United States
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United States
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**Bureau of Land
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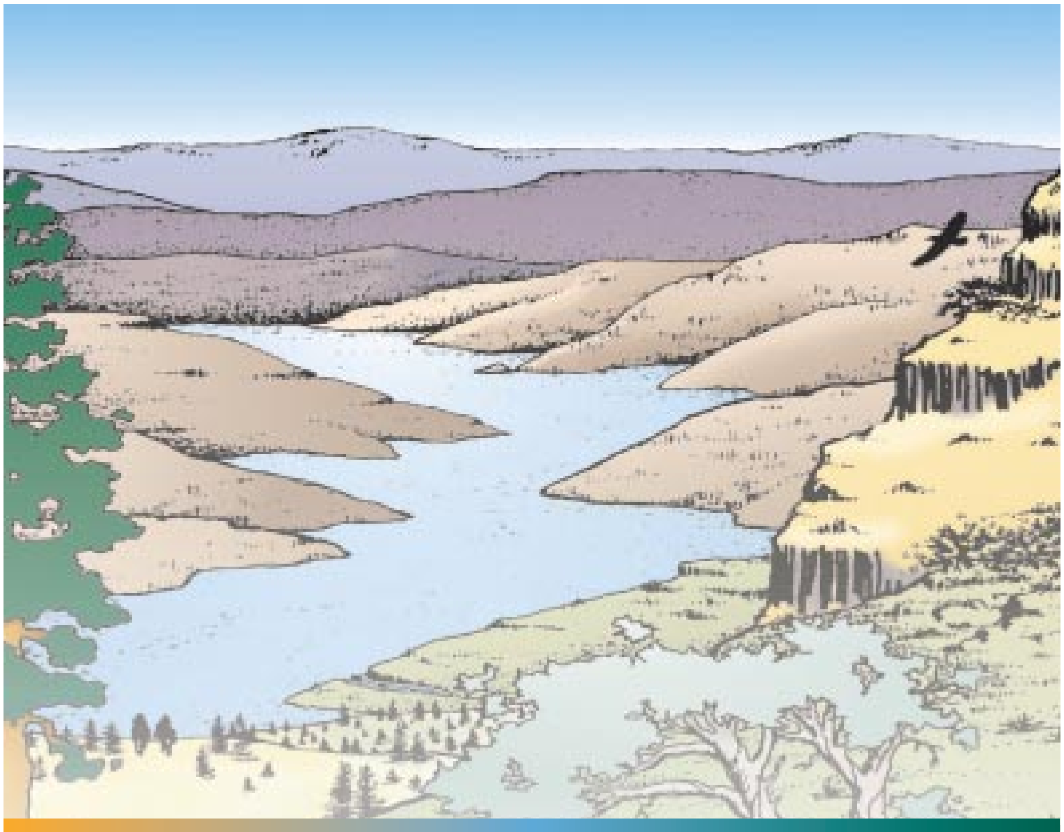
Status of the Interior Columbia Basin

Summary of Scientific Findings

United States Department of Agriculture	United States Department of the Interior
Forest Service	Bureau of Land Management

Interior Columbia Basin Ecosystem Management Project

This is not a NEPA decision document



Status of the Interior Columbia Basin
Summary of Scientific Findings

November 1996
United States Department of Agriculture
Forest Service
Pacific Northwest Research Station
Portland, Oregon

Abstract

U.S. Department of Agriculture, Forest Service. 1996. Status of the interior Columbia basin: summary of scientific findings. Gen. Tech. Rep. PNW-GTR-385. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station; U.S. Department of the Interior, Bureau of Land Management. 144 p.

The *Status of the Interior Columbia Basin* is a summary of the scientific findings from the Interior Columbia Basin Ecosystem Management Project. The Interior Columbia Basin includes some 145 million acres within the northwestern United States. Over 75 million acres of this area are managed by the USDA Forest Service or the USDI Bureau of Land Management. A framework for ecosystem management is described that assumes the broad purpose is to maintain the integrity of ecosystems over time and space. An integrated scientific assessment links landscape, aquatic, terrestrial, social, and economic characterizations to describe the biophysical and social systems. Ecosystem conditions within the Basin have changed substantially within the last 100 years. The status of ecosystems is described in terms of current conditions and trends under three broadly defined management options. The scientific information brought forward will be used in decision-making, and may potentially amend Forest Service and Bureau of Land Management plans within the Basin. The information highlighted here represents an integrated view of biophysical and socioeconomic elements at a scale never before attempted. The risks and opportunities are characterized in the broad context of the Basin for managers and the public to use as a foundation for discussion about future management.

Keywords: ecosystem assessment, ecosystem management, ecosystem integrity, risk analysis.

Preface and Acknowledgment

This report summarizes over 2,000 pages of scientific, technical methods and findings produced by the project's Science Team. Summarizing this much material while also attempting to make it understandable and accessible to a diverse audience was a difficult task. The result provides readers with an overview of the topics covered and key findings. The original documents contain much greater detail and explanation, as well as covering related topics not mentioned here. Readers are encouraged to consult those documents for the full story of Basin ecosystems. We decided not to incorporate references or citations into this summary document to keep it more readable for a broad audience; the full versions of the science documents contain references to all materials used. This report does not summarize material contained in the project's two draft environmental impact statements, which were not released at the time this summary was printed.

This report was prepared by Stewart Allen from material contained in science documents developed for publication by the Interior Columbia Basin Ecosystem Management Project. Tom Quigley verified the scientific accuracy of the summarized material and edited the initial draft; Jodi Clifford and Liz Galli-Noble also edited various drafts. Many of the authors of the science documents also reviewed a draft version. Del Thompson supervised layout and printing. Photographs were taken by Larry Frank, Wendel Hann, Rod Johnson, Mike Northrop, Jane Rohling, K.D. Swann, and Stewart Allen; historical photos courtesy of Deschutes County Historical Society.

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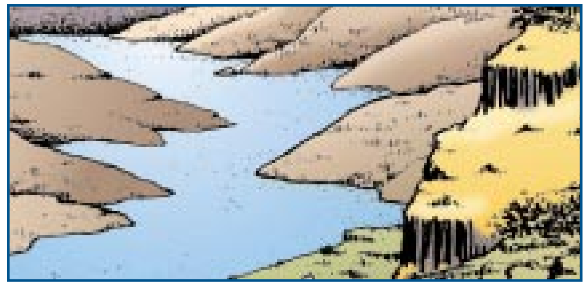

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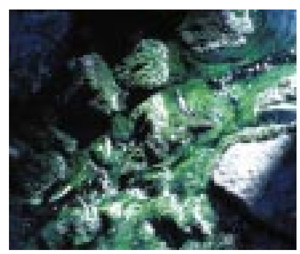

