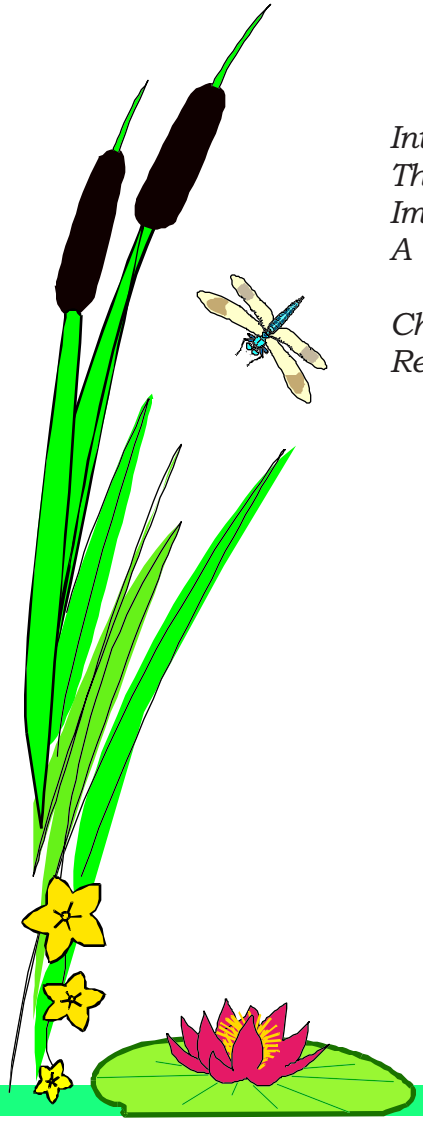
Appendix 3-1 Implementation Framework

(Comparable to UCRB Appendix I)



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Key Terms Used in this Appendix

The EIS Glossary can be used to clarify most key terms used in this appendix. However, several are unique to, or important in this document and are included as follows:

Adaptive Management *- A type of natural resource management in which decisions are made as part of an on-going process. Adaptive management involves testing, monitoring, evaluation, and incorporating new knowledge into management approaches based on scientific findings and the needs of society. Results are used to modify management policy.*

Regional Executives *- A group of BLM State Directors, Forest Service Regional Foresters, Forest Service Research Station Directors, Fish and Wildlife Regional Director, National Marine Fisheries Service Regional Director, and EPA Regional Director representing the agency offices within the Project Area that provide guidance and direction.*

Monitoring *- A process of collecting information to evaluate whether or not objectives of a project and its mitigation plan are being realized.*

Sub-basin *- Equivalent to a 4th-field Hydrologic Unit Code (HUC), a drainage area of approximately 800,000 to 1,000,000 acres.*

Subwatershed *- Equivalent to a 6th-field HUC, a drainage area of approximately 20,000 acres. Hierarchically, subwatersheds (6th-field HUC) are contained within a watershed (5th-field HUC), which in turn is contained within a sub-basin (4th-field HUC). This concept is shown graphically in Figure 2-1 in Chapter 2.*

Watershed *- 1) The region draining into a river, river system, or body of water; 2) In this EIS, a watershed also refers to a drainage area of approximately 50,000 to 100,000 acres, which is equivalent to a 5th-field HUC)*

Introduction

This appendix addresses implementation issues that will be finalized in the Record(s) of Decision (RODs). Processes for implementation, monitoring, and adaptive management are included. This appendix is not intended to be a plan but rather a framework to identify and guide the development work between Draft and Final EIS and to add clarity to the implementation expectations. This appendix is a start in the process, not a completed product. In recognition of the importance and focus needed, a team has been established to begin working on an Implementation Plan, to guide application of decisions made in the ROD(s).

This appendix is composed of four main sections:

- The Nature of Decisions;
- Implementation Process;
- Monitoring, Evaluation, and Adaptive Management Framework;
- Challenges to Implementation.

The Nature of Decisions

Nature of Planning on National Forest System and BLM-Administered Lands

In order to understand the decision(s) to be made based on this EIS, it is important to understand the Forest Service's and Bureau of Land Management's multi-stage process for land use planning.

Under the Forest and Rangeland Renewable Resources Planning Act (RPA) of 1974, the Forest Service Chief's Office prepares nation-wide Renewable Resources Assessment and Program documents (36 CFR 219.4(b)). Under the Federal Land Policy and Management Act of 1976 (FLPMA), the BLM Director provides guidance for the preparation of resource management plans, which includes national level policy (43 CFR 1610.1(a)). The next planning level involves preparation of a regional guide for each Forest Service Region to address "major issues and management concerns which need to be considered at the Regional level" (36 CFR 219.8(a)). Parallel to this, the BLM State Director provides State level guidance for resource management plan preparation (43 CFR 1610.1(a)). Next, individual National Forest/BLM land use plans are prepared which are "land and resource management plans for units of the National Forest System" (16 U.S.C. 1604(a); 36 CFR 219.10 to 219.27) and "resource management plans [which are] prepared and maintained on a resource area basis" (43 CFR 1610.1(b)). Finally, individual projects, such as timber sales, are evaluated and may be approved only if they are consistent with applicable Forest Service/BLM land use plans and applicable environmental standards (16 U.S.C. 1604(I) and 36 CFR 223.30) and (43 CFR 1610.5-3).

