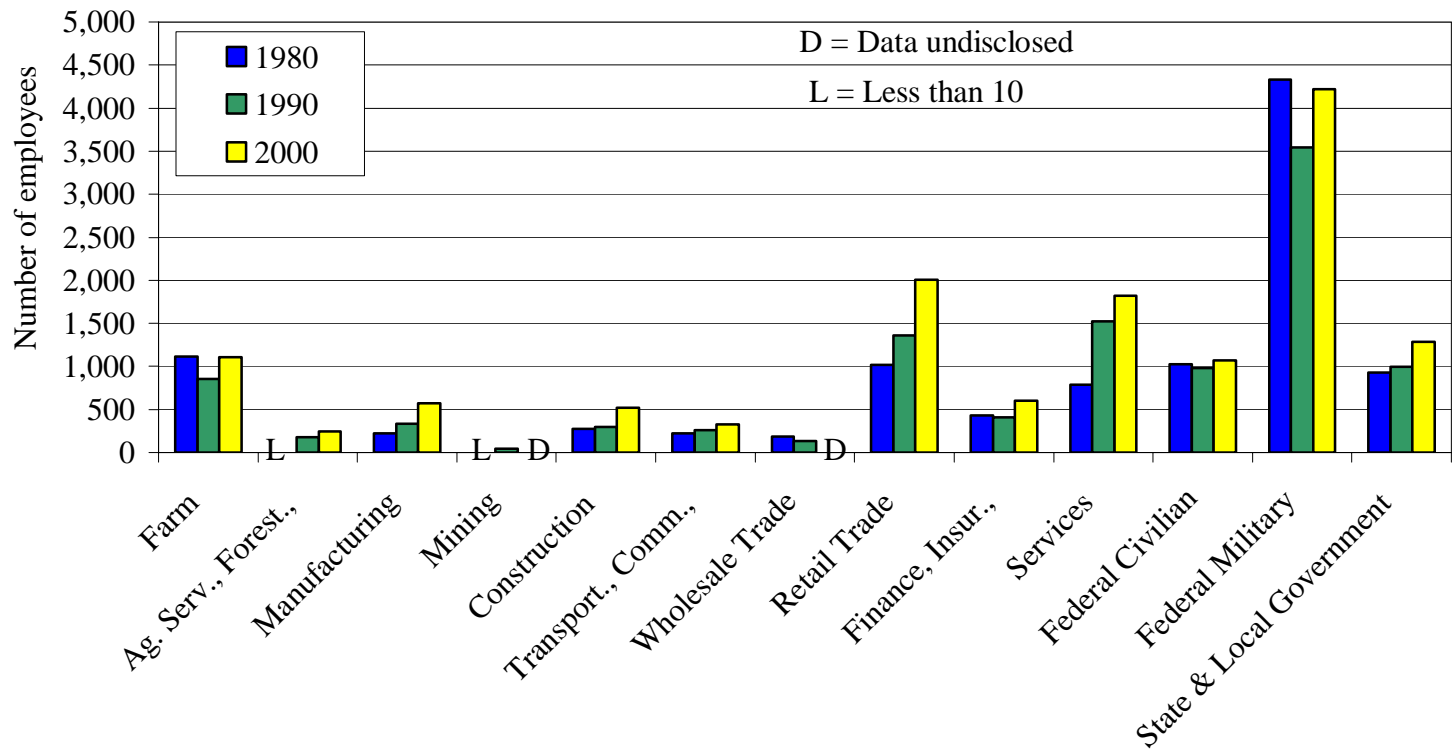


Figure 19. Employment by industry in Elmore County, accounting for 16.7% of the land area in the BPW subbasins (IDOC 2002)