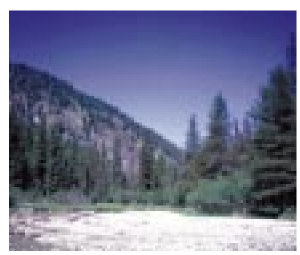

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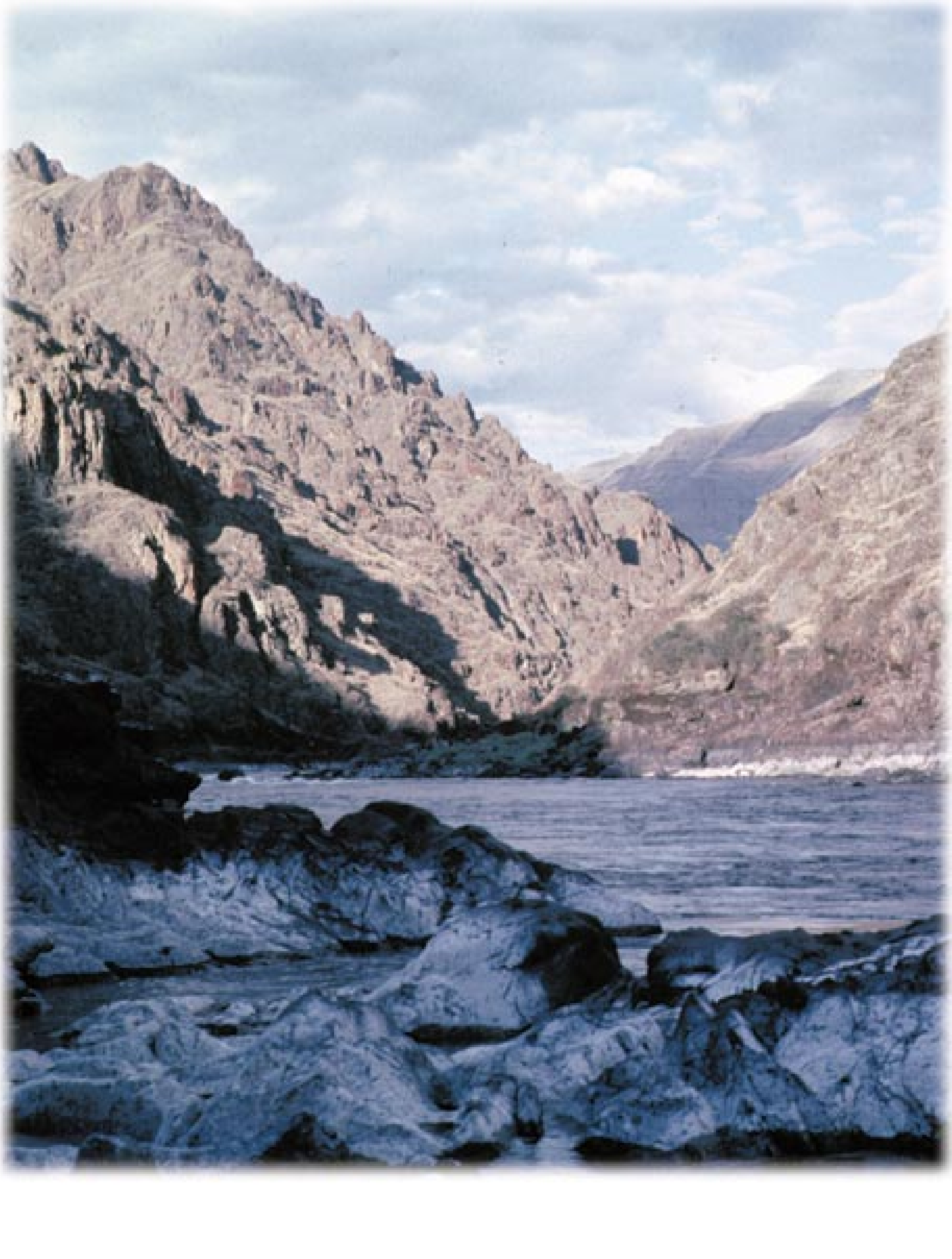
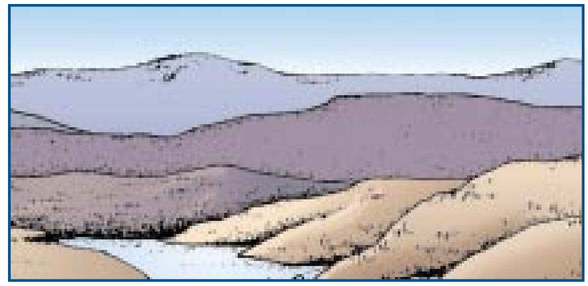


INTRODUCTION



The Pacific Northwest has been involved in controversy over the ownership and management of natural resources since descendants of Europeans began inhabiting the area 150 years ago. After World War II, the debate over management of public lands focused primarily on resource allocation, as commodity production took precedence over early twentieth century custodial protection of public lands. In the last decade, however, concerns have grown about issues related to species associated with old forest structures, anadromous fish, forest health, widespread insect and disease mortality and fire, and rangeland health. This broader concern for ecosystem conditions recognizes that such conditions not only reflect the quality and extent of habitats available for plant, animal, and fish species, but also the ability of lands and waters to provide continued, predictable flows of resources that contribute to both traditional and current human values and demands.

In the wake of studies addressing biophysical, social, and economic issues concerning forest management west of the Cascades, the need for an integrated understanding of conditions on the east side was recognized. Although numerous reports had addressed many forest health problems on the east side, the status of the Basin as a whole had never been assessed.

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The Project

The Interior Columbia Basin Ecosystem Management Project evolved from the current debate over management of lands administered by the U.S. Department of Agriculture, Forest Service (FS) and U.S. Department of Interior, Bureau of Land Management (BLM) in the Columbia River basin within the United States and east of the Cascade crest, and portions of the Klamath and Great basins in Oregon. This sparsely populated 145-million-acre area, referred to here as simply the "Basin," contains a wealth of natural resources and related opportunities.

The Interior Columbia Basin Ecosystem Management Project (ICBEMP) was established by the Eastside Ecosystem Management Project Charter in January 1994. The Charter, signed by the Chief of the Forest Service and the Director of the Bureau of Land Management, directed the agencies to undertake work necessary to develop and then adopt a scientifically sound, ecosystem-based strategy for managing all FS- or BLM-administered lands within the Basin.

The Columbia River Gorge near Hood River, Oregon.

This work has had many components. First, it was necessary to describe how ecosystems operate—the principles important to understand when embarking on such an ambitious project. This was the goal of one of the main project documents, called *A Framework for Ecosystem Management in the Interior Columbia Basin and Portions of the Klamath and Great Basins*. The *Framework* describes principles, goals, and processes applicable to managing ecosystems in the Basin.

The next step was to develop a better understanding of the current biophysical, economic, and social conditions and trends in the Basin. This information is summarized in the document, *An Assessment of Ecosystem Components in the Interior Columbia Basin and Portions of the Klamath and Great Basins.* The *Component Assessment* examines ecosystems within the Basin, including their history, current status, and trends, and offers projections of future conditions. The *Component Assessment* included Federal, state, county, and private lands and resources within the Basin. Though direction is being developed only for lands administered by the FS or BLM, it is important to know how these lands fit into the overall Basin ecosystem.

Because the assessment was conducted by resource area (biophysical, landscape dynamics, terrestrial, aquatic, economic, and social), another analysis integrated those resource-specific findings to develop

The inclusion of a decision component, in the form of two environmental impact statements, is one of the aspects that makes the project unique.

an overall picture of the status of Basin ecosystems. This analysis is reported in the project's *Integrated Scientific Assessment for Ecosystem Management*.

This summary report concentrates on material presented in these three ICBEMP documents—the *Framework*, the *Component Assessment*, and the *Integrated Assessment*.

The Charter also called for preparation of two Environmental Impact Statements (EISs), one establishing direction for FS- and BLM-administered lands in eastern Washington and Oregon, and the other for lands in the upper Columbia basin (Idaho, northwestern Montana, and portions of Nevada, Utah, and Wyoming). The EISs, which will identify and evaluate alternative ways of implementing ecosystem management, are designed to modify existing FS and BLM land management plans. As part of the EIS process, a scientific evaluation of the EIS alternatives was conducted; it will be available as another project document.