Plans for both National Forest System and BLM-administered lands are designed to be consistent with national-level agency policies and regulations. BLM plans at the project or activity level tier to Resource Management Plans or Management Framework Plans, which may be based on State Director guidance when needed. Forest Service project plans must be consistent with Forest Plans, which in turn are based on Regional Guides. When needed, larger scale multi-regional plans, such as this one, may be developed for issues that cross jurisdictional boundaries.

Nature of Decisions Expected in the ROD

The elements of the decisions to be made through the Interior Columbia Basin Ecosystem Management Project (ICBEMP) are described and explained in detail in Chapter 1 of the draft environmental impact statements (Draft EISs).

The decision(s) will include adoption of management goals, a desired range of future conditions expected over the next 50 to 100 years, objectives, and standards. An explanation of each of these decision elements follows:

Management Goals are broad general statements of intent that are not quantified or time specific. The goals of the ICBEMP were derived from consideration of the project charter and the purpose of and need for the project. In adopting these goals as part of the decision, the Forest Service and Bureau of Land Management will identify the general direction to be taken by subsequent planning and management actions.

The ***Desired Range of Future Conditions (DRFC)*** is a portrayal of the land, resource, or social and economic conditions that are expected to result in 50 to 100 years as objectives are achieved. The DRFC helps direct future management actions by providing a vision of these long-term conditions.

Objectives are indicators used to measure progress toward attainment of goals. They address short- and long-term actions taken to meet the goals. The objectives of the ICBEMP are expected to move conditions toward the desired range of future conditions described in Chapter 3 and to be implemented within 10 years. The Draft EISs include an estimation of the level of management activities that would be implemented on Forest Service- and BLM-administered lands in the project area resulting from this direction. (See Tables 3-6 and 3-7.) The activities displayed in these tables are the active methods that are most often anticipated and associated with restoration of ecological function and processes. (A more complete explanation of how the numbers were derived and what is meant by the various activities can be found in Appendix 3-3 in the section entitled *Ruleset*.) These levels of activities are estimates made to facilitate the evaluation of the alternatives. They are not targets or allocations.

Standards are required actions addressing how to achieve objectives. Standards can include additional processes that must be followed, or requirements to refrain from taking action in certain situations.

Decision(s) made by the agencies will provide a large-scale ecological context for Forest Service and BLM land use plans. They will help clarify the relationship of agency activities to ecosystem capabilities and will help develop realistic expectations for the production of economic and social benefits. Most decisions will focus on regional and subregional issues. The decision(s) will establish desired landscape patterns, structure, and succession and disturbance regimes to move toward sustainable forest land, rangeland, aquatic, and riparian ecosystems. Decision(s) are expected to describe a consistent aquatic/riparian strategy, the needs for ecosystem analysis, and management emphasis. Decision(s) will also establish general direction for management of habitat for threatened or endangered species, species of concern to tribes, or communities of species that require management across broad landscapes to assure viability. Decision(s) described in the Record(s) of Decision will focus on those that have been challenging to address at the local level. Most implementation decisions will be made locally within the context of those described in the Record(s) of Decision.

After the Record(s) of Decision are issued, each administrative unit will need to ensure that it is complying with both the amendment adopted by the ROD(s) and remaining language in the original plan. In addition, refinement of direction applicable to individual units may be developed through subsequent plan amendments or revisions.

Relationship to Existing Plans, Policies and Decisions

Both the Forest Service and Bureau of Land Management land use plans vary in their consistency with the different alternatives displayed in this EIS. Consequently, it is expected that the degree of change to individual plans as a result of the Record(s) of Decision will also vary from plan to plan. The amended plans will incorporate management goals and the desired range of future conditions over the next 50 to 100 years, will modify existing objectives or adopt new objectives to be used in measuring progress toward attainment of the management goals, and will identify standards to direct future management actions. In summary, this EIS will provide updated and broad regional direction, while individual Forest Service and BLM plans, as amended, will continue to provide more specific direction.

While the ROD will amend all existing land use plans, it will not replace or supersede all of the decisions and direction in these plans. Where those plans already provide management direction and land allocations not superseded by the ROD(s) for the ICBEMP, those mid- or lower tier decisions will remain in effect. Examples would include protective management direction and land use allocations for designated components of the Wild and Scenic River System, designated Research Natural Areas, National Historic Sites and Districts, or off-highway-vehicle play areas.

