



**United States
Department of
Agriculture**



Forest Service



**United States
Department of
the Interior**



**Bureau of Land
Management**

Interior Columbia Basin Ecosystem Management Project

Interior Columbia Basin Supplemental Draft Environmental Impact Statement

Summary

March 2000

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of nationally owned public lands and natural resources. This includes fostering the wisest uses of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interest of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. administration.

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Interior Columbia Basin Ecosystem Management Project

**Interior Columbia
Basin Supplemental
Draft Environmental
Impact Statement
*Summary***

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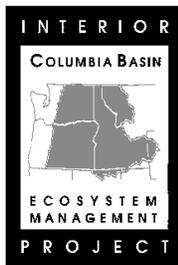
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Dear Reader:

Thank you for your interest in the management of public lands in the interior Columbia River Basin. A more coordinated, ecosystem approach to managing Bureau of Land Management- and Forest Service-administered lands is needed. This Supplemental Draft Environmental Impact Statement (EIS) outlines three management alternatives for your review. Of the three alternatives presented, Alternative S2 has been identified as the preferred alternative.

This Supplemental Draft EIS supplements the Eastside and Upper Columbia River Basin Draft EISs released in June 1997, and is written to be a stand-alone document. The accompanying issues, alternatives, and analyses were significantly influenced by the more than 83,000 comments received on the Draft EISs. The responses to the public comments on the Draft EISs are found in Appendix 4, *Response to Comments*.

We look forward to receiving your comments on this draft document. Your opinions, insights and suggestions are critical to shaping a successful management strategy. Your written comments will be most helpful if they are specific, mention particular pages or chapters where appropriate and address one or more of the following issues:

- How well the preferred alternative meets the purpose and need statements,
- Which other alternative or parts of alternatives you would support or prefer, and why,
- Items that need clarification, and
- New information that could have a bearing on the analysis.

You will have 90 days to review this draft document. After full consideration of all comments received, a Final EIS and Record of Decision will be issued. The Record of Decision will amend 62 individual land use plans on the 32 Forest Service and Bureau of Land Management administrative units in the project area. The selected alternative will also replace the interim management strategies of PACFISH, INFISH, and the Eastside Screens.

We are accepting written comments through the mail at SDEIS; P.O. Box 420; Boise, ID 83701-0420 or electronically by accessing the project's web site at <http://www.icbemp.gov/eis>. (A copy of the Supplemental Draft EIS and the unattached appendices are also posted at this web site.)

We appreciate your interest and participation in crafting a management strategy for Forest Service- and Bureau of Land Management-administered lands in the interior Columbia River Basin.

Sincerely,

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Project Manager

GEOFF MIDDAUGH
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ICBEMP Supplemental Draft EIS

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Introduction

Changed conditions over the past century and new information and understandings indicate that the ecosystems of the interior Columbia River Basin are declining in health. Improving the health, diversity and productivity of these ecosystems will support cleaner air and water, healthier populations of fish and wildlife, and help meet the needs of current and future generations.

The Forest Service and Bureau of Land Management propose to develop and implement a coordinated, scientifically sound, broad-scale, ecosystem-based management strategy for lands they administer across parts of Idaho, Oregon, Montana, and Washington (approximately 63 million acres) (See Map 1-1). The Interior Columbia Basin Ecosystem Management Project (ICBEMP) Supplemental Draft Environmental Impact Statement (EIS) presents three management alternatives for managing these important ecosystems.

This Supplemental Draft EIS supplements the Eastside and Upper Columbia River Basin Draft EISs released in June 1997. A Final EIS and subsequent Record of Decision (ROD) will provide a context for managers to make sound local decisions while considering effects, particularly cumulative effects, at a scale larger than individual administrative units.

Purposes and needs for developing an ecosystem-based strategy are to:

- ♦ Restore and maintain long-term ecosystem health and ecological integrity.
- ♦ Support economic and/or social needs of people, cultures, and communities, and provide sustainable and predictable levels of products and services from lands administered by the Forest Service or the BLM, including fish, wildlife, and native plant communities.
- ♦ Update or amend, if necessary, current Forest Service and BLM management plans with long-term direction, primarily at regional and subregional levels.

- ♦ Provide consistent direction at regional and subregional levels to assist federal managers in making decisions at a local level within the context of broader ecological considerations.
- ♦ Help restore and maintain habitats of plant and animal species, especially those of threatened, endangered, and candidate species, and of special interest to tribes.
- ♦ Provide opportunities for cultural, recreational, and aesthetic experiences.
- ♦ Provide long-term, broad-scale management direction that will replace interim strategies (PACFISH, Eastside Screens, and Inland Native Fish Strategy).

The proposed strategies outlined in the Supplemental Draft EIS address several critical issues:

- ♦ In what condition should ecosystems be maintained?
- ♦ To what degree, and under what circumstances should restoration be active (with human intervention) or passive (letting nature take its course)?
- ♦ What emphasis will be assigned when trade-offs are necessary among resources, species, land areas, and uses?
- ♦ To what degree will ecosystem-based management support economic and/or social needs of people, cultures, and communities?
- ♦ How will ecosystem-based management incorporate the interactions of disturbance processes across landscapes?
- ♦ How will ecosystem-based management contribute to meeting treaty and trust responsibilities to American Indian tribes?

This summary provides a brief overview of the Supplemental Draft EIS chapters including: Interior Columbia Basin Conditions and Trends (Chapter 2), Description of Management Alternatives (Chapter 3), Selection of the Preferred Alternative (Chapter 3), and Environmental Consequences (Chapter 4).



Map I-I. Forest Service- and BLM-administered Lands.

Interior Columbia River Basin Conditions and Trends

The ecological and social conditions and trends of the basin indicate a need for a new management strategy for public lands. Following is a brief overview of some of these conditions and trends.

Physical Setting

Soils and Soil Productivity

- ♦ Soil productivity across the project area is generally stable to declining. Generally, greater declines in soil productivity are associated with greater intensities of timber harvesting, roading, and grazing.
- ♦ Sustainability of soil ecosystem function and process is at risk in areas where redistribution of nutrients has resulted from changes in vegetation composition and pattern and removal of larger wood.

Hydrology and Watershed Processes

- ♦ Management activities throughout watersheds in the project area have affected the processes of sedimentation and erosion and the production and distribution of organic material, thus affecting hydrologic conditions. On federally administered lands the most pronounced changes to watersheds are due to water diversions and impoundments, road construction, changes in vegetation (from silvicultural practices and fire exclusion), and excessive livestock grazing.
- ♦ Stream flow regimes have been locally affected by dams, diversions, and groundwater withdrawal. More subtle but widespread changes to natural stream flows on federally administered lands have probably been caused by road construction and changes in vegetation due to silvicultural practices and excessive livestock grazing.

Air Quality

- ♦ The current condition of air quality in the project area is considered good, relative to other areas of the country.
- ♦ Current wildfires produce higher levels of smoke emissions than historically, because fuel available to be consumed by wildfire has increased.

Terrestrial (Upland) Vegetation

- ♦ Interior ponderosa pine has decreased across its range, with a significant decrease in the amount of old trees in single story structure. Western white pine and whitebark pine/alpine larch have decreased by 95 percent across their range in the project area.
- ♦ There has been a loss of the large tree component (live and dead) within roaded and harvested areas. This loss affects terrestrial wildlife species closely associated with these old forest structures.
- ♦ Generally, mid aged forest structures have increased in dry and moist forests, with a loss of large, scattered, shade-intolerant tree components and an increase in density of smaller diameter shade-tolerant trees.
- ♦ Increased fragmentation and loss of connectivity within and between blocks of habitat, especially in the shrub steppe and riparian areas, have isolated some habitats and populations and reduced the ability of wildlife populations to move across the landscape, resulting in long-term loss of genetic interchange.
- ♦ Rangeland noxious weeds are spreading rapidly and in some cases exponentially throughout the project area. Cheatgrass and other exotic plant infestations have simplified species composition, reduced biodiversity, changed species interactions and forage availability, and reduced the system's ability to buffer against change or act as wildlife strongholds in the face of long-term environmental variation.
- ♦ Woody species encroachment by and/or increasing density of woody species (sagebrush, juniper, ponderosa pine, lodgepole pine, Douglas-fir), especially on the dry grassland and cool shrublands, have reduced herbaceous understory (such as grasses and forbs) and biodiversity.