The inclusion of a decision component, in the form of two environmental impact statements, is one of the aspects that makes the project unique. While other broadscale assessments are being conducted in the United States, such as those recently completed for the Sierra Nevada and Southern Appalachian ecosystems, they do not include a decision component in the form of an EIS or similar document. Another unique aspect of this project is the sheer scale of the assessment area—145 million acres, compared with 37 million acres for the Southern Appalachian assessment, or 21 million acres for the core area of the Sierra Nevada assessment.

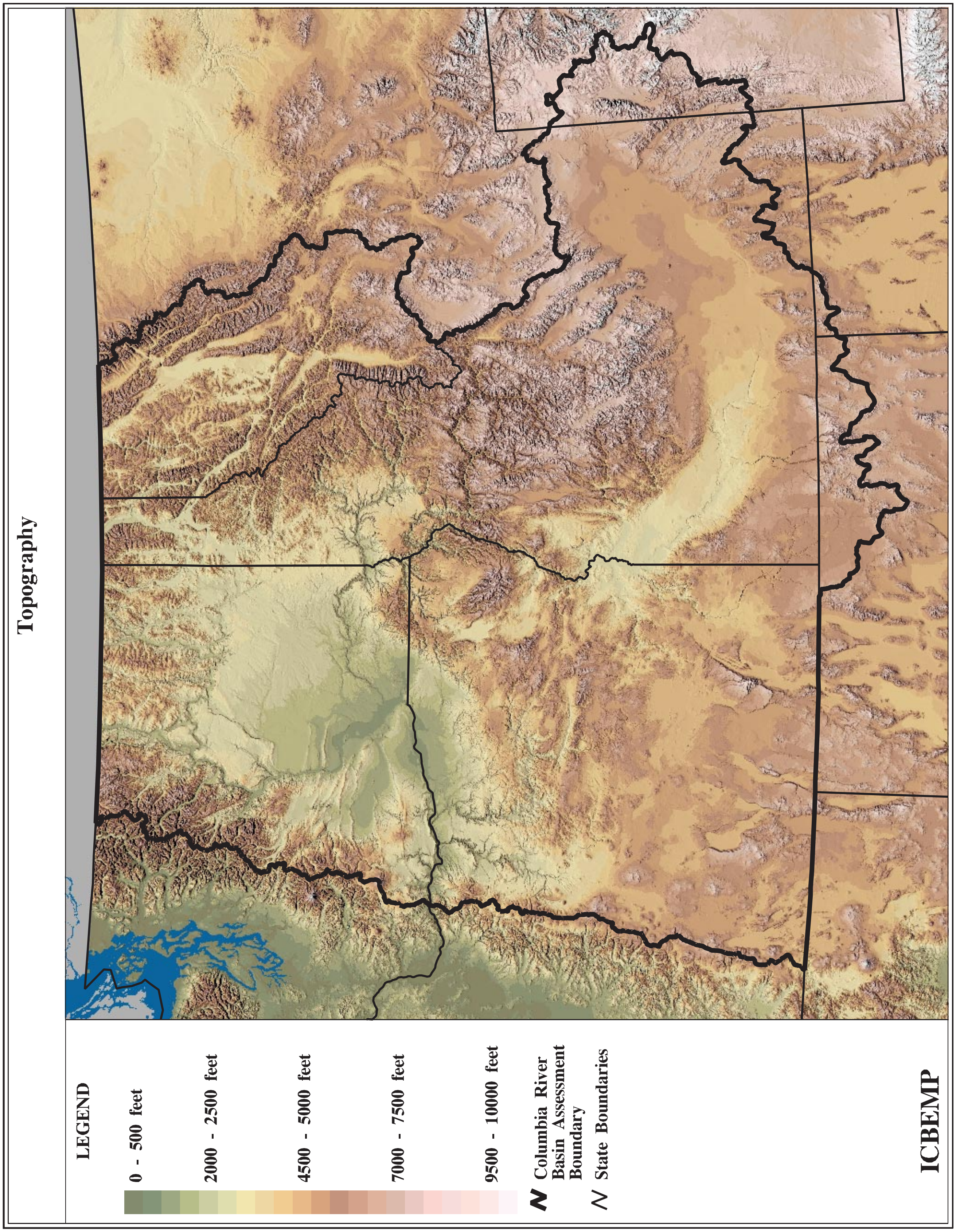
The Basin

A quick snapshot of the Basin is a good starting point. Basin lands are highly diverse, ranging from the Cascades on the west to the continental divide in the Rocky Mountains on the northeast and east (map 1). Several mountain ranges in central Idaho and western Montana commonly have elevations over 10,000 feet. The Basin includes the extensive basalt plateau of eastern Oregon, eastern Washington, and southern Idaho as well the high desert of the Klamath Basin in southwest Oregon and the plains of the Great Basin in northern Nevada, northern Utah, and southern Idaho.

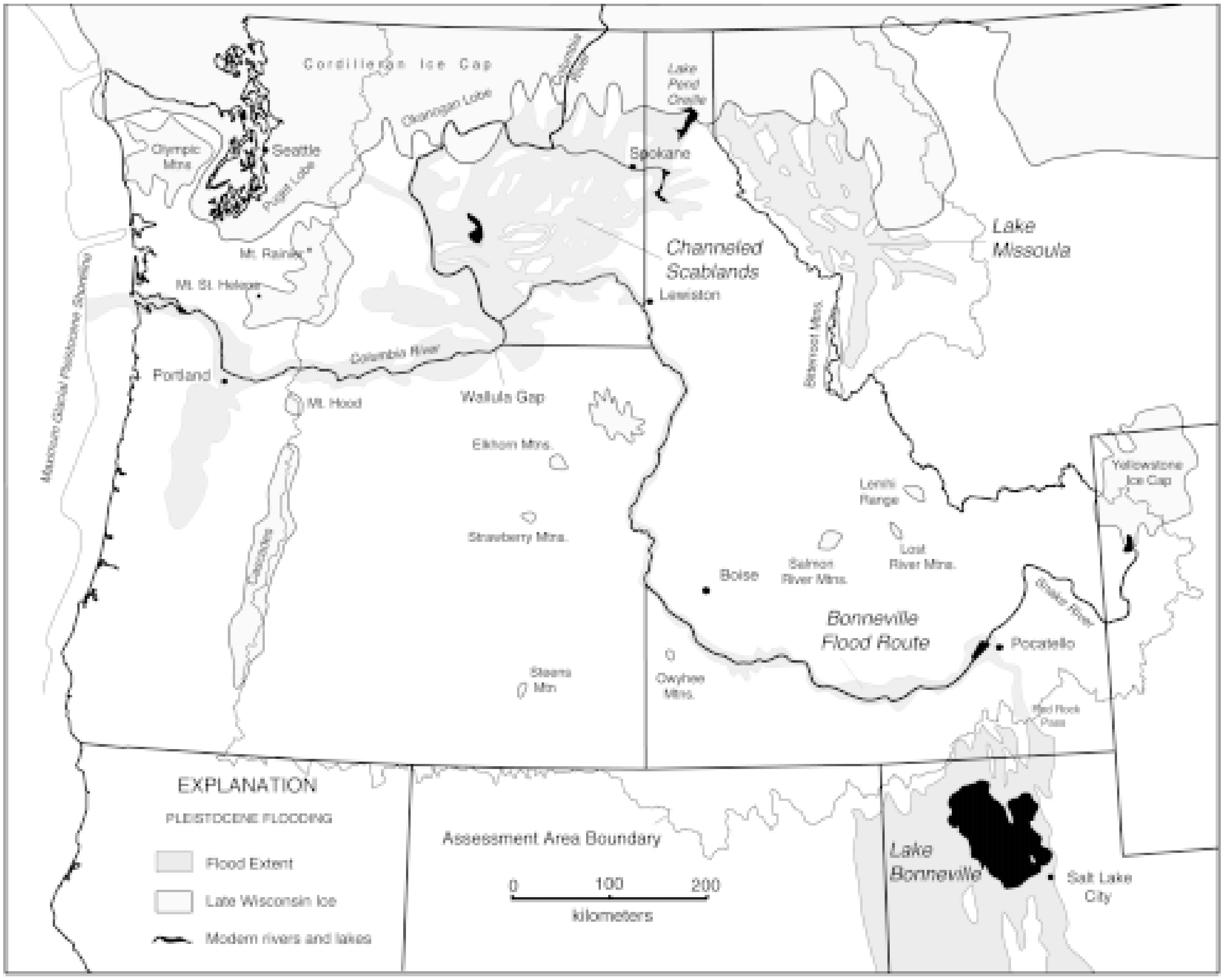
Events during the Pleistocene epoch shaped much of the Basin's landscape. Continental ice sheets originating in Canada excavated and molded valleys in the northern portion of the Basin, while alpine glaciers occurred in most of the mountainous areas. As a result of a prolonged wet climate, many large lakes formed, particularly in southern portions of the Basin. Repeated breaching