The Forest Service and BLM will continue to comply with existing laws and regulations and with longstanding agency policies such as those for management of special status species. The special status species policies for the BLM and Forest Service basically state that the agencies will manage such that special status species do not need to be listed as threatened or endangered under the Endangered Species Act.

Compliance with the National Environmental Policy Act (NEPA)

The EIS for this project provides the compliance with NEPA for the broad-scale decisions that will be made in the ROD. It does not replace the requirement to comply with NEPA for implementation

actions. The agencies will continue to prepare Environmental Assessments (EAs) and Environmental Impact Statements (EISs) as part of decision making and planning processes. These subsequent EISs and EAs will tier to the Upper Columbia River Basin (UCRB) or Eastside EIS.

Management Priorities

Management priorities are described in Chapter 1. In addition, management emphasis is described in Chapter 3 for each alternative. With the significant diversity of issues, resources, conditions, trends, and communities within the planning area, there is no simple solution to ambiguities or conflicts that may arise through implementation at the field level. The management priorities and emphasis outlined in this EIS and Record(s) of Decision will provide the context, framework, or umbrella for local decision making. Local managers need the flexibility to work within this umbrella to adapt priorities and emphasis to local conditions such that outcomes can be most effective.

In Chapter 1, three priorities are stated: protect ecosystems, restore deteriorated ecosystems, and provide multiple benefits for people within the capabilities of ecosystems. In Chapters 2 and 3, forest and range clusters are described. Within the clusters, priorities and opportunities are discussed. In addition, in Chapter 3, management emphasis is assigned by alternative and cluster to conserve, restore, produce, or a combination of these. These descriptions outline the framework and context to conduct management activities. While clusters represent areas with similar risks, opportunities, existing conditions, and management histories, they are not homogeneous and contain a variety of actual and potential conditions. While a management emphasis has been assigned for each cluster as a whole, the varying conditions within a cluster will require that management activities are selectively placed to create the optimum mix of restoration, conservation, and production. Placement of activities will be based upon local conditions as described during further analysis (See *Linking Broad-scale Decisions and Information to Finer Levels* in this appendix).

Clusters also contain parts of more than one administrative unit. Implementation will require a consistent approach among affected administrative units, and will be guided by four components: integrated risk analysis, spatial prioritization, additional analysis as described in the section entitled *Linking Broad-scale Decisions and Information to Finer Levels* in this appendix, and monitoring and evaluation.

An integrated risk analysis, conducted prior to the ROD, will examine relative risks to important components of the terrestrial, aquatic, and landscape processes as brought forward through the *Scientific Assessment*. This process will also consider the opportunities that are consistent with reducing risks; restoring areas important to terrestrial, aquatic, and landscape systems but currently not at their potential; and the provision of goods and services consistent with maintaining ecological integrity. It is expected that the combination of the integrated risk analysis and the theme of the alternatives will be used to identify subbasins where there is the greatest opportunity to jointly reduce overall ecological risk, and meet other societal needs. This is referred to as spatial prioritization.

Next, a process for using information from multiple scales to aid in decision making will be implemented as described in the section entitled *Linking Broad Scale Decisions and Information to Finer Levels*. This step-down process is designed to ensure that final commitments of actions prescribed to meet broad-scale goals and objectives are made only after considering local conditions. It will validate the risk determinations made as part of the spatial prioritization process, and facilitate the analysis of cumulative effects when individual project decisions are made.

Finally, implementation will include a feedback mechanism that will compile information about implementation, and aggregate it upward to determine if the cumulative results of implementation are as desired or expected. This monitoring process will examine whether existing conditions match those projected, and whether progress is being made toward achieving the desired

conditions. It will include a determination of whether the levels of activities that were projected are occurring, whether they are occurring in the expected locations, and how these findings relate to the projected effects of implementation. Monitoring may occur in conjunction with analysis done at any scale in the step-down process. (See *A Framework for Monitoring, Evaluation, and Adaptive Management* in this appendix).

Concerns may arise about possible conflicts between resource needs and people's needs. These are ultimately addressed at the local level, within the context of overall direction and priorities contained in the ROD(s). As a foundation, however, the Forest Service and BLM are obligated and committed to meeting the intent of existing laws, regulations and policies. Various Federal and State laws, such as the Clean Water Act, Clean Air Act, Endangered Species Act, Federal trust responsibilities, and the National Forest Management Act (NFMA), have minimum requirements or conditions (such as meeting the viability requirement of the NFMA, water temperature standards of the Clean Water Act, or emission standards from the Clean Air Act) that must be attained prior to or while conducting management activities. While these define the lower limits of the decision space, the upper limit is often bounded by the biological potential, or maximum capabilities of the land and resources. This then allows for a range of management options between the minimum legal requirements and the biological potential. Selection of a Preferred Alternative or action within that range of options can then be focused on social, economic, or special resource considerations. In general, after ensuring that legal requirements are satisfied, a combination of social, economic, and resource values will be greatest somewhere short of maximizing any one value, except where very limited opportunities, high risks, or rare and sensitive species or habitats exist.