Terrestrial Species

- ◆ The Supplemental Draft EIS focuses on 91 terrestrial vertebrate species (a total of 97 combinations of species and their seasonal variations in use of habitats) that are of broad-scale concern and whose habitat could be mapped reliably using available broad-scale data. A general downward trend in habitat has been documented for most of these combinations.
- ◆ From historical to current periods, there has been an increase in fragmentation and loss of connectivity within and between blocks of habitat, especially in lower elevation forests, shrub steppe, and riparian areas in the interior Columbia River Basin. Fragmentation has isolated some animal and plant habitats and populations and reduced the ability of populations to disperse across the landscape, resulting in potential, long-term loss of genetic interchange.
- ◆ Declines in plant and animal terrestrial species are due to a number of human causes including: conversion of habitat to agriculture and urban development, grazing, timber harvest, introduction of exotic plant and animal species, recreation, high road densities, fire exclusion, and mining.
- ◆ Biological crusts have been degraded and their development has been inhibited in some rangeland cover types by recreational activities, excessive livestock grazing pressure, and exotic undesirable plant invasions. Degradation of biological crusts and inhibition of biological crust development often causes and perpetuates an increase in soil erosion.

Aquatic–Riparian–Hydrologic Component

Aquatic and Riparian Habitats

- ◆ Important aspects of stream channel stability, such as channel complexity and large wood abundance, have decreased throughout much of the project area. Aquatic species habitat features such as riffle–pool frequency and wood frequency are generally less in areas with higher road densities and in areas where timber harvest has been a management emphasis.

- ◆ The overall extent and continuity of riparian areas and wetlands has decreased, primarily because of conversion to agriculture but also because of urbanization, transportation improvements, and stream channel modifications.
- ◆ Most riparian areas on Forest Service- or BLM-administered lands are either “not meeting objectives”, “non-functioning”, or “functioning at risk.”
- ◆ Within riparian woodlands, the abundance of mid seral vegetation has increased, whereas the abundance of late and early seral structural stages has decreased, primarily because of fire exclusion and harvest of large trees.
- ◆ Within riparian shrublands, there has been extensive conversion to riparian herblands and increases in exotic grasses and forbs, both primarily because of processes and activities associated with excessive livestock grazing pressure. Finer scale information also indicates an extensive spread of western juniper into riparian shrublands.
- ◆ There is an overall decrease in large trees and late seral vegetation in many riparian areas.

Water Quality

- ◆ Management activities throughout the project area have affected water quality, which is important to aquatic habitats and riparian and wetland areas by altering the streamflow, erosion, and sedimentation regimes, and the production and distribution of organic material. On federally administered lands, the most pronounced changes to water quality are due to road construction, changes in vegetation (from silvicultural practices and fire exclusion), excessive livestock grazing, and water diversions and impoundments.
- ◆ Within the project area, approximately eight percent of stream miles on Forest Service- and BLM-administered lands are water quality limited as defined by the Clean Water Act. On Forest Service-administered lands, the primary water quality problems are non-point sources of pollution consisting of sedimentation, turbidity, flow alteration, and high temperatures. On BLM-administered lands, water quality limited segments are listed because of non-point pollution sources consisting of high sediment, turbidity, and high temperatures.

Aquatic Species

- ♦ The composition, distribution, and status of fishes within the project area are different than they were historically. Some native fishes have been extirpated from large portions of their historical ranges.
- ♦ Many native nongame fish are vulnerable because of their restricted distribution or fragile or unique habitats.
- ♦ Although several of the key salmonids are still broadly distributed (notably the cutthroat trout and redband trout), declines in abundance, loss of life history patterns, local extinctions, and fragmentation and isolation in smaller blocks of high quality habitat are apparent.
- ♦ Wild chinook salmon and steelhead are near extinction in a major part of their remaining habitat.

Social–Economic–Tribal Component

Social and Economic Considerations

- ♦ The project area is sparsely populated and rural, especially in areas with a large amount of federal lands. Some areas are experiencing rapid population growth, especially those areas offering high quality recreation and scenery.
- ♦ Development for a growing human population is encroaching on previously undeveloped areas adjacent to lands administered by the Forest Service or BLM. Population growth and associated new development can put stress on the political and physical infrastructure of rural communities, diminish habitat for wildlife, and increase agency costs to manage fire to protect people and structures.
- ♦ Changing levels and values of commodity outputs can affect budgets of counties that have benefitted from federal sharing of receipts from sales of commodities and services on BLM- and Forest Service-administered lands.
- ♦ At the local level, some communities rely on economic activity supported by harvest and processing of forest products, livestock grazing, mining, and recreation. Forest products and livestock grazing no longer solely dictate the economic prosperity of the region, even though

they remain economically and culturally important in rural areas. The economic dependence of communities on these industries is highest in areas that are geographically isolated and offer few alternative employment opportunities.

Federal Trust Responsibility and Tribal Rights and Interests

- ♦ The relationship that American Indians have with federal lands may be affected by proposed actions on forestlands and rangelands because of changes in vegetation structure, composition, and density; existing roads; and watershed conditions.
- ♦ Culturally significant species such as anadromous fish and the habitat necessary to support healthy, sustainable, and harvestable aquatic and terrestrial species constitute a major, but not the only, American Indian relationship potentially affected by the ICBEMP decision, along with other factors that keep the ecosystem healthy.

Description of Alternatives

There are three alternative management strategies analyzed in the Supplemental Draft EIS: Alternative S1, Alternative S2, and Alternative S3.

Alternative S1

Alternative S1 (no action) continues management specified under each existing Forest Service and BLM land use plan, as amended or modified by interim direction—known as Eastside Screens (national forests in eastern Oregon and Washington only), PACFISH, and INFISH—as the longterm strategy for lands managed by the Forest Service or BLM. The final standards for rangeland health and guidelines for livestock grazing management (Healthy Rangelands) currently being implemented on BLM-administered lands in Idaho, Montana, Oregon, and Washington are continued on the same lands. The reasonable and prudent measures, terms and conditions, and/or conservation recommendations from the Biological Opinions on the Forest Service

Land and Resource Management Plans as amended by PACFISH and INFISH are maintained and followed where applicable.

Forest Service- and BLM-administered lands would continue to be managed by direction in individual existing land use plans, recovery plans, and other current direction. Many of the plans were based on the assumption that ecological conditions were healthy, or that disturbances (such as fire, insects, and disease) would not substantially affect planned actions, desired outcomes, or outputs. In general, the intent is to provide sustainable levels of resources (such as timber and wood products, livestock forage, big game and game birds, and minerals) in an environmentally prudent manner from some areas. Other areas are managed as wilderness or wilderness study areas, scenic areas, research natural areas, unroaded lands, and conservation areas to provide other uses and values such as aesthetics, recreation opportunities, viewable wildlife, and clean air and water.

Design and Architecture of Alternative S1

Alternative S1, the no-action alternative, represents all the various land use plans in the project area. These plans were developed at different times by two agencies in several regions using different definitions and policies. The plans vary tremendously. Each plan was written at a much smaller scale than the ICBEMP, and each was developed using different goals than the ICBEMP. An attempt was made to make Alternative S1 parallel to the other alternatives; however, it is described and presented somewhat differently than Alternatives S2 and S3. For example, Alternative S1 is organized by the four major components, just as Alternatives S2 and S3 are (landscape succession/disturbance; terrestrial species habitat; aquatic habitat; and human needs, products, and services). However, it does not have a comprehensive restoration strategy, and there are no aquatic (A1 and A2 subwatersheds) or terrestrial (T watersheds) habitats delineated. Therefore, since it was neither appropriate nor possible to include all direction from individual plans, relevant items were consolidated and paraphrased.

Management Direction

Forestland Vegetation Management

The general intent of forestland vegetation management is to rely on even-aged management practices, favor shade-intolerant species with reduced stand densities, improve growth and yields, restore and

maintain soil productivity, use genetically improved trees to prompt reforestation, and reduce fuel loads. In the past, lands suitable for timber production were managed at the stand level; however, policy changes, interim strategies, and Biological Opinions have affected forestland management so management activities are planned at watershed scales more than at the stand level, uneven-aged practices are emphasized more, and timber harvest is reduced within riparian areas and priority watersheds.

Rangeland Vegetation Management

The intent of vegetation management on rangelands is focused on providing forage for livestock and wildlife, while protecting soil productivity and coordinating with other resource uses. Control and prevention of noxious weeds and management of non-native plants is gaining importance as a management intent. Healthy Rangelands direction for BLM-administered lands, interim strategies, and Biological Opinions have increased the focus on vegetation and soil conditions and protection of aquatic and riparian values.

Wildlife Habitat Management

The intent of wildlife habitat management is to develop effective wildlife habitat (primarily big game and other game animal habitat) by managing vegetation and road access. Certain key habitats and habitat components, such as late/old growth forests and snags and downed wood, are generally planned to exist at relatively low levels—often the minimum required to maintain species viability, although the importance of these habitat components has been enhanced in eastern Oregon and eastern Washington forests because of the Eastside Screens.