Public Participation

The ICBEMP was committed to an open process with numerous and diverse opportunities for public involvement during the project. The public was encouraged to attend the workshops and regularly scheduled public sessions held throughout the Basin. At these briefings, project staff and management discussed the latest scientific findings and provided updates on progress, with time for interaction between scientists and attendees. Reports from contractors and other draft materials were made available to the public through a variety of means. Much of the material was available in an electronic library maintained by project personnel, and data layers and maps were released as they became final and documented. Other special efforts to communicate with the public included a day-long conference on social issues and findings, held in April, 1995, in Spokane, Washington.



Map 1—Basin topography.



Map 2—Pleistocene events in the Basin.

of ice dams by glacial Lake Missoula led to cataclysmic flooding that carved the "channeled scablands" of eastern Washington (map 2). Spillovers of pluvial Lake Bonneville into the Snake River system modified the valley of the Snake River and left large cataract complexes. Sedimentary deposits including glacial till, outwash and loess, and valley fill, terraces, and scour features occur over much of the Basin. Soils developed from loess deposits in the Columbia Plateau and Snake River plain have enabled these areas to develop into highly-productive agricultural areas, such as the Palouse.

The Basin is in a transition-type climate zone where climate patterns are dominated by topographic features. Type and distribution of vegetation varies with soils, long-term precipitation patterns, and climate. Forested vegetation differs among dry, moist, and cold vegetation types. Grassland, shrubland, and woodlands are also present across the Basin. These differ between

The Basin is sparsely populated, covering about eight percent of the land area of the United States while containing about one percent of the Nation's population.

Blue Mountains. There is a great deal of diversity in the Basin's landscape types. This is a landscape dominated by foothill and mountain environments. Land uses include recreation, forestry, livestock grazing, wildlife, fisheries and use as a watershed. Such landscapes have highly dynamic disturbance potentials. Fire and floods are common. These landscapes have relatively low productivity and are mostly in public ownership.

desert (very dry) areas and high elevation (very cold) areas.

Most of the area is drained by the Columbia River and its tributaries. The portion of the Klamath Basin that occurs in the project area is drained by the Klamath River and its tributaries; the portion of the Great Basin that occurs in the project area has closed basins. Stream modifications to facilitate navigation on the Columbia River system began in 1876 with construction of locks and canals. By 1975, the waterway between Lewiston, Idaho, and the Pacific Ocean had become a series of reservoirs.

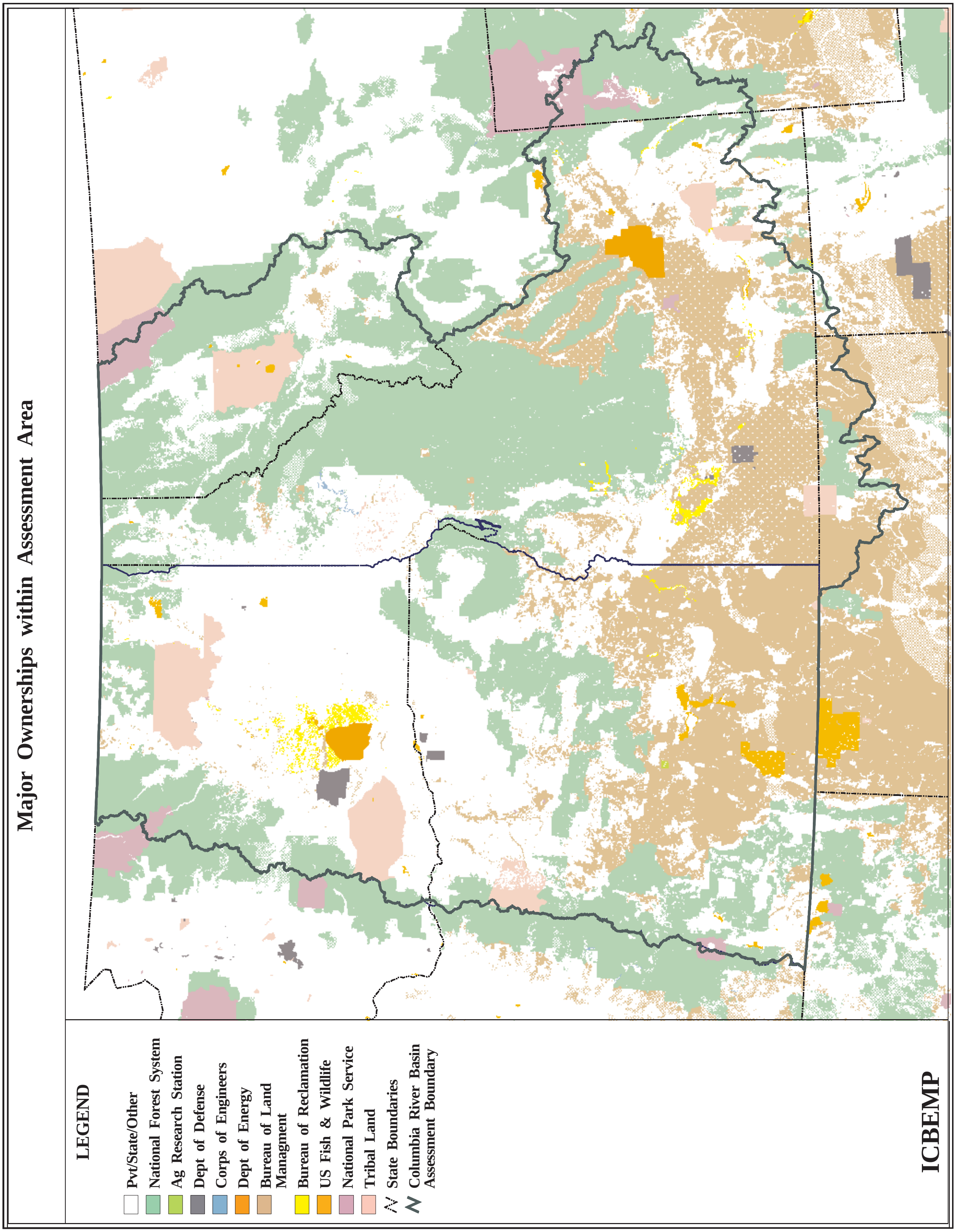
The Basin is sparsely populated, covering about eight percent of the land area of the United States while containing about one percent of the Nation's population. This results in a population density less than one-sixth of the U.S. average. Like much of the rural West, the Basin has experienced recent, rapid population growth that is expected to continue. The Basin contains nearly 500 small, rural communities of 10,000 people or fewer that have been undergoing significant social and economic change.