Implementation Process

Introduction

An implementation plan will be developed to guide application of decisions made in the ROD(s). The Implementation Plan will not add new objectives, standards, or guidelines, but it will describe an implementation process that will increase the likelihood of meeting management goals and objectives and of attaining the desired range of future conditions described in the selected alternative.

Time Frames for Implementation

Implementation of decisions made through this process will occur in two phases. First, activity planning and project design will begin almost immediately to reflect the management direction as described in the ROD. Generally, any ongoing, short-term activity that has been through the NEPA process would not be changed as a result of new direction. Short-term activities where analysis has been completed and decisions are pending will be screened to ensure there are no major conflicts with the new direction. Decisions affecting longer term permitted activities, such as livestock grazing and special-use activities, would have a transition period to come into compliance with new direction. The actual time frame and process to bring existing activities into compliance will be included in the Record of Decision. New projects will be designed to achieve the broad-scale objectives, and all new standards will be applied to those projects.

The second phase of implementation will occur over the longer term, whereby plans for individual administrative units will be reviewed for barriers to achieving broad-scale objectives. This should occur through the monitoring and evaluation process, and may lead to additional changes in plans through a later amendment or revision process that considers information specific to each administrative unit.

Interagency/Intergovernmental Coordination, Collaboration, and Accountability

This EIS has been prepared with close coordination and collaboration with other Federal agencies; State, local, and tribal governments; Resource Advisory Councils (RACs); and Provincial Advisory Committees (PACs). Expectations are high for these decisions to resolve many broad-scale issues within the project area. In order to maximize the likelihood of fulfilling these expectations, and to successfully restore the ecosystems of the project area, a collaborative approach toward implementing decisions made in the Record(s) of Decision will be developed. Currently there is no project-wide, systematic approach for interagency or intergovernmental coordination, collaboration, and accountability. Several areas have been identified where opportunities should be provided to meet this need. They include, but are not limited to:

- Consistent interpretation and application of decisions;
- Coordinating and conducting Sub-basin Review;
- Prioritizing and conducting Ecosystem Analysis at the Watershed Scale;
- Assessing cumulative effects;
- Monitoring and adaptive management;
- Data management and inventory;
- Accountability and credibility;
- Coordination and collaboration with other Federal agencies, State and local governments, and tribes.

There are many approaches that will be explored between the release of this Draft EIS and release of a Final EIS to address these areas. These approaches will be examined in light of their overall effectiveness and cost. Many efforts to coordinate and effectively communicate are currently in place in portions of the project area and may need to be institutionalized project-wide. For example, the *Federal Guide for Watershed Analysis, Version 2.2,* describes methods for and the value of interagency coordination; the *Guide* currently is being used in parts of the project area. Also, the Forest Service, Bureau of Land Management, National Marine Fisheries Service, Fish and Wildlife Service, and Environmental Protection Agency (EPA) have signed a Memorandum of Agreement (MOA) that streamlines consultation processes under the Endangered Species Act, and provides an effective issue resolution mechanism. This MOA, which provides a four-level process to resolve interpretation and accountability issues, appears to be working well and will likely be continued and expanded.

The Federal partner agencies are dedicated to ensuring that line officers from both the land management agencies and the regulatory agencies are held accountable for implementing the selected alternative (A-O1, A-S1, A-S2, in Table 3-5). Mechanisms for ensuring this accountability will be developed and reinforced prior to publishing the Final EIS.Opportunities will be provided to tribes, State and local governments, other Federal agencies, Resource Advisory Councils, and Provincial Advisory Committees to participate in this oversight (A-S3).

An Interagency Implementation Team consisting of representatives from the Forest Service, BLM, National Marine Fisheries Service, Fish and Wildlife Service, and Environmental Protection Agency will further develop and evaluate organizational options, process strategies, and training opportunities to accomplish this need and desire for interagency/intergovernmental cooperation, collaboration, and accountability.

Consultation with Tribal Governments

Indian tribes are asking, and the agencies agree, for the tribes to have more involvement in the decision process. The United States Government has an obligation to deal with Indian tribes as sovereign governments. Since late 1993, there have been numerous executive orders, laws, and statutes (See Appendix 1-2) that have directed and encouraged this interaction. Objectives TI-O1 – 4 and associated standards (Table 3-5) direct agencies to meet Federal Government responsibilities, to maintain meaningful government-to-government relationships, and to consult with the tribes.

Consultation is an active, affirmative process which identifies issues and seeks input from affected tribal governments, considers their input, resolves conflicts, and explains decisions. It is a necessary and integral part of the decision-making process. Consultation can build strong working relationships and encourage exchange of local site-specific information resulting in better decisions.

Public Involvement and Collaboration

Federal agencies, social scientists, and others agree that ecosystem management requires greater participation by the public and other governmental agencies, especially for collaborative efforts that foster mutual learning. Alternatives 3 through 7 reflect this with a number of objectives and standards designed to ensure that stakeholders play an increased role in public land planning, implementation and monitoring.