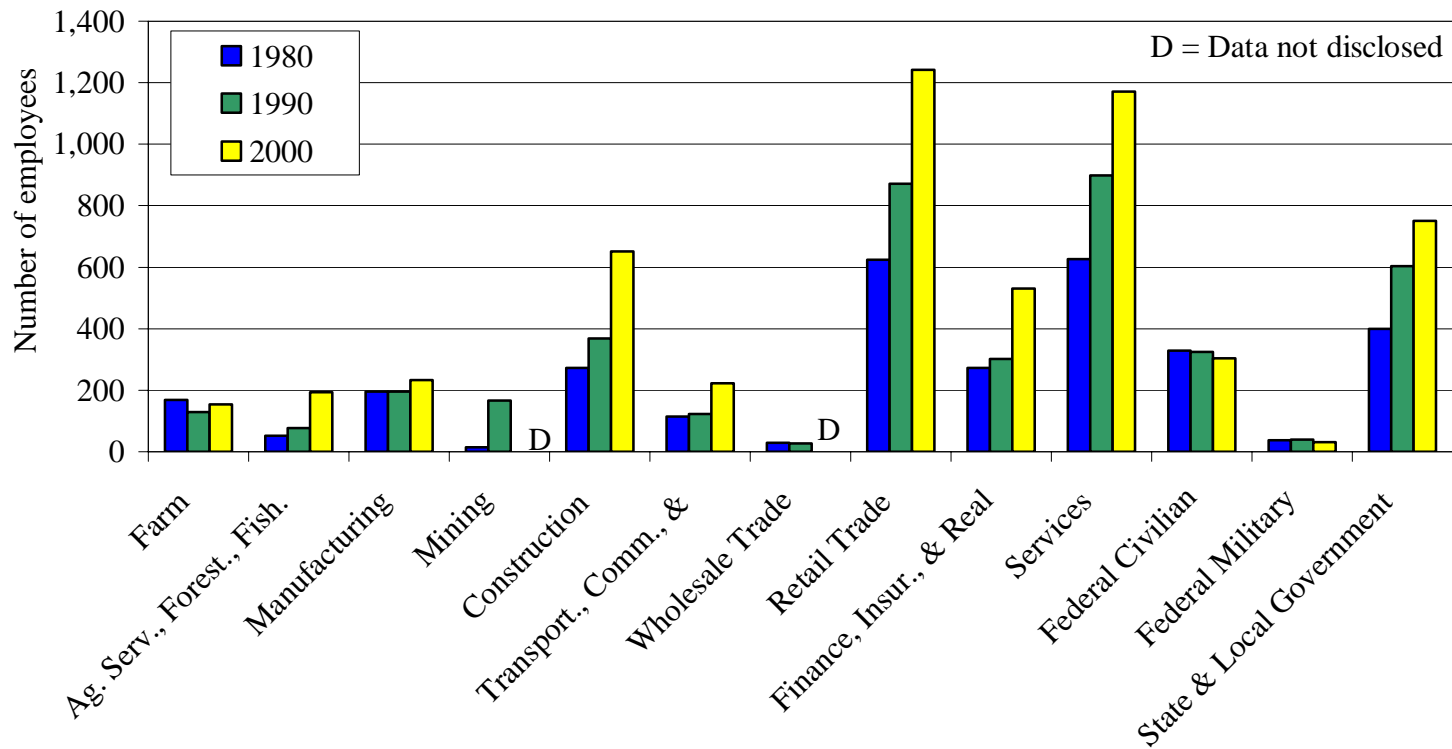


Figure 20. Employment by industry in Valley County, accounting for 14.7% of the land area in the BPW subbasins (IDOC 2002)