Aquatic/Riparian Management

Each land use plan generally has direction for aquatic and riparian management. The intent of managing aquatic/riparian resources has been modified by requirements in PACFISH, INFISH, and the Biological Opinions, which provide a consistent approach to aquatic habitat management for most of the project area. The requirements include:

- ♦ Establishing Riparian Habitat Conservation Areas and Riparian Management Objectives;
- ♦ Incorporating standards and guidelines for resource management applied to riparian conservation areas and upland areas affecting riparian areas;
- ♦ Designating priority watersheds and specific subbasins for protection/restoration activities;

- ♦ Using subbasin analyses and Ecosystem Analysis at the Watershed Scale;
- ♦ Focusing watershed restoration on degraded habitats to improve long-term conditions; and
- ♦ Applying terms, conditions, and conservation recommendations to watersheds with listed aquatic species habitats, priority watersheds, or specific subbasins.

Restoration

Restoration of vegetation and succession/disturbance regimes usually are not a priority in existing land use plans. In general, restoration activities such as thinning, prescribed fire, decreased road densities, and watershed restoration occur at relatively low levels. Restoration priorities are set locally, not regionally. The interim strategies and Biological Opinions have increased the focus on restoration of aquatic and riparian resources, and of forest vegetation in eastern Oregon and eastern Washington forests. They have also increased the emphasis on prioritizing restoration beyond the bounds of individual administrative units.

Alternatives S2 and S3

Alternatives S2 and S3 focus on restoring and maintaining ecosystems across the project area and providing for the social and economic needs of people, while reducing short- and long-term risks to natural resources from human and natural disturbances.

In **Alternative S2** there is an emphasis on conducting analyses, such as Subbasin Review and Ecosystem Analysis at the Watershed Scale (EAWS), prior to conducting management activities. This is intended to minimize short-term risk from management activities in areas where short-term risks are of most concern, and to ensure actions occur in the most appropriate locations in the most appropriate sequence. In this way, Alternative S2 systematically minimizes short-term risks from management activities or disturbance events. Economic participation of the local workforce in management activities is promoted by ensuring restoration activities are prioritized to occur in areas that are economically specialized in industries tied to goods and services from Forest Service- and BLM-administered lands.

In **Alternative S3**, minor emphasis is put on conducting Subbasin Review and Ecosystem Analysis at the Watershed Scale (EAWS) prior to conducting manage-

ment activities. Management activities are linked to areas where they can benefit isolated communities that are economically specialized in industries tied to goods and services from Forest Service- and BLM-administered lands.

Under both Alternatives, restoration activities are planned and conducted across the project area to effectively and efficiently address the long-term risks associated with disturbance events. Restoration in certain areas is prioritized based on: areas that have high risk to terrestrial and aquatic habitats of unnaturally severe disturbance and high or moderate opportunity to address those risks (for example through the ability to connect and expand scarce aquatic and terrestrial habitats) (see Maps 3-8, 3-9). In addition, some of these areas are near isolated and economically specialized communities, and therefore have opportunity to provide economic value to human communities.

In addition to promoting the broad-scale restoration and maintenance of ecosystems, conservative direction is also provided to further promote the protection of specific watersheds containing important terrestrial wildlife source habitats (see Map 3-10) and specific subwatersheds containing important fish populations (see Maps 3-11 and 3-12). These are the habitats that have declined the most (in geographic extent) from historical to current periods, and therefore, they are in short supply. Management is designed to conserve these habitats by avoiding short-term risks to them, while expanding them elsewhere through restoration actions.

Design/Architecture of Alternatives S2 and S3

Management direction in Alternatives S2 and S3 is hierarchical in that some types of direction take precedence over others. ICBEMP direction may be basin-wide (applies to all Forest Service- and BLM-administered lands in the project area), geographic (applies to certain mapped or described areas), or conditional (applies wherever particular conditions are found).

The design or architecture of Alternatives S2 and S3 include four main elements:

- ♦ *Integrated management direction* includes base level, restoration, and geographically specific direction, which addresses landscape dynamics, terrestrial source habitats, aquatic species and riparian and hydrologic processes; and social-economics and tribal governments;



Map 3-8. Alternative S2: Broad-scale High Restoration Priority Subbasins.



Map 3-9. Alternative S3: Broad-scale High Restoration Priority Subbasins.



Map 3-10. Terrestrial (T) Watersheds, Alternatives S2 and S3.



Map 3-II. Aquatic A1 and A2 Subwatersheds, Alternative S2.



Map 3-12. Aquatic A1 and A2 Subwatersheds, Alternative S2.

- ♦ A *step-down process* to bring broad-scale management direction and scientific findings to national forests and BLM districts;
- ♦ *Adaptive management*, which allows modification of management direction to incorporate new knowledge and understandings; and
- ♦ *Monitoring and evaluation* to ensure management activities are achieving desired results.

Integrated Management Direction

The management direction in Alternatives S2 and S3 is designed to address four major broad-scale ecosystem components: landscape dynamics; terrestrial source habitats; aquatic species and riparian and hydrologic processes; and social-economic-tribal considerations. The direction is organized to integrate the interconnections among these components. The intent of the management direction—which includes objectives, standards, and guidelines—is summarized below. Where differences exist between the two action alternatives, those differences are discussed.

Landscape Dynamics

The landscape dynamics component of the integrated ecosystem management strategy was developed to maintain ecosystems that are in good condition, and to restore ecosystems that are degraded on Forest Service- and BLM-administered lands. The intent of management direction for **landscape dynamics** is to maintain or, if necessary, restore the health, productivity, and diversity of native fish, wildlife, and plants; maintain or improve water quality; sustain stream flows; and maintain and/or enhance the resiliency of forests and rangelands to fires, disease, and other disturbances. This direction provides the foundation for managing long-term risk to fish, wildlife, and plant species and habitats, and social-economic needs (including tribal rights and interests). It provides the thread that connects and integrates the individual components. Management direction for landscape dynamics can be found in the base level, restoration, and terrestrial T watershed sections; however, direction for aquatic A1 and A2 subwatersheds also contributes to the maintenance and restoration of landscape dynamics.

One intent of managing native plant communities is to slow the rapid spread of **noxious weeds** using an integrated weed management strategy. Another intent is to protect and enhance vegetation types that are in short supply and are important to wildlife, such as **old forests**.

Management direction for fire and roads is included as part of landscape dynamics. The intent of direction for **fire management** is to improve vegetation conditions and reduce the threat of severe wildfire through the use of prescribed fire. Coordinating fire management with adjacent landowners is intended to increase the resiliency of forests and rangelands to severe wildfires while also reducing the negative air quality impacts that are associated with severe wildfires.

The overarching intent for **roads management** within the ICBEMP is to progress toward a smaller transportation system that provides public access, reduces road-related adverse effects, and can be maintained in the long term with minimal environmental impact. Roads that are no longer needed will be closed or obliterated and ecological values restored. Roads that are needed for land management, public access, and tribal rights are intended to be safe, promote efficient travel, and be improved as needed. New road construction will be reduced from past levels. The focus of road restoration is intended to occur where reduction of adverse effects and benefits to resources can be maximized—for example, along valley bottoms and main river corridors where species are negatively affected by human disturbance and habitat degradation associated with roads.

When comparing landscape dynamics management direction under Alternatives S2 and S3, **Alternative S3** places a greater emphasis on conducting more immediate actions to address long-term risks to resources from unnaturally severe disturbance. Terrestrial Source Habitat

The terrestrial component of the integrated ecosystem management strategy was developed to consider and provide habitat for productive and diverse populations and communities of plant and animal species; provide habitat capable of supporting harvestable resources; and provide for terrestrial habitats on Forest Service- and BLM-administered lands. The focus of the **terrestrial source habitat** direction is to change declining trends in terrestrial habitats by maintaining important vegetation characteristics (such as plant species composition, forest and rangeland vegetation structure, snags, and coarse woody debris) which various terrestrial species need to survive and reproduce. Management direction for terrestrial source habitat can be found in the base level, restoration, and terrestrial T watersheds sections.

Terrestrial T watersheds (see Map 3-10) were identified because they contain source habitat for one or more of five “Families” of terrestrial species.

Terrestrial species in these Families in general represent those for which source habitats have declined the most from historical to current periods in the project area. In addition, the pattern of source habitats within these watersheds is most similar to that historically found. Terrestrial T watersheds are an important, but not the only, component of the terrestrial habitat strategy. In the short term, the intent of managing source habitats, especially in T watersheds, is to conserve habitats with old-forest characteristics and those that have shown the greatest decline in geographic extent from what they were historically and therefore are in short supply. In the long term, the overall intent is to increase the geographic extent and connectivity of these same habitats, and to have a sustainable mix and pattern of habitats, which should contribute to the long-term persistence of terrestrial species.