The Basin has a diverse economy that makes up just under 4 percent of the U.S. economy. Six metropolitan areas have been the centers of its

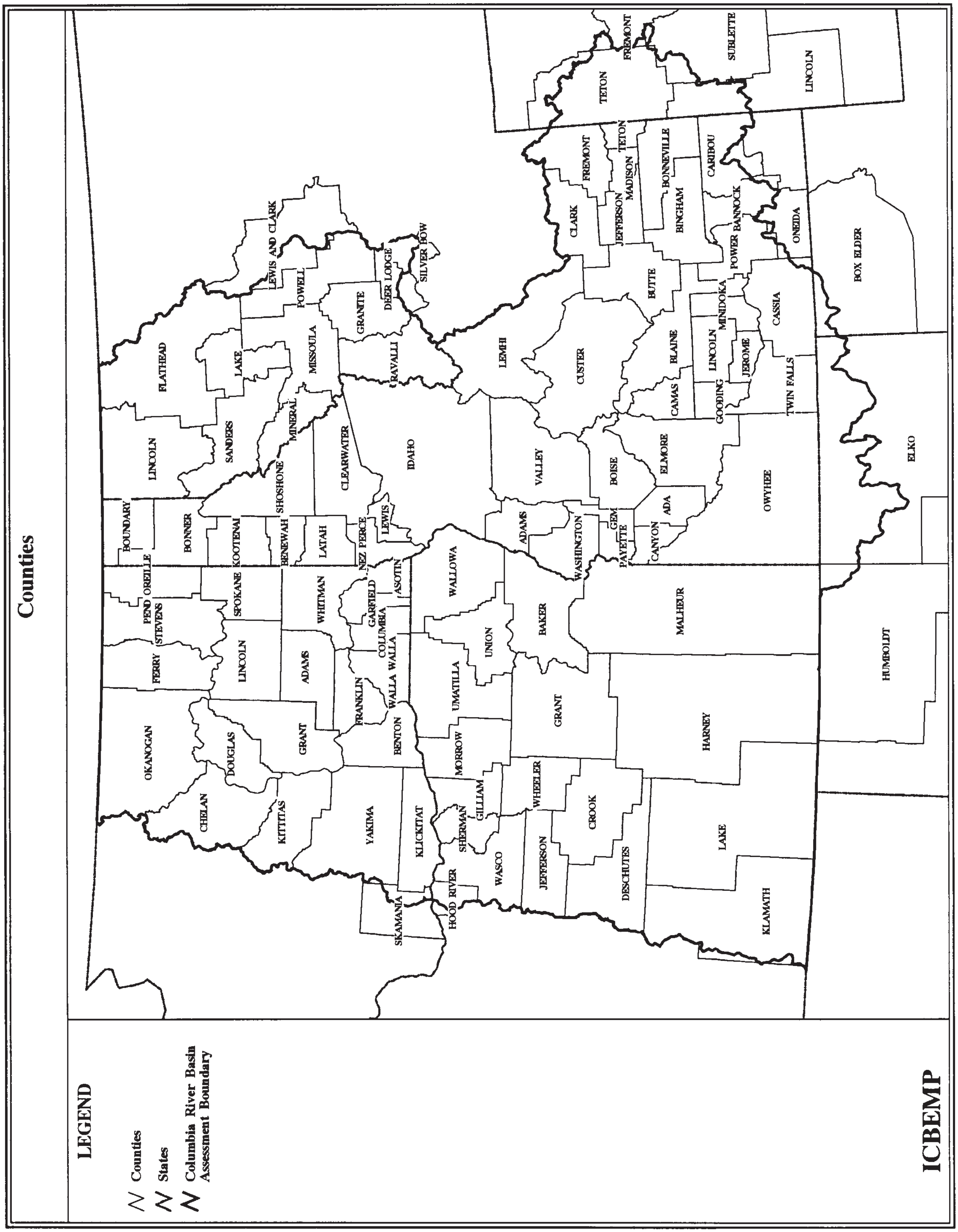
Columbia Plateau. This is a landscape dominated by plains (or valley) environments with mixed forest, range, and agriculture. These types of landscapes are very productive and are mostly in private ownership. They are highly dynamic in terms of disturbance, particularly climatic fluctuations (drought).

economic growth: Spokane, Yakima, Pasco/Kennewick/Richland ("Tri-Cities"), and Wenatchee, Washington; Bend, Oregon; and Boise, Idaho. The past two decades have seen the evolution of what was a mature, resource-based economy into a diverse economy oriented toward the technology, transportation, and service sectors. Economic strengths of the Basin include agriculture and agricultural services.

Of the 145 million acres in the Basin, 53 percent is public land managed by the BLM or the FS through 35 National Forests and 17 BLM Districts (map 3). The project area contains all or significant portions of 100 counties across seven states (map 4). This makes it clear, as will be discussed later, that the Forest Service and Bureau of Land Management will need help from others to make ecosystem management work. The Basin contains about 24 percent of the Nation's National Forest system lands and 10 percent of the Nation's BLM-administered lands. Designated Wilderness within the Basin, present in 46 of the 100 counties, totals just over 10 million acres—about 29 percent of the Wilderness acres within the contiguous United States.



Map 3—Major land ownerships within the Basin.



Map 4—Counties in the Interior Columbia Basin project area.

Ecosystem Principles

Understanding ecosystem management requires defining ecosystems and the principles under which they operate. An ecosystem is a complete, interacting system of living organisms and the land and water that make up their environment—the home places of all living things, including humans (figure 1). Because humans have developed the capacity to rapidly alter the environment beyond the capacity of any other species and because humans are dependent, like all species, on the environment, humans are included as a component of ecosystems.

Ecosystems

Ecosystems are places where all plants, animals, soils, waters, climate, people, and processes of life interact as a whole. They may be small, such as a rotting log, or large, such as an entire continent; smaller ecosystems are subsets of larger ones. All ecosystems have flows of things—organisms, energy, water, air, nutrients—moving among them. Ecosystems change over space and time, so it is not possible to draw a line around an ecosystem and try to keep it the same. Instead, managing ecosystems means understanding and working with the processes that cause ecosystems to vary and to change.

Concepts and principles underlying ecosystem management are evolving. Four broad principles guided the ICBEMP:

Ecosystems are dynamic, evolutionary, and resilient;

Ecosystems are viewed spatially and temporally within organizational levels;

Ecosystems have biophysical, economic, and social limits; and

Ecosystem patterns and processes are not completely predictable.

Ecosystems are dynamic; they change with or without human influence. Existing ecosystem conditions are a product of natural and human history—including fire, flood, and other disturbances, climatic shifts, and geological events such as landslides and volcanic eruptions. Change is inherent in ecosystems. An ecosystem is said to be resilient if it tends to return to some developmental pathway when disturbed or otherwise changed, or if its state is always changing within some definable bounds. While ecosystem management can recognize the inherent resiliency of natural systems, it should also recognize that maintaining the status quo is difficult and not necessarily a goal. Just as disturbances and the actions of human generations shaped the ecosystems of today, actions of this generation will transform ecosystems of the future.