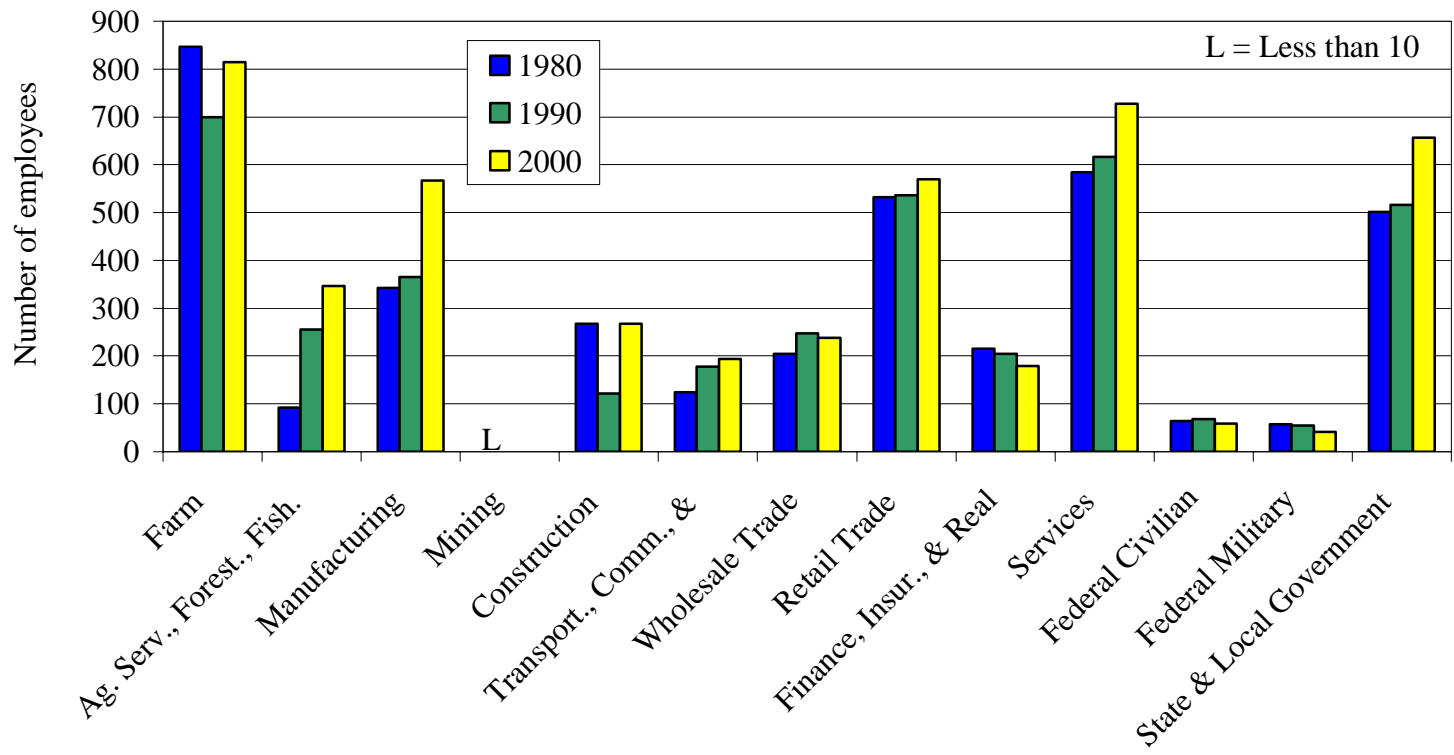


Figure 21. Employment by industry in Washington County, accounting for 11.7% of the land area in the BPW subbasins (IDOC 2002)

Major Employers

The following list of major employers in the subbasins (Table 16) describes the industry categories in each county more specifically (IDOC 2002).

Table 16. Largest employers in counties representing the BPW subbasins (IDOC 2002)

LARGEST EMPLOYERS	Product or Service
PAYETTE COUNTY	
Chiquita Processed Foods	Food Processing
Payette School District	Education
Sunbridge of Payette	Nursing Home Care
Lynn Josephson Produce	Food Processing
Marshall Furniture	Manufacture Church Furniture
Idaho Power Company	Electric Utility
Payette City	Government Services
Teton Machine Company	Precision Machinery
United Parcel Service	Package Delivery
ADAMS COUNTY	
Adams County government	Government Services
U.S. Forest Service	Government Services
Evergreen Forest Products	Forest Products Manufacturing
S & S Drywall, Inc.	Construction
JI Morgans	
Meadowcreek Properties	
Council Community Hospital	Health Care Services
Seven Devils Mountains	Recreation/Tourism
Hells Canyon	Recreation/Tourism
Brundage Ski Area	Recreation/Tourism
ADA COUNTY	
Micron Technology, Inc.	Electronics Manufacturer
Hewlett-Packard Company	Electronics Manufacturer
Albertsons, Inc.	Retail Food Sales
St. Luke's Medical Center	Health Care Services
Boise State University	Education
St. Alphonsus Medical Center	Health Care Services
Boise Corporation	Wood & Paper Manufacturing Mgmt.
Washington Group International	Construction Management
WASHINGTON COUNTY	
Agriculture	
Idaho Timber Corporation	Forest Products Manufacturing
Appleton Produce	Food Products Manufacturing
Washington County government	Government Services