Aquatic Species and Riparian and Hydrologic Processes

The aquatic/riparian/hydrologic component of the integrated ecosystem management strategy was developed to maintain and restore the health of watersheds and aquatic ecosystems on Forest Service and BLM-administered lands. It focuses on maintaining and restoring watershed conditions, water quality, and aquatic and riparian habitat by replacing interim strategies (PACFISH and INFISH), and addressing long-term aquatic species viability, short- and long-term risks to these resources from management activities, and long-term risks from uncharacteristically severe natural disturbances. Geographically specific areas, such as riparian conservation areas (RCAs), aquatic A1 subwatersheds, and aquatic A2 subwatersheds, (see Maps 3-11 and 3-12) are important components of the aquatic strategy. Management direction for aquatic/riparian/hydrologic resources can be found in the base level, restoration, and aquatic A1 and A2 subwatersheds sections. In addition, management direction for landscape dynamics and terrestrial source habitats is intended to enhance aquatic/riparian/hydrologic resources.

RCAs, A1 subwatersheds, and A2 subwatersheds were identified because of their importance to fish, riparian-dependent species, water quality, and other aquatic, riparian, or hydrologic resources. The management intent in these areas is to protect these resources in the short term and improve them in the long term. Protection and enhancement of these areas is intended to contribute to a network of connected aquatic/riparian habitats and enhance the long-term persistence of aquatic and riparian-dependent species.

When comparing aquatic management direction in Alternatives S2 and S3, **Alternative S3** has fewer acres that are delineated as aquatic A1 and A2 subwatersheds and riparian conservation areas (RCAs).

Socio-economic and Tribal Considerations

The social-economic-tribal component of the integrated ecosystem management strategy was developed to support the economic and social needs of people, cultures, and communities of the interior Columbia Basin, and to provide for sustainable levels of **products and services** from lands administered by the Forest Service and BLM within the capabilities of the ecosystem. It focuses on producing products and services from public lands to encourage and support people's use of public land resources within the capacity of ecosystems to provide sustainable levels of products and services, consistent with other ecological and restoration goals. Another intent is to support **economic activity** for local and tribal communities, particularly those that are isolated and economically specialized, which will help maintain their viability as they move toward achieving their long-range goals of economic development and broader economic diversification. Management direction that specifically addresses this component can be found in base level and restoration sections.

The socio-economic and tribal direction promotes agency support for, and collaboration with, local communities and tribal governments when developing methods to support their **social and economic needs**. Another intent is to integrate the needs of local and tribal communities more thoroughly into agency decision-making and management activities.

The **social-economic-tribal** restoration direction highlights areas where restoration activities have a direct influence on human community economic, social, and cultural needs. This direction is linked to restoration direction provided in the landscape dynamics, terrestrial, and aquatic/riparian/hydrologic sections; it relates to considerations for designing and implementing restoration activities that are intended to promote workforce participation, serve demands for commodity products at various levels, encourage intergovernmental collaboration, and consider tribal needs and interests.

The intent of management direction for **federal trust responsibility and tribal rights and interests** is to address as fully as possible tribal concerns and interests and to reflect consideration of federal legal

responsibilities both to tribes and American Indian people as expressed through treaty language, federal laws, executive orders, and federal court judgements.

When comparing socio-economic management direction in Alternatives S2 and S3, **Alternative S3** promotes the economic participation of the local workforce in management activities by prioritizing more restoration areas near communities that are less economically diverse, more economically specialized, and near tribal communities.

Step-down

Step-down is the process of applying broad-scale science ICBEMP findings and management direction to site-specific activities on national forests and BLM districts.

Four levels of analysis make up this step-down process:

- ◆ Subregional analysis (BLM resource management plans or Forest Service land and resource management plans);
- ◆ Mid-scale analysis (Subbasin Review);
- ◆ Fine-scale analysis (Ecosystem Analysis at the Watershed Scale);
- ◆ Site-specific NEPA analysis (environmental analysis or environmental impact statement).

The Supplemental Draft EIS proposes direction for mid-scale analysis (Subbasin Review) and fine-scale analysis (Ecosystem Analysis at the Watershed Scale). Forest Service and BLM direction already exist for the development of resource management plans and site-specific NEPA analysis.

The intent of conducting these analyses in this step-down manner is to reduce overall short-term and long-term risks to resources from human and natural disturbances, while maximizing conservation and restoration opportunities. For example, broad-scale or regional resource risks are addressed through the Supplemental Draft EIS, subregional resource risks are addressed through land use plans, mid-scale or landscape resource risks through Subbasin Review and/or EAWS, and site-specific resource risks through site-specific NEPA analysis.

In **Alternative S2**, there is greater emphasis on conducting analyses (Subbasin Review and EAWS) prior to conducting management activities in certain

areas, which is intended to minimize the short-term risks posed by the activities and to assist in determining the most appropriate location and sequence of activities. In **Alternative S3**, there is less of an emphasis to complete EAWS prior to conducting management activities. Instead, the intent is to prioritize and schedule EAWS and any other necessary analysis during Subbasin Review.

Adaptive Management

The intent of adaptive management is to incorporate and build on current knowledge, observation, experimentation, and experience to adjust management methods and policies, and to accelerate learning. The intent is for management direction to be modified if a site-specific situation is different than what was assumed during ICBEMP planning; if a flood, fire, or other event changes the characteristics of the environment; if new information gathered through monitoring indicates objectives are not being met; or if new science information indicates a need for change. Accelerated learning is intended to occur from formal research designed to test hypotheses of scientifically uncertain and/or controversial management issues, or to use field trials to test the usefulness of new strategies to achieve objectives.

Monitoring and Evaluation

Monitoring and evaluation are an integral part of adaptive management and are key to achieving the short- and long-term goals and objectives of the ICBEMP. Success in meeting ICBEMP goals and objectives requires that the effects of this outcome-based direction be monitored and evaluated in a timely manner to determine if modifications are needed.

The monitoring and evaluation process is intended to:

- ◆ Focus on ICBEMP goals and objectives to guide key elements to monitor;
- ◆ Be developed collaboratively using an intergovernmental, interdisciplinary team;
- ◆ Address linkages and relationships among scales in the project area;
- ◆ Be based on scientific understandings of interactions among ecosystem components and human activities; and
- ◆ Be technically feasible, affordable, and operationally attainable.

Selection of the Preferred Alternative

The preferred alternative identified by the Regional Executive Steering Committee as “preferred” among all those considered (this includes the seven alternatives presented in the Eastside and Upper Columbia River Basin Draft EISs and the three alternatives presented in the ICBEMP Supplemental Draft EIS) is Alternative S2. The preferred alternative identified in this Supplemental Draft EIS replaces the preferred alternative identified in the Draft EISs (Alternative 4). The changes in the Supplemental Draft EIS and in the preferred alternative were influenced by the 83,000 comments received on these Draft EISs, new scientific information, and feedback from the land management agencies, intergovernmental and interagency partners, and the Congress.

Alternative S2 was identified as the preferred alternative because the Executive Steering Committee agreed that it would provide the strongest and best strategy for: restoring the health of the forests, rangelands, and aquatic-riparian ecosystems in the project area; recovering plant and animal (including fish) species; avoiding future species listings; and providing a predictable level of goods and services from the lands administered by the BLM and the Forest Service.

In coming to this conclusion, the regional executives considered the effects of the alternatives and other factors including:

- ♦ meets the purpose and need statement for the project,
- ♦ consistency with Endangered Species Act requirements and recovery plans,
- ♦ includes a strategy that is intended to preclude further listings of species,
- ♦ addresses agencies’ tribal treaty and trust responsibilities,
- ♦ implementable at reasonably foreseeable funding levels,
- ♦ consistent with and founded on science,
- ♦ provides for implementation accountability,
- ♦ provides for implementation clarity such that management actions will result in the predicted and desired outcomes,

- ♦ degree of likelihood of broad public support for implementation, and
- ♦ meets the intent of applicable federal and state laws.

In the Final EIS and Record of Decision (ROD), the decision makers may modify the preferred alternative, incorporate elements of the various alternatives analyzed in the Draft EIS and Supplemental Draft EISs, or even select a different alternative as the preferred alternative. Before issuing the Final EIS and ROD, the Regional Executives will consider additional analysis of, and changes to, the preferred alternative. The option of incorporating elements of the no-action alternative (Alternative S1) is particularly relevant to the transition from current direction of PACFISH, INFISH, and the Biological Opinions to a long-term management strategy. The effectiveness of Alternative S2 depends on an implementation strategy that uses the existing Federal Land Policy and Management Act and National Forest Management Act planning process and National Environmental Policy Act decision-making process to translate objectives and standards on an ecosystem scale into watershed- and site-specific criteria that local managers can apply when designing particular projects and activities. This implementation strategy is supported by step-down processes, such as Subbasin Review and Ecosystem Analysis at the Watershed Scale.

This transition phase begins when the ROD is signed. This period will vary for different elements of direction and different subbasins and watersheds. While some elements of Alternative S1 are already contained in Alternative S2, particularly as interim and default standards, the decision makers may consider retaining additional elements of Alternative S1 for the transition phase. Prior to issuance of the ROD, additional work will be done on this transition strategy to determine whether and how elements of Alternative S1 should be carried forward in the transition phase for the preferred alternative.