Ecosystems and the links among them can be studied at a variety of scales. Ecosystems can vary in size, for example, from a small pond to an entire river basin. To describe the dynamic nature of ecosystems, it is useful to view them as having multiple organizational levels differing over time and space. These levels can be organized within

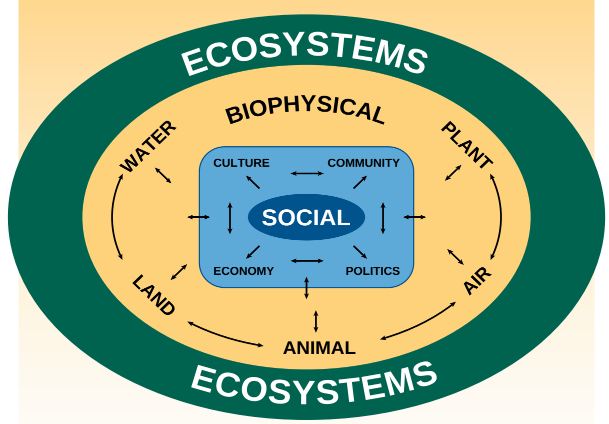


Figure 1—Ecosystems are places where biophysical and social components interact as a whole. All ecosystems have flows of energy, organisms, water, air, and nutrients and each element is affected by other elements. All ecosystems change over space and time.

Ecosystems can vary in size and scale, as demonstrated by these three scenes from the White Salmon River at the Basin's western boundary.

hierarchies, in which every level has discrete ecological functions but at the same time is part of a larger whole. Higher levels usually occupy larger areas and are usually characterized by longer timeframes. Spatial extent can range from a few square meters to millions of square meters, and timeframes can range from less than one year to millions of years.

The main purpose of the data collection portion of the ICBEMP was to gain an understanding of the Basin as a whole, but for individual resource areas data were collected and analyzed at many smaller scales as well. This is crucial because the Basin is so diverse that "average" numbers tend to be very misleading and fail to reflect the vast differences present. Aquatics and other analyses, for example, were conducted at watershed, subbasin, and basin scales. For other analyses, the Basin was divided into 13 ecologically distinct areas called Ecological Reporting Units. Social and economic information was generally at the state or county level of analysis. Bureau of Economic Analysis reporting areas were used to characterize centers of trade and economic activity. However, measuring social and economic conditions only at these scales would mask differences among the many communities within the Basin, so the project also collected information about hundreds of small, rural communities. There is no "right" level of analysis; the appropriate scale depends on what question is being answered, and it is useful to study ecosystem conditions at multiple levels to understand how one set of conditions depends on and affects another.

Ecosystem processes such as soil formation that occur over long periods (centuries or millennia) hold little meaning for political processes that operate biennially.

Organizational levels, timeframes, and spatial extents that are significant to human decision-making often do not correspond to the same timeframes and spatial extents as biophysical systems. Ecosystem processes such as soil formation that occur over long periods (centuries or millennia) hold little meaning for political processes that operate biennially. In addition, people respond to environments symbolically, and places important to people cannot typically be defined by using biophysical hierarchies alone. To some extent, the selection of hierarchies represents a compromise among the various disciplines involved in an assessment.

Ecosystems have biophysical, economic, and social limits. The environment is constantly in a state of flux, causing ecosystems to change. Given this, human populations recognize that the ability of an ecosystem to provide goods and services has limitations. Unfortunately, people also often make demands on ecosystems that exceed the system's biological or physical capabilities. Science provides information about ecosystem limits; society uses this shared information to make choices about its behavior. Land managers then use this information as they develop ways to allocate finite resources. People can choose to modify their behavior and organize their institutions to be consistent with the capabilities of ecosystems, or they can pursue actions inconsistent with the capabilities of ecosystems. People can also improve ecosystem productivity on some sites through investments in management practices. Societal choices regarding the use and allocation of resources have implications for inter-generational equity and tradeoffs.

There are limits to our ability to predict how ecosystems may change. Even the best modeling systems that try to predict what will happen to an ecosystem are only guesses, subject to a variety of assumptions and uncertainties. This is true for both human and nonhuman components of ecosystems. The events that influence ecosystem

Salmon River in the Frank Church River of No Return Wilderness Area. Society has already chosen to set aside some resources from many types of uses by humans. This does not mean, however, that the landscape will remain the same; successional and disturbance processes continue to operate.

patterns and processes are usually unpredictable, and predictability varies over temporal and spatial organizational levels. For example, from year-to-year wildfire occurrences are associated with particular seasons and environmental conditions, but a fire may occur in any season and under many different environmental conditions. Similarly, eruptions of volcanos in the Cascade Mountain Range have occurred, on average, twice each century for the past 4,000 years; however, neither when the next eruption will occur, nor its size and effects, can be predicted. In the social dimension, predicting crime rates at the regional or community level is possible, but it is much more difficult to predict the occurrence of a crime at a particular household.

The limited predictability of ecosystem outcomes has several important implications. Land management policies and practices should give managers sufficient flexibility to respond effectively to any unanticipated effects of previous decisions. As knowledge increases, managers are better able to predict outcomes, yet long-term yields of goods and services may remain unpredictable. Finally, although models are simplistic representations of real world systems, they may improve the predictability of outcomes.

Ecosystem Management

The institutional framework and societal desires surrounding public land stewardship continuously evolve. In the course of U.S. history, major land management themes have changed from privatization (1800-1891), to conservation and scientific management (1891-1945), to commodity production (1945-1960), to increasingly complex and contentious demands (1960-present). Today, the agencies are faced with attempting to balance these traditional issues with demands for and greater concern over ecosystem health and fire management.

It is not just Basin ecosystems that have changed, but how society views resources and makes decisions about their use. The 1990s are characterized by public concern over ecosystems and their physical, biological, economic, and social conditions. There is widespread concern for forests, rangelands, rivers, and the species dependent on them—including humans and in particular the residents of small, rural communities in the Basin. The costs and benefits of activities such as salvage logging and its appropriate role have emerged as national issues. Aggressive fire suppression policies of Federal land-managing agencies have been increasingly criticized as more has been learned about natural fire cycles. Rangeland ecosystems in large areas of the Basin have been altered dramatically by land use conversion and the accidental and deliberate introduction of non-native species. Noxious weeds threaten rangeland vegetation upon which both wild and domestic animals depend. The costs of these and other changes have been measured not just in the listing of endangered species but in appeals, court decisions, and regulations that have decreased the availability and predictability of public land management outputs such as timber.

The Forest Service and the BLM response to these emerging social and environmental issues is ecosystem management, a relatively new term that has been given varied definitions and has a wide variety of connotations for people. Ecosystem management is scientifically-based land and resource management that integrates ecological capabilities with social values and economic relations to produce, restore, or sustain ecosystem integrity and desired conditions, uses, products, values, and services over the long term. The Chief of the Forest Service has described ecosystem management as the next intelligent evolution of multiple use. One of the main distinctions of ecosystem management is that it concentrates on overall ecosystem health and productivity through an understanding of how different parts of the ecosystem function with each other, rather than on achieving a set of outputs. Human activities, including social values about demands on public lands and biophysical ecosystem components, are part of the total picture.

Federal land management agencies have legal and social obligations to sustain the health, diversity, and productivity of ecosystems for the benefit of present and future generations. In addition, they are obligated to fulfill responsibilities assumed from treaties with American Indian tribes including maintaining or restoring viable, and in some cases harvestable, populations of plants and

One of the main distinctions of ecosystem management is that it concentrates on overall ecosystem health and productivity through an understanding of how different parts of the ecosystem function with each other, rather than on achieving a set of outputs.

Owyhee River canyon in southeastern Oregon. Ecosystem management attempts to look at the total picture and manage with an understanding of how ecosystems function.

animals. Satisfying these obligations is often complicated by changing and competing public values, the constant march of science, and land ownership and jurisdictional patterns that do not correspond to ecosystem patterns.