LARGEST EMPLOYERS	Product or Service
Ridley's	
Hometown Ford	Retail Car Sales
Weiser Memorial Hospital,	Health Care Services
Weiser Rehabilitation & Care Center	Health Care Services
Champion Home Builders	Construction
CANYON COUNTY	
Agriculture	Food Products Manufacturing
Amalgamated Sugar Company	Food Processing
Conagra Foods/Armour Fresh Meat Company	Food Processing
J.R. Simplot Company	Manufacturer
Kit Manufacturing	Manufacturer
Plexus (MCMS)	Manufacturer
Micron Electronics	Manufacturer
MPC.com	Manufacturer
Sorrento Lactalis	Manufacturer
SSI	Manufacturer
Symms Fruit Ranch	Food Products Manufacturing
Wal-Mart	Retail goods
West Valley Medical Center	Health Care Services
Mercy Medical Center	Health Care Services
Albertson College of Idaho	Education
Northwest Nazarene University	Education
Future satellite campus: Boise State University	Education
Many Wineries	Recreation/Tourism
ELMORE COUNTY	
Mountain Home Air Force Base	Government
Albertson's, Inc.	Retail Food Sales
Mountain Home	
Glenns Ferry School Districts	Education
Elmore Medical Center,	Health Care Services
Idahoan Foods	Food Processing
Wal-Mart	Retail goods
Elmore County government.	Government
Sawtooth Mountains	Recreation/Tourism
Three Island Crossing (Oregon Trail)	Recreation/Tourism
Boise County government	Government Services
U.S. Department of Agriculture	Government Services
County school districts	Education
MQ Reforestation	Forest Products
Challenger Electric	Construction

LARGEST EMPLOYERS	Product or Service
GV Construction	Construction
Bogus Basin Ski Resort	Recreation/Tourism
Payette River	Recreation/Tourism
GEM COUNTY	
Agriculture	Food Products Manufacturing
Wood Products	Forest Products
Gem County government	Government Services
U.S. Forest Service	Government Services
Albertson's, Inc	Retail Food Sales
Elderly Opportunity Center	Health Care Services
Emmett Care Center	Health Care Services
Emmett School District	Education
GEM COUNTY Continued	
Emmett Valley Livestock Auction	Food Products sales
Walter Knox Memorial Hospital	Health Care Services
Black Canyon Reservoir	Fishing/waterskiing recreation
VALLEY COUNTY	
Payette Lakes	Recreation/Tourism
Cascade Reservoir	Recreation/Tourism
Brundage Ski Area	Recreation/Tourism
Payette River	Recreation/Tourism
U.S. Forest Service	Government Services
McCall Memorial Hospital	Health Care Services
Paul's Market	Food retail sales
Ridley's	
County school districts	Education
Valley County government	Government Services

Employment by Recreation and Tourism

Forestry, fishing, and agricultural service economies saw steady growth from 1980 to 2000 (Figure 17). The recreation and tourism industry was hard to measure on a county basis. However, the *2001 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation* (USFWS 2003) found 486 thousand Idaho residents and non residents (16 and older) spent nearly 755 million dollars in Idaho for fishing and hunting, and an additional 982 million for wildlife viewing and related activities in 2001. The International Association of Fish and Wildlife Agencies modeled the survey data (Southwick Associates 2001) and estimated the number of jobs created in Idaho from all hunting activities 6,197. The number of jobs created from all fishing activities was not modeled, but higher expectations could be made based on the higher percentage of fishing expenditures (57%) in comparison to hunting expenditures in Idaho State. Rural community economies are generally considered to benefit from hunting and fishing activities, while some are highly dependant on it (Southwick Associates 2001).

A summary of 2002 resident hunting and fishing license sales by county illustrates the areas where most sportsmen live in the subbasins (assuming people buy licenses in the county of their residence). Ada and Canyon counties had the highest number of license sales in 2002 with 65,745 and 35,848, respectively (Figure 22, IDFG 2003). The 1991 *National Survey of Fishing, Hunting, and Wildlife-Associated Recreation* found 49 percent of all hunters and 52 percent of freshwater anglers traveled less than 25 miles to the sites they used most often (Figure 23, USFWS 1993).