These measures are directed at three main audiences: tribal governments, local and State governments, and other stakeholders. HU-S1 (Table 3-5) directs National Forests and BLM districts to initiate Memoranda of Understanding (MOU) or similar agreements with tribal, local and State governments to offer advice to Federal land managers in decision making. Objective HU-O1 directs agencies to provide opportunities for increased involvement by a broad range of stakeholders. The intent of these objectives is to provide opportunities beyond that required by NEPA to move beyond an activity-by-activity involvement of tribes, the public, and local and State governments.

An ongoing issue in public participation is how to involve not just the local and regional public, but the national public. There appears to be consensus that it is most important to involve people who will be most directly affected by public land management. However, the *Economics Chapter of the Assessment of Ecosystem Components* demonstrated the tremendous national values associated with project area resources. Involving this constituency should be part of the process, especially in areas such as regional priority setting.

It will be important for tribal governments, other agencies, the public, and local and State governments to have the opportunity to participate in technology transfer efforts. If these participants are expected to have an increased role in planning, implementation, and monitoring, they, as well as agency employees, will need a better understanding of conditions, trends, issues and interactions, rather than just information about the result of analysis.

Collaborative approaches to implementation will be necessary to assure success. Close working relationships between management and regulatory agencies will need to be developed and maintained. Others outside the Forest Service and BLM should be involved in monitoring, evaluation, and adaptive management. The BLM and Forest Service retain the responsibility and authority for land management decisions. However, these decisions will be more meaningful, effective, and long lasting if done in an open process through collaborative means.

Linking Broad-scale Decisions and Information to Finer Levels

In this Draft EIS, certain requirements are described that provide a hierarchy of analysis to support land management decisions. The following section provides an outline of the expected types and levels of analysis that will "step-down" broad-scale information and decisions to site-specific actions. This step-down process is designed to ensure that broad-scale decisions are viewed within the context of local conditions, and that local decisions are made within the context of broad-scale goals and objectives.

While this Draft EIS contains regional direction and context for addressing broad-scale issues and resource conditions, most management actions will require further analysis and additional decisions prior to being implemented. This additional analysis is necessary to:

- Validate, refine, or add to information concerning current and historical resource conditions, processes, and interactions;
- Address issues not appropriately addressed at the broad scale;
- Prioritize restoration efforts to maximize the likelihood of meeting management goals and objectives, and to minimize negative impacts;
- Provide subregional and local input.

Analysis of ecosystems is a systematic way of gathering, organizing, and understanding ecosystem information. It is not, in itself, a decision-making process. Rather, it provides the information necessary to make wise, well-informed decisions as required by the National Environmental Policy Act (NEPA). With this information, managers can better understand and disclose the effects of their decisions. It also helps guide the type, location, and sequence of appropriate management activities within a watershed. In addition, this analysis can help identify monitoring and research needs.

Additional analysis is directed by the action alternatives (Alternatives 3 through 7) in this Draft EIS primarily to provide the context necessary for applying broad-scale decisions to site-specific situations. It is a particularly valuable instrument for providing the type and level of information necessary for amending and revising land use plans and scheduling site-specific management activities.

While it is the goal of the Forest Service and BLM to conduct this analysis throughout the project area, it is required to different degrees, by alternative, before certain activities can proceed.

Hierarchy of Analysis

Three additional levels of analysis or review, below the project-wide analysis, conducted as part of the ICBEMP are intended to provide the context necessary to appropriately implement these broad-level decisions on individual National Forests and BLM Resource Areas or Districts. They include Sub-basin Review, Ecosystem Analysis at the Watershed Scale, and site-specific analysis. This hierarchy of analysis or review is intended to meet the objectives mentioned above; however, additional scales may be more appropriate for certain subregional issues. Generally, watershed scale analyses will be aggregated to address issues that transcend individual 5th- and 6th-field HUC watersheds.

Examples of information that should be considered during Sub-basin Review and Ecosystem Analysis at the Watershed Scale are:

A. Socioeconomic -
- ◆Economic resiliency;
- ◆Transportation corridors, infrastructure;
- ◆Recreation opportunities;
- ◆Economic opportunities;
- ◆Urban interface;
- ◆Quality of life;
- ◆Custom and culture;

B. Tribal -
- ◆Indian religious sites;
- ◆Cultural and spiritual values;
- ◆Reserved rights on ceded lands;
- ◆Traditional use areas, hunting, fishing, grazing, and gathering areas and opportunities to improve these sites;