The final transition strategy is not expected to result in effects that fall outside the range of effects described for the alternatives in this Supplemental Draft EIS. Indeed, the Regional Executives have agreed that the purpose of this additional work is to clarify and focus the preferred alternative to ensure that the effects of the transition strategy, upon implementation, are consistent with the effects described herein. Comment on this topic is encouraged.

Environmental Consequences

The following section summarizes the key effects of the alternatives on various elements of the ecosystem.

Physical Setting

Over the long term, Alternative S2 would better maintain and restore soil productivity, hydrologic functions, and watershed processes than Alternative S3, followed by Alternative S1. Alternative S2 would also maintain riparian ecological functions better than Alternatives S3 and S1. Alternative S1 would have greater total impact on air quality because of smoke from large wildfires. Prescribed fire activity under Alternatives S2 and S3 would generate more frequent but lesser amounts of smoke in the short term and would have lower total air quality impact in both the long and the short term than Alternative S1.

Soil Functions and Processes, Including Soil Productivity

- ◆ The majority of Forest Service- and BLM-administered lands would be in the low and very low soil disturbance category for all alternatives over the next 100 years. No decreases in long-term soil productivity would result from implementing any of the alternatives.
- ◆ Activities in the high restoration priority subbasins for Alternatives S2 and S3 are predicted to cause a slight change of land from none, very low, or low soil disturbance to moderate levels. These increases would not result in decreases to long-term soil productivity because restoration activities are designed to resemble soil disturbance effects that would be expected under natural disturbance processes.
- ◆ In the high restoration priority subbasins, reductions in negative effects from uncharacteristic wildfire and livestock grazing would provide benefits to soil productivity over the next 100 years.
- ◆ Snags and large downed wood are key components in maintaining and restoring soil functions and providing for soil productivity over the long term. Alternative S2 places the most emphasis on increasing snags for the long term. The amount of

large downed wood is currently above historical levels on most forested lands and would increase under all alternatives. Alternative S2 is predicted to be slightly more effective than Alternatives S3 and S1 in using prescribed fire to manage for desirable concentrations of large downed wood.

- ◆ Over the next 100 years Alternative S2 would provide more maintenance and restoration of soil productivity than either Alternative S3 or Alternative S1 because of its reduced rate of departure from the historical range of variability (HRV).
- ◆ Predicted decreases in road-related adverse effects would be beneficial for the long-term recovery of soil productivity by re-establishing soil functions and processes. Benefits to soil productivity would be highest under the intensive restoration emphasis of Alternative S2, followed by Alternative S3 then Alternative S1.

Hydrology and Watershed Processes

- ◆ Alternative S2 would maintain or slightly restore hydrologic functions and watershed processes better than Alternative S3 as a result of activities to decrease the rate of HRV departure. Activities in Alternative S1 are not expected to decrease the rate of HRV departure; therefore, trends for hydrologic function and watershed processes are predicted to gradually decline over the long term.
- ◆ Alternative S2 would reduce adverse effects from uncharacteristic wildfire, slightly better than Alternative S3, and would provide higher protection and maintenance of hydrologic function and watershed processes. The management approach to wildfire in Alternative S1 would do little to protect and maintain hydrologic function and watershed processes.
- ◆ Changes in vegetation (for example, plant species changes, and changes from grasses to shrubs) and soils (for example, soil surface characteristics) caused by livestock grazing would trend back toward historical conditions the strongest in Alternative S2. The trend would be slightly less strong in Alternative S3. These trends would lead to increased maintenance and restoration of hydrologic function and watershed processes. With regard to effects from livestock grazing, Alternative S1 would not provide the same level of improvements to hydrologic function and watershed processes compared to Alternatives S2 and S3.

- ◆ Road density trends for Alternative S1 are estimated to remain static in the long term. The restoration emphasis of Alternatives S2 and S3 would result in fewer roads than Alternative S1. Decreases in adverse road effects with short- and long-term benefits to hydrologic function and watershed processes would be highest for Alternative S2, then Alternative S3 and Alternative S1, respectively.
- ◆ Higher levels of landscape restoration would occur in the high restoration priority subbasins in Alternatives S2 and S3. Activities would contribute to the restoration of integrated ecological processes. Activities such as those planned under the restoration strategy in Alternatives S2 and S3 are more likely to be successful in protection, maintenance, and restoration of watershed processes at the broad scale as compared to Alternative S1.
- ◆ Alternative S2 would maintain riparian ecological processes through time and would contribute most to protecting, maintaining, or restoring watershed processes and hydrologic function, more so than Alternatives S3 and S1.
- ◆ The higher rate and frequency of hierarchical step-down analysis under Alternatives S2 would be more likely than Alternatives S3 and S1 to protect and restore hydrologic function and watershed processes, using an integrated landscape approach.

Air Quality

- ◆ The dispersion modeling assessment indicates that there may be significantly greater impacts on the National Ambient Air Quality Standards (NAAQS) from wildfires than from prescribed burning.
- ◆ Modeling of emissions from prescribed burning suggests that at a coarse scale (20 km and 4 km grids) NAAQS would not be violated (averaged across the 20 km grid). However, compliance with the NAAQS at a local level must be evaluated at subsequent planning levels to assure they are not violated.
- ◆ Increased short-term haziness (a reduction in viewing distance and ability to detect finer features on the landscape) would likely result from the increased use of prescribed burning in Alternatives S2 and S3. It can be inferred that because of higher concentrations of emissions associated with wildfires, the magnitude of visibility impairment from wildfires would be

greater than the highest levels of prescribed fire used in Alternatives S2 and S3. However, a higher frequency of lower visibility impacts can be expected from prescribed fire than wildfire.

- ◆ Other criteria pollutants produced from prescribed fire are not likely to have an impact on public health because of the small levels produced, distances to populated areas, and the rapid dilution or modification of these substances within relatively short time frames.
- ◆ Alternatives S2 and S3 would allow an opportunity to reduce fuel accumulations across the landscape and lessen the impacts from wildfire. An analogy would be that prescribed fire acts as a “pressure relief valve” for wildfire.

Terrestrial (Upland) Vegetation

It has taken more than a hundred years to reach the present condition of the terrestrial uplands characterized by increasingly larger and more severe wildfire, increased invasion of noxious weeds, more insect and disease problems, and changes in the mix of vegetation types on the landscape that once provided for a balance of wildlife species that use them. Although these changes came on slowly at first, the movement away from historical succession and disturbance regimes increased over time; currently the movement away from historical regimes is proceeding rapidly with a great momentum.

Because it took a long time to reach this condition, remedies will not be easy, inexpensive, or quickly achieved. In general there is little difference among the long-term effects of the Supplemental Draft EIS alternatives at the basin-wide scale. On BLM- and Forest Service-administered lands alone, the differences among alternatives are generally still small. When restoration activities are concentrated into high restoration priority subbasins, then Alternative S2 emerges as the most effective alternative, followed by Alternative S3 and lastly, Alternative S1. However, even in the high restoration priority subbasins there is a considerable time lag involved in moving vegetation closer to historical conditions. To further complicate the situation, the drier parts of the project area seem to take even longer to restore because the vegetation responds more slowly and the methodology is less refined in more arid ecosystems. Higher amounts of restoration activities applied to forest and rangelands alike would be expected to result in greater differences between Alternatives S2 and S3 and Alternative S1.

Succession/Disturbance

- ♦ Alternative S2 is expected to do a better job of repatterning vegetation on the landscape to provide a proper mix of habitats and so that vegetation would be resilient to disturbance and sustainable in the long term.
- ♦ Effects from uncharacteristic wildfire are expected to increase slightly under Alternative S1 and decrease in Alternatives S2 and S3, with Alternative S2 slightly better on Forest Service- and BLM-administered lands in the long term.
- ♦ Uncharacteristic insect and disease effects are expected to remain near current levels on Forest Service- and BLM-administered lands in the long term. Alternative S2 should be slightly better than Alternative S1 and Alternative S3 would likely be in between.
- ♦ The higher concentration of restoration activities in high restoration priority subbasins is expected to lead to a more healthy landscape in those areas under Alternatives S2 and S3.

Vegetation Composition and Structure

- ♦ Alternative S2 is expected to increase the extent of old forests to near historical levels, slightly more than Alternative S3, followed by Alternative S1 on Forest Service- and BLM-administered lands in the long term.
- ♦ Alternative S2 is expected to increase the extent of old forests in the single story structural stage more than Alternative S3. Both are expected to fall short of historical levels. Alternative S1 would also increase the extent but fall far short of historical on Forest Service- and BLM-administered lands in the long term.
- ♦ All alternatives are expected to increase extent of ponderosa pine. Alternatives S2 and S3 would increase extent to near historical levels, while Alternative S1 would result in above historical levels (go too far). Alternatives S2 and S3 would do a better job of increasing the vegetation types that have declined substantially from historical to current periods within this cover type.
- ♦ Alternatives S2 and S3 are expected to increase the extent of western white pine to slightly below historical levels. Alternative S1 would result in levels lower than Alternatives S2 and S3.
- ♦ All alternatives are expected to increase the extent of whitebark pine, but none would be able to

prevent the future decline of the late seral single story structure.