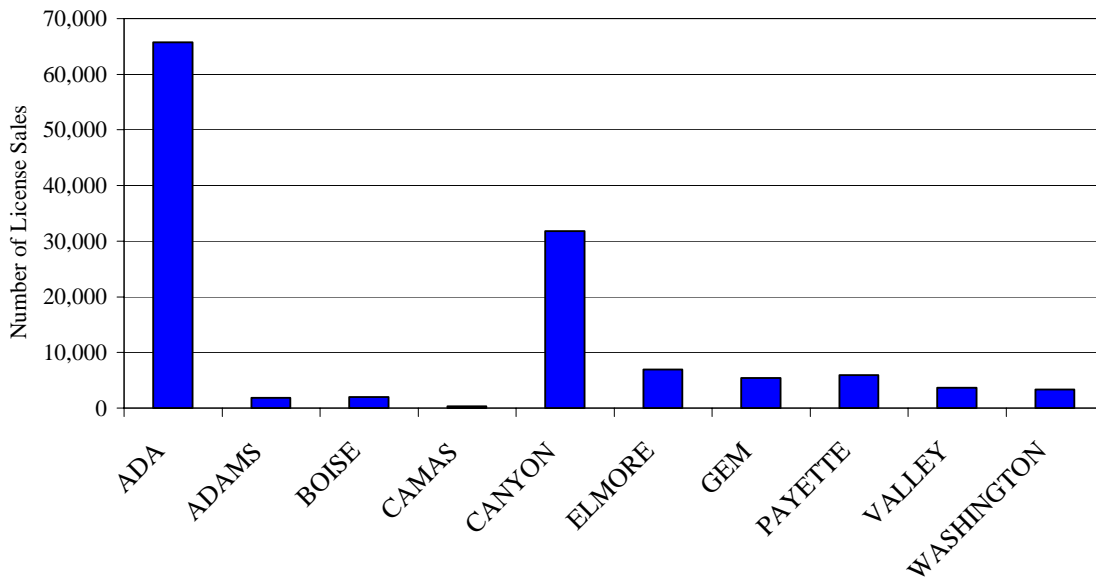


Figure 22. Resident hunting and fishing license sales in 2002 for counties in the BPW subbasins (IDFG 2003)

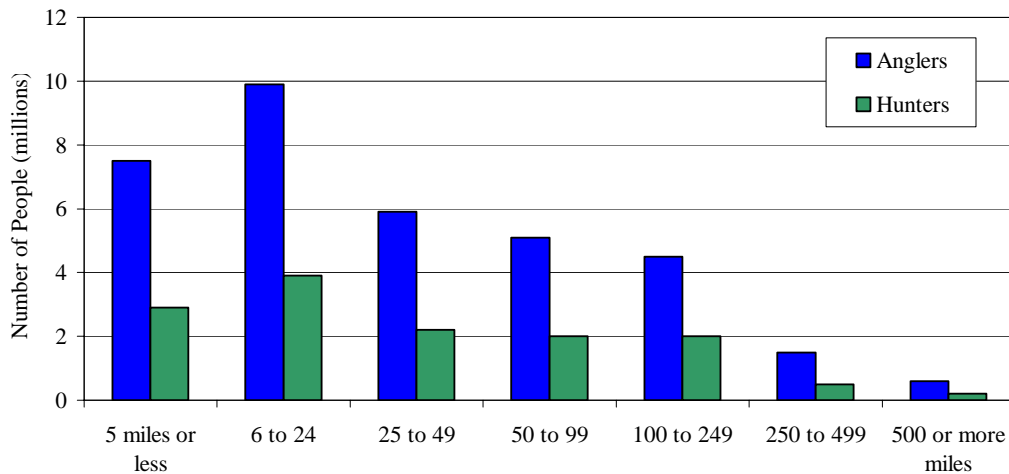


Figure 23. Distance traveled one-way to sites used most often by hunters and fisherman (USFWS 1993)

Recreation and tourism also includes those who camp, hike, ski and snowmobile. A study of the Valley County economy by the University of Idaho in 2000 broke out the amount of spending in Valley County by recreation type:

- Campers spent \$7.52 per person per day with 34% of that amount for camp/park fees. (1,724 person days)
- Rafters spent \$22.38 per person per day with 83% spent on rafting fees. (275.5 person days)
- Anglers spent \$13.16 per person per day in Valley County with 23% of that amount spent on groceries. (186 person days)
- Hunters spent a total of \$14.70 per person per day with 51% of that spent on gas and groceries. (101 person days)
- Down hill skiers in Valley County spent \$58.69 per person per day with 28% of that for lift tickets and 44% for lodging. (455 person days)
- Snowmobilers spent \$36.45 per person per day with 55% of that for lodging. (276 person days)

Income

The average per capita income trends in the BPW subbasins are slightly lower than that of the United States and Idaho in 2000 (Figure 24). However, there has been an upward trend in income from 1980 to 2000.