Ecosystem management, in this sense, is another stage in the agencies' evolving efforts to satisfy their obligation to stakeholders while striving to resolve these complications. Stakeholders include tribal, state, county, local governments, private land holders, and individuals or groups representing local and national interests in land management. Stakeholders also include all of the citizens of the United States who use, value, and depend on the goods, services, and amenities produced by federally administered public lands.

The meaning of ecosystem management as it applies to FS- and BLM-administered lands in the Basin would be better understood if accompanied by a broad set of goals that describe its overall intent. However, ecosystem management goals will be chosen and implemented by land managers, because identifying goals is a policy decision, rather than a scientific one. The ICBEMP's two environmental impact statements will identify draft goals. In the absence of the actual goals, scientists working on the project developed a list of illustrative management goals (fully described in the *Framework*) to help examine the status of eco-

The Role of Science

The role of science in the ecosystem management model is to provide information for the decision-making process. Such information helps to identify the current status of ecosystems as well as potential options for addressing issues; the social, physical, economic, and biological consequences of those options; and tradeoffs among options. Science, however, cannot choose among the options; that is the role of decision-makers. Recognition of these distinct responsibilities led the project to establish two main teams of staff: scientists, who wrote the science documents summarized here; and management, who will ultimately make decisions (through the EIS process) about how to carry out ecosystem management on FS- and BLM-administered lands in the Basin.

systems within the Basin. These goals reflect the diverse views that humans have about ecosystem management:

- Maintain evolutionary and ecological processes
- Manage in the context of multiple ecological domains and evolutionary timeframes
- Maintain viable populations of native and desired non-native species
- Encourage social and economic resiliency
- Manage for the human sense of "place"
- Manage to maintain the mix of ecosystem goods, functions, and conditions that society wants

These are reasonable assumptions about management goals because they explicitly recognize the ways in which humans depend on and interact with the environment in our modern world. They seek to reduce risk from ecological surprises and acknowledge important social values derived from commodity and non-commodity use of natural resources. The goals are therefore assumed to provide important benchmarks against which to measure the progress of ecosystem management. If adopted, they would force decision-makers to explicitly consider the extensive range of values and choices involved in ecosystem management.

The goals and the four ecosystem principles described above suggest the need for an adaptive approach to management—an approach that can be adjusted in response to new information. A general planning model for ecosystem management has four iterative steps (figure 2); monitoring, assessment, decision-making, and implementation occur in a cyclic process. Each step has considerable room for both formal and informal public participation.

In the model, monitoring is the process of collecting and evaluating information to determine baseline conditions or to determine if planned activities have been accomplished, if assumptions are correct, and if management objectives have been met. Assessments, which begin by recognizing who the clients are and what questions they have, describes biophysical and social ecosystem components at various timeframes and scales. The decision-making step involves the full range of decision components, from identifying alternatives to selecting one for implementation. The implementation step is the process of turning plans and decisions into projects and practices on the ground.

This general planning model provides a context for integrating social, economic, and ecological information with management goals. It is not fundamentally different from existing ways that FS or BLM plans are developed, but the emphasis on monitoring—learning more about the effects of management actions—is greatly increased, as is the ability to respond to new knowledge as it is gained.

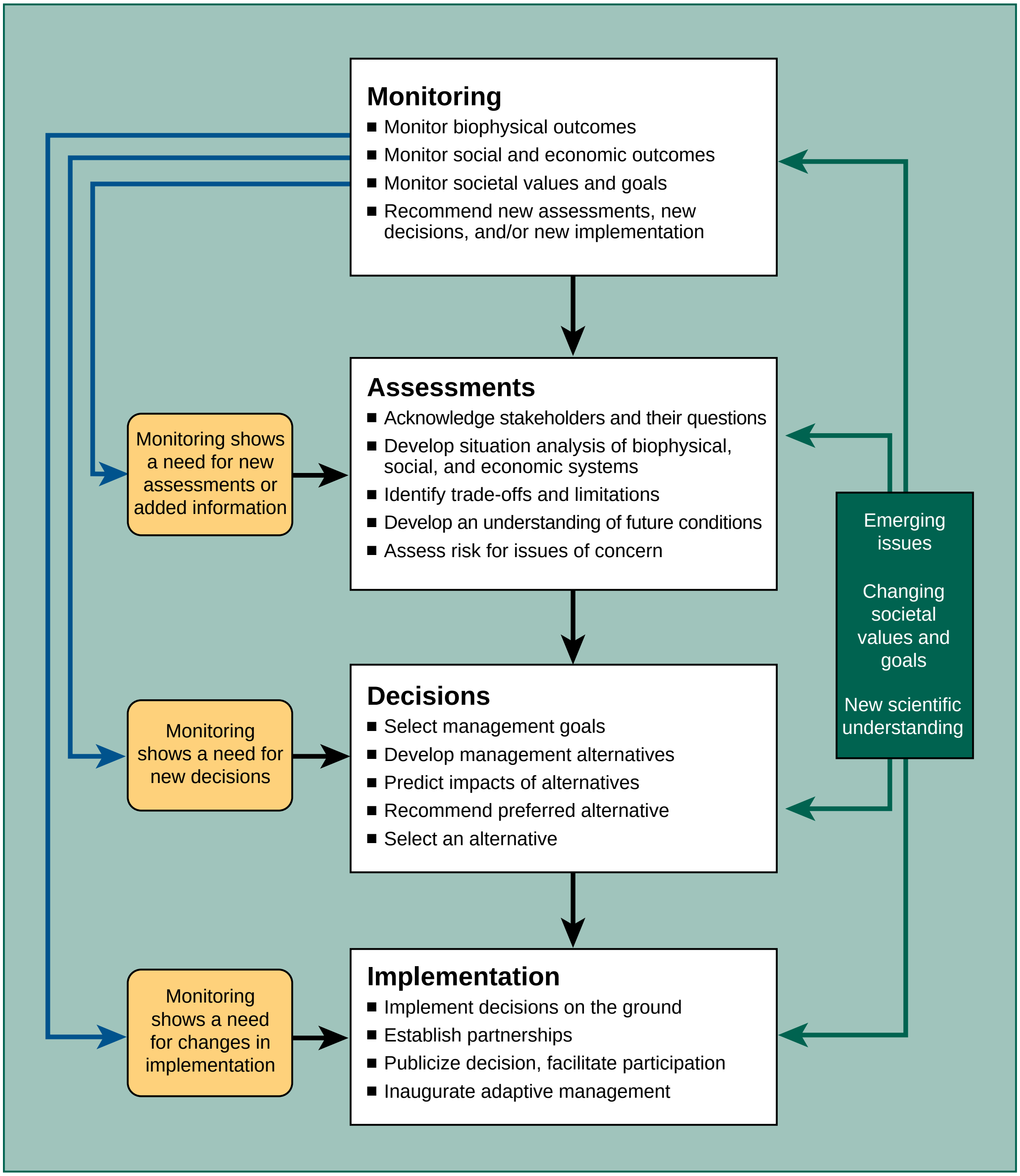


Figure 2—Each step of the General Planning Model for ecosystem management has several parts. Because the model is iterative, external or internal influences can initiate any step in the process and the process never ends.

Evolving Role of the Public and Institutions

Determining societal expectations for outputs (goods and services) and ecological conditions is a key feature of the planning model. In adaptive management, decisions are made as part of an ongoing process in which actions are tested, their effects monitored, and the resulting knowledge is used to modify management plans and practices. Interaction with the public, elected officials, and Indian tribes, takes place on a continual basis, rather than being solely project-driven.