C. Biophysical -
- ◆Distribution and status of threatened, endangered, proposed, and candidate species, species of concern, sensitive species, or remnant populations of species;
- ◆Number of different native vertebrate species present or thought to be present in a given area (native species richness);
- ◆Designated or proposed critical habitat or habitat necessary for species recovery;
- ◆Populations with unique genetic traits or populations near the edge of the range of a more widely distributed species;
- ◆Habitat for rare or endemic species;
- ◆Distribution and status of exotic vertebrate and vascular plant species;
- ◆Watershed, aquatic, and terrestrial connectivity and potential for reestablishment of connectivity in fragmented watersheds;
- ◆High quality waters which include, but are not limited to:
  - waters whose quality is necessary to support threatened, endangered, candidate, and sensitive species restoration, conservation, or recovery;
  - waters/watersheds used as sources of public drinking water;
  - waters/watersheds where groundwater recharge to Sole Source Aquifers designated under the Safe Drinking Water Act occurs;
  - waters whose quality is necessary to support any beneficial use;
- ◆Degraded waters which include, but are not limited to:
  - waters that do not meet one or more State, EPA, or tribal water quality standards;
  - waters whose quality does not support a beneficial use;
  - waters officially designated as Water Quality Limited under Clean Water Act(CWA) Section 303(d);
  - waters currently meeting water quality standards but which require above-normal measures of practices to maintain;
- ◆Watershed, aquatic and terrestrial habitat condition;
- ◆Vegetation composition, distribution, health, and patch and pattern (includes, but not limited to insect and disease problems and fuel loading);
- ◆Verification of aquatic and terrestrial strongholds and sub-basin category designations;
- ◆Downed woody debris and snags;
- ◆Biophysical and watershed sensitivity to natural and management disturbances;
- ◆Completeness of watershed, aquatic, and terrestrial information;
- ◆High quality, restorable, and previously restored terrestrial and aquatic habitats and waters including those important to the conservation of sensitive, candidate, proposed, and listed species. Indicators may include:
  - road density;
  - hydrologic integrity;
  - rangeland and forest land integrity.

Sub-basin Review

The first step toward understanding how the *Scientific Assessment* relates to more localized conditions is Sub-basin Review (800,000- to 1,000,000-acre watershed), which is directed in EM-O3 and EM-S1 for all of the action alternatives. This process is based upon existing information and is intended to be a brief validation; it is designed to:

- Review information provided in the ICBEMP *Scientific Assessment* and from the spatial prioritization process and validate with existing local information;
- Prioritize opportunities for Ecosystem Analysis at the Watershed Scale within the subbasins;
- Identify potential project level opportunities for implementing ecosystem management that can be determined at this scale;
- Identify data gaps;
- Identify opportunities for pooling interagency (Federal agencies), tribal, and intergovernmental (States, counties, cities) resources for completing analyses and project-level work.

Sub-basin Review will generally occur on each 4th-field HUC across the project area. Exceptions include those watersheds where Forest Service- and BLM-administered lands make up only a small fraction of the total land area, or where lumping subbasins is logical. Sub-basin Review will be conducted by an interagency, interdisciplinary team.

Ecosystem Analysis at the Watershed Scale

The second analysis scale below the broad-scale is watershed scale analysis (5th- or 6th-field HUC; 10,000- to 100,000-acre watersheds), which is directed in EM-O4 and EM-S5 through EM-S10 for all the action alternatives. This analysis will normally employ watershed and subwatershed boundaries, however, using other boundaries that are meaningful and efficient is appropriate as long as the logic and processes for Ecosystem Analysis at the Watershed Scale are followed, and the product provides context and information for decisions. This scale of analysis is intended to:

- Establish a consistent watershed-wide context for water quality conditions and protection of beneficial uses;
- Provide the hydrologic characterization and identification of pollutant sources;
- Understand actual conditions at a resolution necessary to make judgement about watershed-scale effects of actions on resources;
- Evaluate potential actions in the context of an overall understanding of the capabilities, limitations, and risks of a specific watershed;
- Identify watershed level issues and concerns;
- Identify synergies that can be gained through sequencing activities;
- Refine management standards to fit local conditions and values at risk;
- Identify monitoring needs for watershed-wide effects.

Ecosystem Analysis at the Watershed Scale will provide the opportunity for interagency and intergovernmental involvement and will follow the *Federal Guide for Watershed Analysis, Version 2.2*, or subsequent replacements. It will be conducted by teams of journey-level specialists who follow a standard six-step process. It is an incremental process, whereby information from inventories, monitoring reports, or additional analyses can be added at any time.

In many cases, activities that require an Environmental Assessment or an Environmental Impact Statement will also require Ecosystem Analysis at the Watershed Scale. To address any ambiguity between projects needing ecosystem analysis and those needing only site-specific analysis, an interagency team will develop a screening process that will help identify which activities that

require an EA or an EIS are exempt from the requirement to conduct Ecosystem Analysis at the Watershed Scale. This process will guide decisions concerning which projects are appropriate to proceed without watershed scale analysis in certain areas.

Information derived through Sub-basin Review and Ecosystem Analysis at the Watershed Scale would be aggregated up to assist in making programmatic decisions, such as land use plan amendments and revisions, and would be incorporated into project decisions at lower levels (EM-S4).