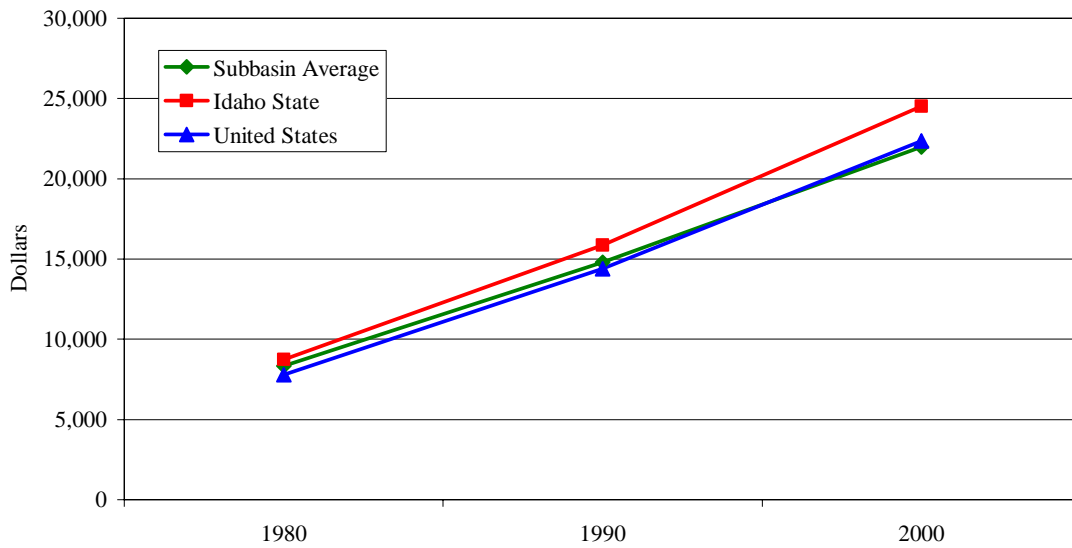


Figure 24. Per Capita Income Trends from 1980-2000 in the United States, the State of Idaho, and the BPW subbasins (IDOC 2002, NIIP 2001, U.S. Census Bureau 2000b)

Unemployment

The average unemployment rate in the BPW subbasins has decreased, from 1980 to 2000, along with the state of Idaho and the nation. The average unemployment rate around the year 2000 was 7.0 percent, compared to 4.9 percent in Idaho State. The average unemployment rate decreased from 12.2 percent in 1980 to 7.0 percent in 2000 in the subbasins.

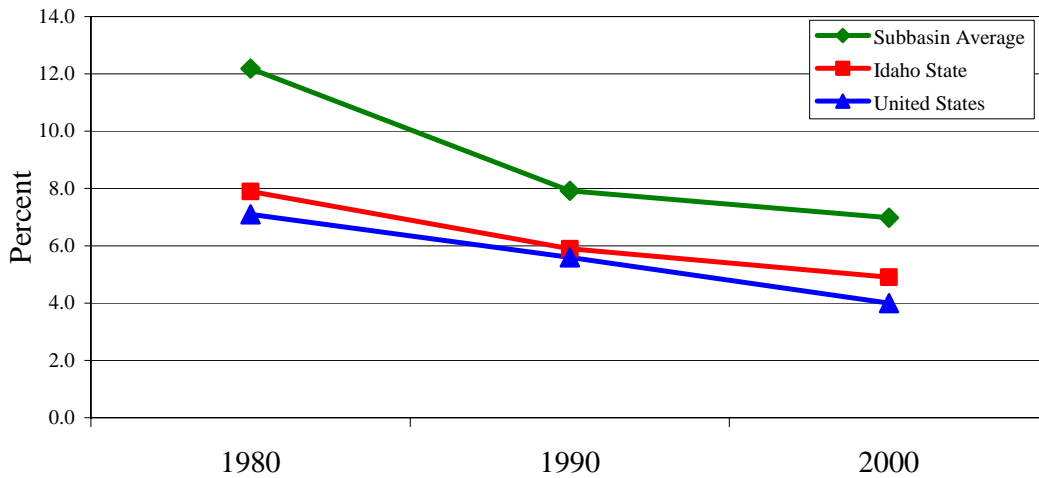


Figure 25. Percent civilian labor force unemployment trends from 1980 to 2002 in the BPW subbasins, State of Idaho, and United States (IDOC 2002, US Census Bureau 2000b).