- ♦ Over the long term, all three alternatives are projected to reverse the major vegetation changes within the woodland and cool shrub potential vegetation groups (that is, woody species encroachment and increasing density in shrublands and/or herblands) on BLM- and Forest Service-administered lands. Reversal would be more pronounced in Alternatives S2 and S3 than in Alternative S1.
- ♦ Vegetation types that have declined substantially in geographic extent from historical to current periods in the project area (for example, mountain big sagebrush, fescue-bunchgrass, and wheatgrass bunchgrass) would increase in the woodland and cool shrub potential vegetation groups as a result of the reversal in trend for encroachment of woody species.
- ♦ The rate of expansion of noxious weeds and other exotic undesirable plants on BLM- and Forest Service-administered lands in the project area as a whole would be slowed in Alternatives S2 and S3 more so than in Alternative S1. However, for all alternatives the extent of noxious weeds and other exotic undesirable plants would continue to increase.
- ♦ The wheatgrass bunchgrass and fescue-bunchgrass vegetation types within the dry grass potential vegetation group, and the big sagebrush vegetation type within the dry shrub potential vegetation group, all of which have declined substantially in geographic extent from historical to current periods, would continue to decline and trend away from historical amounts.

Terrestrial Species

In general, Alternative S2 would result in better conditions for terrestrial vertebrates on BLM- and Forest Service-administered lands than Alternative S3, followed by Alternative S1. Differences among alternatives would be smaller when looking at all lands because of the higher proportion of human effects on private ownerships. Relative to the differences among alternatives, most of the species in the following groups would see improved conditions compared to current conditions: old-forest species, riparian species, and species that use habitats that have declined substantially in geographic extent from historical to current periods. Conditions for rangeland species are expected to be stable or declining because of a lack of restoration technology and available resources for

active restoration. Within high restoration priority subbasins, the differences among alternatives would be greater. In the long term, passive management would have adverse effects on some terrestrial species. Because the land area within the project area is finite, management actions to benefit one species could harm another.

Plants

- ♦ Plant species in all major plant groups would remain stable in their likelihood of persistence under Alternatives S2 and S3 relative to current conditions. In contrast, plant species in all major plant groups would have a reduced likelihood of persistence under Alternative S1 relative to current conditions.
- ♦ All alternatives would promote development and maintenance of biological crusts. Alternatives S2 and S3 would provide more restoration focus on biological crusts than Alternative S1.

Terrestrial Invertebrates

- ♦ Alternatives S2 and S3 should provide more general benefits to invertebrates than would Alternative S1.

Broad-scale Terrestrial Vertebrates

- ♦ Generally, for broad-scale terrestrial vertebrates, there are not substantial differences among the alternatives.
- ♦ Habitat for terrestrial species dependent on old-forest conditions would generally increase from current levels under all alternatives, sometimes approaching historical levels.
- ♦ Habitat for terrestrial species that use multiple vegetation types would generally remain stable at current levels under all alternatives.
- ♦ Habitat for terrestrial species dependent on shrublands or grasslands would generally decrease from current levels under all alternatives.
- ♦ Habitat conditions among species would generally be better on Forest Service- or BLM-administered lands compared to all lands under all alternatives.

Terrestrial Riparian and Wetland Species

- ♦ For riparian- or wetland-dependent terrestrial vertebrates, Alternative S2 would provide general improved results compared to Alternatives S3, which would have slightly improved results compared to Alternative S1.

Special Status Terrestrial Species

- ♦ Management of ecosystems is more effective at maintaining a diverse array of species compared to management for single species. For example, most vertebrate Terrestrial Families have at least one species with reduced habitat capability, so an action to benefit one species could adversely affect another species.
- ♦ Broad-scale threatened and endangered species (woodland caribou, gray wolf, and grizzly bear) would trend toward recovery within recovery areas, but basin-wide conditions would remain greatly reduced from historical for gray wolf and grizzly bear.
- ♦ Generally, passive management would have adverse effects on species in a variety of environments. A high degree of departure of vegetation from historical range of variability (HRV) was judged to be adverse for many species. The number of acres with a high level of HRV departure would increase considerably more in wilderness and wilderness-like areas than elsewhere.

Aquatic–Riparian–Hydrologic Component

The largest increase in aquatic habitat capacity would come from Alternative S2, followed by Alternative S1 and then Alternative S3. Alternative S2 would maintain or improve riparian ecological processes, while Alternative S1 would likely maintain them and Alternative S3 would contain more uncertainty. Water quality effects can be thought of as indicators of the upland physical and biological processes. For example, high water quality generally suggests that these processes are on an improving trend, characteristic of historical succession and disturbance regimes. Aquatic habitat on BLM- and Forest Service-administered lands is vital to native fish populations, but other factors

are also important, such as effects from harvest, dams that restrict fish migrations, non-native aquatic species, and human activities and habitat conditions on private lands.

Aquatic and Riparian Habitats

- ♦ All three alternatives are projected to improve aquatic habitat conditions on BLM- and Forest Service-administered lands compared to projections of current conditions over the long term. The largest increase in aquatic habitat capacity would occur under Alternative S2 and the smallest increase under Alternative S3.
- ♦ Alternative S2 would maintain and improve riparian ecological processes through time, based on the interim RCA delineation criteria. Some uncertainty is associated with the other two alternatives, where one-half site potential tree height is used as an interim RCA delineation criterion.

Water Quality

- ♦ In the long term (100 years) all three alternatives are predicted to improve water quality conditions on BLM- and Forest Service-administered lands compared to current conditions.
- ♦ Alternative S2 is predicted to have the most positive influence on water quality, while Alternative S3 is predicted to result in the least improvement.

Aquatic Species

- ♦ All alternatives are expected to result in improved population status and habitat capacity for the six key salmonids over the long term. Predicted changes in population status reflect less improvement than does habitat capacity because of other biological constraints on a population's response (for example, exotic species and migratory corridor survival) and uncertainty in the analysis. Overall, Alternative S2 is expected to result in the most improvement for these six species. Alternative S3 is expected to result in the least improvement when compared to the other two alternatives.
- ♦ Other factors beyond Forest Service or BLM management authority may limit the response of aquatic species to habitat conservation and restoration on federal lands. These factors

include condition of non-federal habitat and non-native fish species. It is assumed that habitat conditions on non-federal lands would remain stable or would slightly improve over the long term.

- ♦ Although stream-type chinook and steelhead habitat capacity would substantially improve under all alternatives, population status outcomes reflect minor or no improvement. Population status outcomes reflect the assumptions regarding biological constraints which influence survival throughout their life cycle. The greatest uncertainty is associated with migration corridor survival, especially for populations above several dams in the Snake River and Upper Columbia River. Management of habitat on Forest Service- and BLM-administered lands is expected to play a major but not exclusive role in the future status of the species. Rehabilitation of depressed populations above several dams cannot be accomplished via federal habitat improvement alone but will require improvements in migration corridor survival and efforts to address causes of mortality in other life stages. However, securing and restoring federal freshwater habitat may be critical to the short-term persistence of many anadromous populations. Trends in improving strong status and habitat associated with Alternative S2 were slightly greater than those in Alternatives S1 and S3; thus, Alternative S2 is expected to result in more favorable conditions supporting the persistence of anadromous fish.

Social–Economic–Tribal Component

The effects analysis on biophysical resources differs from the socio-economic effects analysis in that most of the biophysical analysis focuses on the long term (100 years) while the socio-economic analysis is more concerned with the short term (10 years). It is clear that the first priority of Alternatives S2 and S3 is restoration of ecosystems and watersheds. However, along with ecological benefits, restoration activities also make an important human contribution through generating employment and economic activities. Overall, Alternative S2 would be best for tribal rights and interests, with Alternative S3 next and Alternative S1 last.

In the first decade, within the project area, livestock grazing on BLM- and Forest Service-administered lands and the number of related jobs could decline most under Alternative S2, followed by Alternative S3, as a result of rangeland management objectives. Conversely, first-decade increases in timber volume, forest and rangeland restora-

tion activities, and related jobs are expected to be slightly higher under Alternative S2 than Alternative S3. Alternative S1 is expected to hold livestock grazing, timber volumes, restoration, and jobs related to federal land outputs, at near current levels. No broad-scale changes are predicted for levels of recreation and related jobs. In general, economic and social effects at the broad scale would be small. However, this may not be true for geographically isolated communities whose economies are specialized in sectors that depend on outputs from federal lands. In these places, adverse economic and social effects would likely be more pronounced if the levels of outputs and activities from BLM- and Forest Service-administered lands decline.