Previously, public participation often meant reacting to predetermined agency proposals on a project-by-project basis. In adaptive management, changes to this process are driven by a desire to improve understanding about and confidence in agency policies and actions, including ecosystem management, among stakeholders. Interagency coordination and intergovernmental (and sometimes international) cooperation are essential to the success of an ecosystem approach to Federal land management.

Many public/private collaborative groups have formed in the Basin over the past few years to jointly address natural resource issues. These groups, which typically strive to include a balanced range of stakeholders regarding a given piece of land, natural resource, or decision, have yielded many benefits, including opportunities for mutual learning, increased ownership in decisions, and improved agency ability to implement plans. Such groups provide models of collaboration for use in ecosystem management strategies.

On the west side of the Cascades, the Northwest Forest Plan's creation of Province Advisory Committees was a move toward a new approach to public participation. Each of the 12 Provinces created as management units for the plan has an advisory committee made up of Federal employees and members of the public. The plan also established Adaptive Management Areas that called for new forms of ongoing collaboration in the planning, management, and monitoring of public lands.

A similar effort began in 1995, when the BLM and FS formed Resource Advisory Councils (RACs), each covering a distinct geographic area in eastern Oregon and Washington. The RACs, which eventually will cover much of the western United States, are designed to make recommendations to the FS and BLM on ecosystem management, watershed planning, and other local or regional natural resource issues. The list of objectives for RACs includes collaborating in resource management across jurisdictions, promoting partnerships and working groups to develop regional solutions to management issues, assisting with educational efforts, sharing science and other information, and encouraging and supporting local groups to help implement ecosystem management.

A key aspect of these two recent efforts is that they are ongoing rather than project-specific. People have the opportunity to become more involved in the entire flow of agency ecosystem management activities, rather than having only piecemeal involvement. Because these efforts are relatively new, their success has not yet been measured, but adaptive management includes tracking public participation and the social acceptability of management actions and their effects.

Ecosystem management calls for agencies and people to work together effectively in managing resources and opportunities that cross jurisdictional boundaries. The Federal Government, state governments, local governments, and the public all have their roles—some of which may differ from roles they have had in the past. Relations

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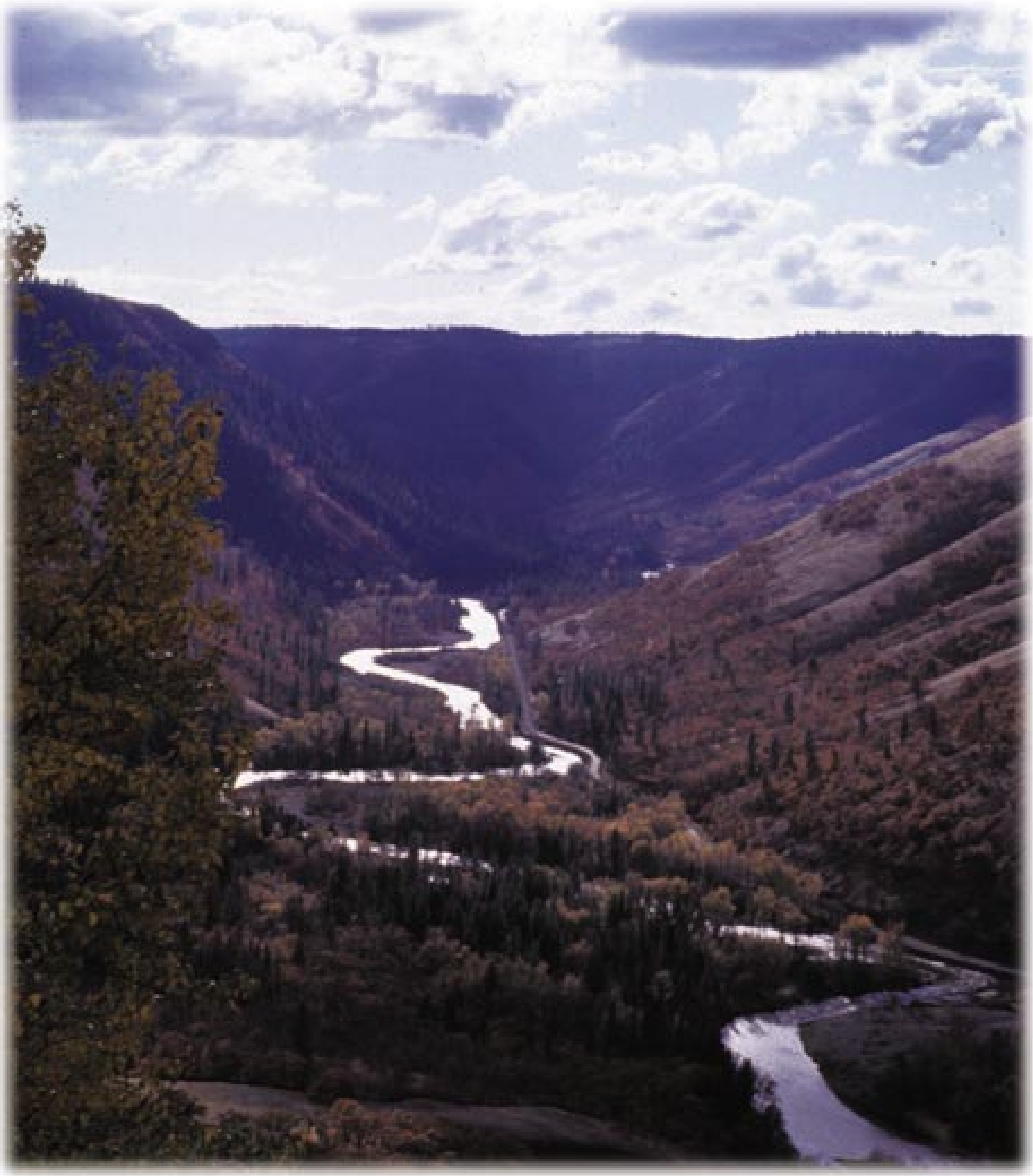

The upper Klickitat River in southcentral Washington. A public/private task force reached consensus on a management plan for the river in the late 1980s. Members of the group included federal and state agency employees, American Indians, loggers, ranchers, private landowners, recreationists, county commissioners, and conservationists.

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between county governments and the FS and BLM took on a new dimension in the Basin during the Interior Columbia Basin Ecosystem Management Project. The Association of Oregon Counties, the Washington Association of Counties, the Montana Association of Counties, and the Idaho Association of Counties created a new institution, the Eastside Ecosystem Coalition of Counties, to observe activities of the ICBEMP and communicate the interests of county governments.

The multiplicity of agencies with conflicting mandates and goals and the varieties of constituencies and legal authority, coupled with significant transboundary management questions and short timeframes, may challenge the agencies' ability to implement ecosystem management. Studies of previous cross-jurisdictional management efforts have shown that tolerance for change is critical, suggesting an approach that emphasizes incremental changes and places authority for managing change in the hands of those most directly affected. An open information flow is another key factor because the success of institutions depends in large part on learning gained from the trials and errors of past practices.

A number of institutional challenges to implementing ecosystem management were identified during the course of the ICBEMP. These include poor communication and poor understanding of the definition of ecosystem management, and questions about how to implement it without new legislation. Laws such as the Federal Advisory Committee Act may pose a barrier to some forms of desirable public participation, and aspects of BLM and FS policies and procedures such as budgeting and contracting may need modification. The money required to restore ecosystems to more productive and desirable conditions is another central issue.

Despite these challenges and complexities, there is widespread agreement that existing management of public lands in the Basin should be re-examined. The following sections summarize some of the ICBEMP science findings regarding existing conditions and trends in Basin resources and opportunities.