Poverty

The percentage of families or persons living below the poverty level was nearly the same between the BPW subbasins, the State of Idaho, and the United States in 1999. The percentage of families below poverty is generally 3 to 4 percent lower than the percentage of persons below poverty (Figure 26). Adams County had the highest percentage of persons below poverty in 1999 (15.1), while Ada County had the lowest (7.7). Boise County, with the greatest land area in the subbasins, represents the average percentage of persons below poverty in the subbasins at 12.9 percent.

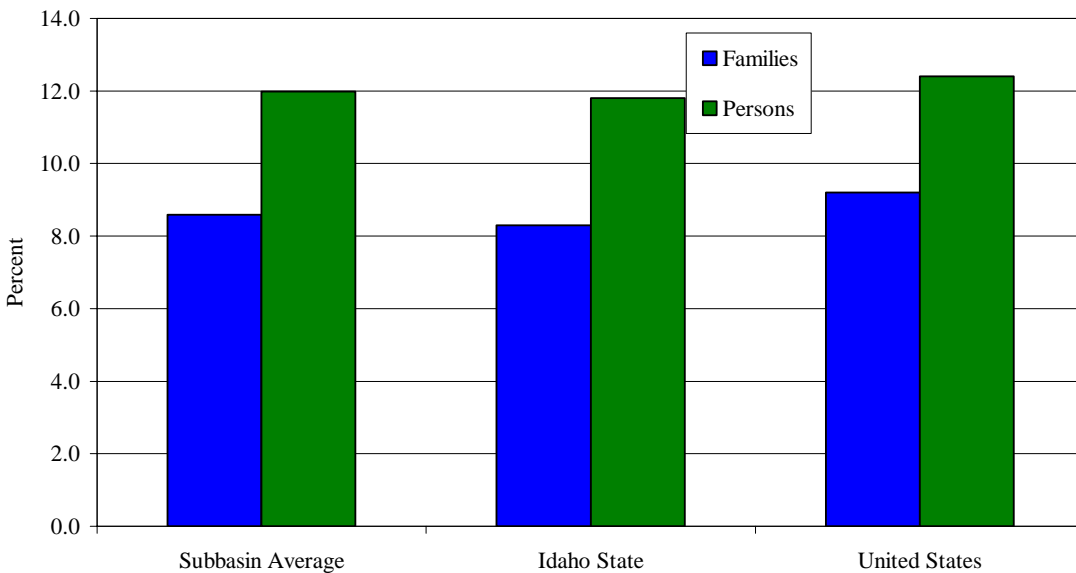


Figure 26. Percentage of families and persons living below poverty in the BPW subbasins, the State of Idaho, and the United States (IDOC 2002, US Census Bureau 2000b)

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Appendix E—Vision Dissent

February 2, 2004

Boise/Payette/Weiser Sub-Basin
Planning Team

As the Idaho Department of Fish and Game’s representative on the Boise/Payette/Weiser Sub-Basin Planning Team, I must follow up my verbal comments with this letter expressing my inability to support the current wording for the plan’s vision. This specific wording was not mentioned or discussed at the October meeting that I attended. I understand it was initially brought up and approved by those present at the November meeting that I was not able to attend.

The purpose for this plan and other plans is to help the Northwest Power Planning Council prioritize and direct funding specifically to mitigate impacts of the federal hydropower system on fish and wildlife populations. I feel that a vision statement that expresses that the focus and inferred primary interest is “ecosystems....which will support sustainable resource-based industries” is inappropriate.

I am not naive enough to think that the vision statement will be a driving factor in ultimate decisions. And I respect and agree with other team member’s desire to acknowledge the local and human side of the mitigation program. But I feel that could easily be accomplished while not making resource based industries the focus by making the following wording change:

The vision for the Boise-PayetteWeiser (BPW) Subbasin is healthy, productive ecosystems with diverse aquatic and terrestrial species, which will support sustainable resource-based ~~industries that provide goods and services and other~~ activities for a growing human population.”

The suggested wording is encompassing enough to include industry without placing the focus on it. I hope that the team can support this change.

Sincerely,

Al Van Vooren

Southwest Regional Supervisor

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