Social and Economic Considerations

Products and Services

- ♦ Timber harvest levels in the first decade are projected to increase at both the basin level and by all RAC/PACs as the consequence of implementation of either Alternative S2 or Alternative S3, compared to Alternative S1. Estimated increases would be just over 21 percent for Alternative S2 and just under 21 percent for Alternative S3. Harvest level increases would come primarily from commercial thinning and other harvest activity designed to promote ecosystem and forest stand restoration (stewardship harvest). While harvest levels would increase in Alternatives S2 and S3, the size and quality of logs produced would decrease because of the stand restoration objectives guiding the thinning and harvest activities. Thus, there is uncertainty about the actual commercial marketability of the volume of wood that is projected for harvest.
- ♦ Model projections indicate domestic livestock use of forage, as measured by Animal Unit Months (AUMs), could decline, both basin-wide and by all RAC/PACs (with one minor exception), in the first decade under either Alternative S2 or Alternative S3, compared to Alternative S1. The estimated decreases would be 10 percent for Alternative S2 and 11 percent for Alternative S3. Reductions in AUMs could result indirectly from objectives and standards to be implemented for watershed and rangeland protection and restoration, as well as directly from the continued historical trend of contraction of the livestock industry in the basin from other social, cultural and economic factors.
- ♦ Forest/woodland restoration activity (pre-commercial thinning and planting), measured in

acres treated, would increase substantially in the first decade, by 40 percent for Alternative S2 and 36 percent for Alternative S3, compared to Alternative S1. There would be a modest increase in rangeland restoration and maintenance: nine percent for Alternative S2 and four percent for Alternative S3. With the focus on reducing forest and range susceptibility to uncharacteristic wildfire, and wildfire threats to the urban-rural-wildland interface, there would be large increases in acres treated by prescribed fire and fuels management in the first decade compared to Alternative S1: seven-fold for Alternative S2 and five-fold for Alternative S3.

Jobs and Employment

- ♦ Given the broad scale and refined focus of this analysis, there are no projections for changes in recreation use among the alternatives. Therefore, there are no expected changes in recreation-related employment among alternatives.
- ♦ Impacts on total basin-wide employment would be negligible—an increase of less than three-tenths of one percent of jobs in the first decade. However, local impacts, both positive and negative, could be much more significant, particularly for rural and tribal communities that are isolated and economically specialized in economic sectors dependent on goods and services from Forest Service- and BLM-administered lands.
- ♦ Average annual direct employment associated with Forest Service- and BLM-administered lands would increase by about 3,900 jobs for Alternative S2 and by a little over 3,100 jobs for Alternative S3, compared to Alternative S1. About 35 to 40 percent of the increase would be associated with stewardship timber harvest, and 60 to 65 percent associated with prescribed fire and fuels management. An increase of about 100 jobs per year in forest and rangeland restoration jobs would be matched by a possible decrease in grazing-related jobs.

Communities

- ♦ Specific effects of the alternatives on local communities or other areas smaller than the RAC/PACs (county, subbasin, community) cannot be measured directly because of the broad-scale nature of this analysis. However, it is likely that isolated and economically specialized communities would be more affected by changes in output

and activity levels than communities that are not isolated or economically specialized. And it is likely that, where projected changes within a RAC/PAC are larger, those communities in counties with higher socio-economic resiliency would likely tend to manage change more readily than similar communities in counties where socio-economic resiliency is low.

- ◆ Under the action alternatives, restoration activity in the first decade would be focused on high restoration priority subbasins (which include a component that is responsive to community economic need). Within those subbasins, activities would be first concentrated as near as possible to those isolated and economically specialized communities that are in greatest need of economic stimulus. Alternative S2 would have more acres of restoration and prescribed fire/fuels management work scheduled per year than would Alternative S3. In addition, the work in Alternative S2 would initially be concentrated in 40 high restoration priority subbasins, compared to 51 high restoration priority subbasins in Alternative S3. Therefore, it is expected that the direct community effects in high restoration priority subbasins would be less under Alternative S3 than under Alternative S2 because fewer acres would be treated across a larger area.
- ◆ Each of the three alternatives has a certain degree of uncertainty and unpredictability associated with it. The non-traditional broad-scale outcome-based objectives and standards in Alternatives S2 and S3—designed to achieve restoration and maintenance of sustainable ecosystems—have not been operationally tested at this scale before. Therefore, there is uncertainty about the levels of goods and services (timber harvest and grazing) that are projected, as well as the effectiveness of the proposed restoration activities in achieving the desired results. On the other hand, Alternative S1, with its continuation of varying management direction across the basin, and no systematic requirements for hierarchical ecosystem analysis (Subbasin Review or EAWS), also faces uncertainty in implementation. There would continue to be project-by-project and area-by-area consultation and mitigation requirements for protection of species listed under the Endangered Species Act (ESA), without broader scale context. Thus, for Alternative S1, the individual mitigation requirements may be more varied, and more restrictive in total, than the management direction, A1/A2/T habitat designations, and restoration focus of Alternatives S2 and S3.

Federal Trust Responsibility and Tribal Rights and Interests

- ◆ Generally, Alternatives S2 and S3 would provide the best approach to appropriate government-to-government consultation because of more consistent and effective consultation direction.
- ◆ Both Alternatives S2 and S3 would provide more opportunities for tribal involvement in both planning and decision-making processes than Alternative S1. Alternative S2, with more extensive requirements for analysis at finer scales, would provide increased opportunities for tribal involvement in planning processes over Alternative S3. While Alternative S3's increased emphasis on restoration actions near reservations and tribal communities may provide for greater consultation opportunities in project decision-making, the difference is negligible since Alternative S2 would have more restorative actions overall. Therefore, Alternative S2 would likely provide more opportunities for tribal consultation and involvement than Alternatives S1 or S3.
- ◆ Alternative S2 appears to be most responsive to honoring the federal trust responsibility and consideration of tribal rights and interests because it would provide more upfront direction (processes and prescriptions) and therefore better certainty to tribes of consistent and accountable implementation.
- ◆ Alternatives S2 and S3 both would respond better than Alternative S1 to protection and/or restoration of identified species of interest to tribes, with Alternative S2 being somewhat more responsive than Alternative S3.
- ◆ Alternatives S2 and S3, because of their broad-scale landscape, terrestrial, aquatic, economic, and restoration strategies, appear most responsive to the restoration of ecological processes as well as consideration of tribal resource concerns. Alternative S3 would provide a better response than Alternative 2 to some social and economic concerns by emphasizing more high restoration priority subbasins that are also high priority tribal restoration subbasins. However, Alternative S2, with a higher rate and intensity of restoration and more analysis to target restoration at lower scales, is predicted to be more responsive than Alternative S1 and somewhat more responsive than Alternative S3 in addressing most social and biophysical concerns.

Glossary

A1/A2 subwatershed — As defined in this EIS, refers to one of the components of the aquatic-riparian-hydrologic strategy. These areas provide a system of core subwatersheds that are the anchor for recovery and viability of widely distributed native fishes. Both A1 and S2 subwatersheds include important fish populations of one or more of the following: known strong populations for the seven key salmonids; important anadromous fish populations in the Snake River Basin; genetically pure populations of anadromous fish outside the Snake River Basin; and fringe populations for four of the key salmonids. A1 and A2 subwatersheds differ in their definition and their management direction, as described in Chapter 3.

Adaptive management — A type of natural resource management in which decisions are made as part of an ongoing process. Adaptive management involves planning, implementing, monitoring, evaluating, and incorporating new knowledge into management approaches based on scientific findings and the needs of society. Results are used to modify management methods and policy.

Biological crust — Thin crust of living organisms on or just below the soil, composed of lichens, mosses, algae, fungi, cyanobacteria, and bacteria.

Coarse Woody Debris (CWD) — Pieces of woody material derived from tree limbs, boles, and roots in various stages of decay, generally having a diameter of at least three inches and a length greater than three feet.

Criteria pollutants — Air pollutants designated by the Environmental Protection Agency (EPA) as potentially harmful and for which ambient air standards have been set to protect the public health and welfare. The criteria pollutants are carbon monoxide, sulfur dioxide, particulate matter, nitrogen dioxide, ozone, hydrocarbons, and lead.

Disturbance — Refers to events that alter the structure, composition, or function of terrestrial or aquatic habitats. Natural disturbances include, among others, drought, floods, wind, fires, wildlife grazing, and insects and diseases. Human-caused disturbances include, among others, actions such as timber harvest, livestock grazing, roads, and the introduction of exotic species.