Site-specific Analysis

The third scale of analysis below the broad-scale is the site-specific, or activity-level analysis. This analysis will typically result in a NEPA process, including public scoping, and a site-specific decision document. While it may be feasible to analyze the effects of groups of activities at the watershed scale, a large majority of the activities proposed will be analyzed at the site-specific scale. Under the hierarchy of analysis outlined above, this scale of analysis acts as a safety net for those issues overlooked or appropriately excluded at larger scales, and provides site-specific information for determining effects. This level of analysis has been used extensively since the inception of NEPA in 1969, and in accordance with Forest Service NEPA Handbook 1909.15 and BLM NEPA Handbook H-1790-1. It has been proven successful at identifying and addressing local issues and concerns; however, as a stand-alone assessment process, it has often been ineffective at addressing larger scale issues. The site-specific analysis process will be significantly enhanced, predominantly by the context provided by higher scales of analysis when assessing cumulative effects. This process should further identify the monitoring necessary to meet those needs identified during Ecosystem Analysis at the Watershed Scale.

Management Activity Levels for Individual National Forests and BLM Resource Areas

Forest and range clusters are described in Chapter 2 in terms of resource conditions, risks, and opportunities. Management emphasis (Conserve, Restore, Produce, or a combination of these) is discussed in Chapter 3 for each alternative, based on the characteristics and conditions within the clusters and the theme of each alternative. Sub-basin Review and Ecosystem Analysis at the Watershed Scale will review and validate or update these conditions, risks, and opportunities for individual subbasins.

Tables 3-6 and 3-7 in Chapter 3 show management activity levels predicted to occur as the result of changes in management emphasis, and goals and objectives for each alternative. The data used to generate these tables were broad in nature and appropriate to this scale of analysis. These estimates were used to run models and to assist in the evaluation of the alternatives. At this broad-scale, there is confidence that the activity tables are good indicators of outcomes of implementation of each alternative, or the relative differences between the alternatives; however, they should not be viewed as targets or requirements.

This Draft EIS sets forth priorities for areas where activities might occur based upon the forest and range clusters and management opportunities identified in the *Scientific Assessment*. The EIS team developed alternative strategies in the form of management priorities, DRFCs, goals, objectives, and standards. The priorities and constraints to types of activities that might occur in certain areas (such as riparian conservation areas) have also been described in each alternative. Based on ecosystem analysis to be performed, for the most part, after the ROD is signed, Forest Service and BLM administrative units, working in close coordination with other administrative units, other Federal agencies, State and local governments, tribes, and the public, will determine which activities, in what proportions, are appropriate for each administrative unit to accomplish. Time frames and actual locations for these activities will be developed during this process. Actual activity levels occurring during implementation will be monitored and differences from projected levels will be evaluated. The effectiveness of activities in achieving desired outcomes will also be assessed. Selection of activities at the project level would become part of an adaptive management approach.

Interagency Cumulative Effects Analysis

The ecosystem management strategy proposed in this document is based on dynamic assessments that provide characterizations at different levels, and a monitoring and evaluation mechanism that helps validate or modify our current understanding about cause-and-effect relationships. The strategy will support decisions closer to the level that the issue, ecosystem process, or risk to ecosystem integrity occurs, through an adaptive approach. Through such a process cumulative effects can be observed and understood at different levels as well, and can more effectively be used by decision makers at the appropriate decision level.

As discussed in the section titled Management Priorities, understanding the cumulative effects of activities being proposed will be greatly aided by information garnered during the step-down analysis process; however, a formal determination of cumulative effects will be made at the decision-making levels discussed in the section titled Nature of Planning on National Forest System and BLM Lands. Likewise, monitoring and evaluation (see *A Framework for Monitoring, Evaluation, and Adaptive Management* later in this appendix) will provide vital information for determining if desired outcomes are being achieved, which will feed into decisions through land use plan amendments and revisions, and through site-specific actions.

A coordinated and consistent approach between the Forest Service and BLM, and involvement of the other Federal partner agencies, will be crucial to the successful understanding of cumulative effects of broad-scale decisions made through this process. The Implementation Team will further develop these concepts prior to publication of the ROD.

This cumulative effects analysis process must be developed within the context of current legal definitions. The following information is provided to help the reader understand how the terms "cumulative impacts" and "cumulative effects" are defined in a legal context.