Ecological integrity — In general, ecological integrity refers to the degree to which all ecological components and their interactions are represented and functioning; the quality of being complete; a sense of wholeness. Absolute measures of integrity do not exist. Proxies provide useful measures to estimate the integrity of major ecosystem components (forestland, rangeland, aquatic, and hydrologic). Estimating these integrity components in a relative sense across the project area helps to explain current conditions and to prioritize future management. Thus, areas of high integrity would represent areas where ecological functions and processes are better represented and functioning than areas rated as low integrity. In this EIS, ecological integrity is used to show the integrated condition of the biophysical environment within the project area.

Ecosystem health — A condition where the parts and functions of an ecosystem are sustained over time and where the system's capacity for self-repair is maintained, such that goals for uses, values, and services of the ecosystem are met.

Ecosystem-based management — The use of an ecological approach to achieve multiple-use management of public lands by blending the needs of people and environmental values in such a way that Forest Service and BLM lands represent diverse, healthy, productive, and sustainable ecosystems.

Excessive livestock grazing pressure — Grazing pressure that results in a decline in physiological vigor of plants, typically observed as a decline in reproductive output (for example, seeds and rhizomes) and growth, both above ground (for example, tiller production of grasses) and below ground (for example, root growth). This decline in physiological vigor results in decreased ability of the plant to compete for resources and results in alteration of plant species composition in plant communities. The connotation of this phrase is negative.

Exotic Species — A plant or animal species introduced from a distant place; not native to the area.

Extinction — Complete disappearance of a species from the earth.

Extirpation — Loss of populations from all or part of a species' range within a specified area.

Fragmentation (habitat) — The break-up of a large land area (such as a forest) into smaller patches isolated by areas converted to a different land type. The opposite of connectivity.

High restoration priority subbasins — Subbasins identified by the ICBEMP as high priority for restoration at the broad scale, where management intent is to concentrate restoration efforts (such as aquatic, water quality, vegetation management, or reestablishing fire) and to make restoration activities more effective and efficient.

Historical Range of Variability (HRV) — The natural fluctuation of ecological and physical processes and functions that would have occurred during a specified period of time. In this EIS, refers to the range of conditions that are likely to have occurred prior to settlement of the project area by Euroamericans (approximately the mid 1800s), which would have varied within certain limits over time. HRV is discussed in this document only as a reference point, to establish a baseline set of conditions for which sufficient scientific or historical information is available to enable comparison to current conditions.

Isolated community — A community located more than 35 to 50 miles from any town with a population greater than 9,000. Communities with populations between about 1,900 and 9,000 are referred to as “isolated trade centers.” (See Reyna 1998 for additional details on how isolated communities were specified.)

Potential Vegetation Group (PVG) — A group of potential vegetation types, grouped on the basis of similar general moisture or temperature environment and similar types of life forms.

Productivity — (1) *Soil productivity*: the capacity of a soil to produce plant growth, due to the soil’s chemical, physical, and biological properties (such as depth, temperature, water-holding capacity, and mineral, nutrient, and organic matter content). (2) *Vegetative productivity*: the rate of production of vegetation within a given period. (3) *General*: the innate capacity of an environment to support plant and animal life over time.

RAC/PAC — Resource Advisory Council/Provincial Advisory Committee areas. Resource advisory councils (RACs) were established by the BLM to provide a forum for non-federal partners to engage in discussion with agency managers regarding management of federal lands. Provincial advisory committees (PACs) were established by the Forest Service, under the Northwest Forest Plan, to provide a forum for non-federal groups and individuals to advise and make recommendations to agency land managers regarding management of federal lands.

Recovery plan — Identifies, justifies, and schedules the research and management actions necessary to reverse the decline of a species and ensure its long-term survival.

Resilient, resilience, resiliency — (1) The ability of a system to respond to disturbances. Resiliency is one of the properties that enable the system to persist in many different states or successional stages. (2) In human communities, refers to the ability of a community to respond to externally induced changes such as larger economic or social forces.

Restoration — Holistic actions taken to modify an ecosystem to achieve desired, healthy, and functioning conditions and processes. Generally refers to the process of enabling the system to resume acting or continue to act following disturbance as if the disturbances were absent. Restoration management activities can be either active (such as control of noxious weeds, thinning of over-dense stands of trees, or redistributing roads) or more passive (more restrictive, hands-off management direction that is primarily conservation oriented).

Riparian conservation area (RCA) — Delineated areas that encompass riparian ecosystems. Management activities in RCAs will be governed by ICBEMP objectives, standards, and guidelines when the Record of Decision is signed.

Salmonids — Fishes of the family Salmonidae, including salmon, trout, chars, whitefish, ciscoes, and grayling.

Seral — Refers to the stages that plant communities go through during succession. Developmental stages have characteristic structure and plant species composition. Early seral refers to plants that are present soon after a disturbance or at the beginning of a new successional process (such as seedling or sapling growth stages in a forest); mid seral in a forest would refer to pole or medium sawtimber growth stages; late or old seral refers to plants present during a later stage of plant community succession (such as mature and old forest stages).

Silviculture(al) — The practice of manipulating the establishment, composition, structure, growth, and rate of succession of forests to accomplish specific objectives.

Soil disturbance — In this EIS, used to describe effects of the alternatives on soil productivity.

Source habitat — Those characteristics of vegetation that support long-term wildlife species persistence, or characteristics of vegetation that contribute to stable or positive population growth for a species in a specified area and time. Source habitats are described in Wisdom et al. (in press) using dominant vegetation cover type and structural stage combinations that can be estimated reliably at the 247-acre (100-hectare) patch scale. Various combinations of these cover type–structural stages make up the source habitats for the terrestrial species discussed in this EIS, and provide the range of vegetation conditions required by these species for food, reproduction, and other needs.

Stewardship harvest/stewardship thinning — Commercial timber harvest where the primary reason for harvesting timber is to obtain a land use plan objective that requires vegetation manipulation. Therefore, even if the timber could not be sold, the harvest would still take place or be accomplished through another means, such as prescribed fire.

Subbasin — A drainage area of approximately 800,000 to 1,000,000 acres, equivalent to a 4th-field hydrologic unit code (HUC). Hierarchically, a subwatershed (6th-field HUC) are contained within a watershed (5th-field HUC), which in turn is contained within a subbasin (4th-field HUC).

Subwatershed — A drainage area of approximately 20,000 acres, equivalent to a 6th-field Hydrologic Unit Code (HUC). Hierarchically, subwatersheds (6th-field HUC) are contained within a watershed (5th-field HUC), which in turn is contained within a subbasin (4th-field HUC).

Succession — A predictable process of changes in structure and composition of plant and animal communities over time. Conditions of the prior plant community or successional stage create conditions that are favorable for the establishment of the next stage. The different stages in succession are often referred to as seral stages.

Sustainability — (1) Meeting the needs of the present without compromising the abilities of future generations to meet their needs; emphasizing and maintaining the underlying ecological processes that ensure long-term productivity of goods, services, and values without impairing productivity of the land. (2) In commodity production, refers to the yield of a natural resource that can be produced continually at a given intensity of management.

T Watershed — Terrestrial T watersheds (5th-field HUCs) identified by the EIS Team based on whether they contained source habitat for one or more of five “Families” of terrestrial species. These five Families represent groups of species associated with habitats that have declined substantially in the project area since the historical period. In addition, the pattern of source habitats within these watersheds is most similar to that found historically. T watersheds alone do not constitute a network of habitats for terrestrial species; however, they are one piece of the overall strategy to maintain and restore networks of habitat for terrestrial species.

Terrestrial Family — An aggregate of groups of broad-based terrestrial vertebrate species of focus for ICBEMP, organized into “families” based on habitat requirements (Wisdom et al. in press). Twelve Terrestrial Families are discussed in this EIS.

Viability — In general, viability means the ability of a population of a plant or animal species to persist for some specified time into the future. For planning purposes, a *viable population* is one that has the estimated numbers and distribution of reproductive individuals to ensure that its continued existence will be well distributed in the planning area.

Watershed— (1) The region draining into a river, river system, or body of water. (2) In this EIS, a watershed also refers specifically to a drainage area of approximately 50,000 to 100,000 acres, which is equivalent to a 5th-field Hydrologic Unit Code (HUC). Hierarchically, a subwatershed (6th-field HUC) is contained within a watershed (5th-field HUC), which in turn is contained within a subbasin (4th-field HUC).

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Acronyms

AUM	Animal Unit Month	NEPA	National Environmental Policy Act
BLM	Bureau of Land Management	PVG	Potential Vegetation Group
EAWS	Ecosystem Analysis at the Watershed Scale	RAC/PAC	Resource Advisory Council/ Provincial Advisory Committee
EIS	Environmental Impact Statement	RCA	Riparian Conservation Area
HRV	Historical Range of Variability		
ICBEMP	Interior Columbia Basin Ecosystem Management Project		