The term "cumulative impact" is defined in the Council on Environmental Quality (CEQ) regulations for NEPA at 40 CFR 1508.7; the Endangered Species Act (ESA) also defines "cumulative effects" at 50 CFR 402.02. To fully understand the use and meaning of the CEQ definition, we also need to look at other portions of the CEQ regulations at 1508.1, Terminology and 1508.8 Effects:

> NEPA 1508.1 Terminology: The terminology of this part shall be uniform throughout the Federal Government.
>
> NEPA 1508.7 Cumulative impact: Cumulative impact is the impact on the environment which results from the incremental impact of action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.
>
> NEPA 1508.8 Effects: Include (a) Direct effects, which are caused by the action and occur at the same time and place. (b) Indirect effects, which are caused by the action and are later in time and farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.
>
> Effects and impacts as used in these regulations are synonymous. Effects include ecological (such as the effects on natural resources and on the components, structure, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions which may have both beneficial and detrimental effects, even if on balance the agency believes that the effects will be beneficial.

ESA 402.2 Cumulative effects are those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation.

Snags and Downed Woody Debris

The action alternatives in the Draft EIS propose a variety of management options for forest vegetation to achieve a pattern that is more consistent with endemic levels of insects and diseases and natural fire regimes. The action alternatives propose reducing fuels and reintroducing fire across the landscape. This pattern on the landscape will also need to be managed to provide adequate levels of snag and downed woody debris habitat for terrestrial and aquatic species in the short-term, and to provide for long-term soil productivity.

Most current snag standards have been in place for 10 to 15 years. More is now known about interrelationships between ecosystem structures and processes, and these standards may not be consistent with other important variables that must also be considered. For instance, in determining desired snags per acre, consistency with fire or insect and disease disturbance regimes has often been overlooked. These disturbance regimes are desirable for creating and maintaining landscape patterns and micro-habitat structures that support native plants and animals. These regimes are variable and consequently the patterns that result are also variable. Ideally, management activities should focus on developing and maintaining a variable patchwork of landscape patterns whose living and dead structural attributes are consistent with biophysical environments and natural disturbance regimes.

HA-S7 (Table 3-5) directs administrative units to review existing information or conduct the appropriate analysis to link snag levels and recruitment standards to more localized biophysical environments. This same approach would be developed for determining the amount of coarse woody debris to retain, as directed by standards PE-S1, PE-S2, and HA-S8. Between publication of the Draft and Final EISs, a team will develop a consistent methodology and criteria for determining the appropriate levels. This will be reflected in the Record(s) of Decision. Although the goal is to move toward patterns that are consistent with natural disturbance processes, in the interim some adaptations may be necessary to ensure that no vital habitat is lost during the transition. For instance, to provide quality, quantity and distribution of snags in the short term, the amounts may have to be higher than expected for the biophysical environment on one site to compensate for another site.

Policies on Special Status Species

Not all special status species were analyzed at the broad-scale since populations may be endemic, may be most influenced by factors outside the control of the Forest Service or BLM, or for other reasons may be best addressed at finer scales of analysis. These species are covered under existing policies currently being implemented by the Forest Service and BLM and described or referenced below.

Under Forest Service Manual (FSM) 2670, Forest Service objectives for threatened, endangered, proposed, and sensitive species are outlined. The process of reviewing all Forest Service planned, funded, executed, or permitted programs and activities for possible effects on these species through the development of biological evaluations are described. In addition, FSM 2670.32 describes the objectives, responsibilities and processes associated with the Forest Service sensitive species program. Key objectives include:

- Assist States in achieving their goals for conservation of endemic species;
- As part of the NEPA process, review programs and activities, through a biological evaluation, to determine their potential effect on sensitive species;

- Avoid or minimize impacts to species whose viability has been identified as a concern;
- If impacts cannot be avoided, analyze the significance of potential adverse effects on the population or its habitat within the area of concern and on the species as a whole. (The line officer, with project approval authority, makes the decision to allow or disallow impact, but the decision must not result in loss of species viability or create significant trends toward Federal listing.)

BLM Manual 6840 provides policy and guidance for the conservation of special status species of plants and animals and their habitats. This group of species includes those that are officially listed, are proposed for listing, or are candidates for listing under the provisions of ESA; are State listed as endangered or threatened; and BLM sensitive, which are designated at the State Office level.

For Federal candidates such as bull trout or the spotted frog, the 6840 policies require that the BLM will carry out management, consistent with the principles of multiple use, for the conservation of candidate species and their habitats. The BLM is required to ensure that the actions authorized, funded, or carried out do not contribute to the need to list candidate species as threatened or endangered. The policy directs the agency to determine the status and distribution, and to address the species in land use plans, in plan implementation, and in monitoring and evaluation.

BLM sensitive species are designated by the BLM State directors and are defined as species that may easily become endangered or threatened within a State.

Under the BLM Manual 6840, the BLM is also directed to cooperate with States where they have species listed as threatened or endangered, to assist States in meeting their management objectives.

Data Management and Technology Transfer

A key element for ecosystem management is the need for consistent, current, and accurate information concerning the ecological and biophysical environments across the landscape. The collection and management of this data and information among tribal, Federal, State, and local agencies need to be effectively coordinated and shared in order to implement ecosystem management. Currently, data are collected in many formats among and within agencies. Developing a minimum data standard for vegetation, aquatic, fisheries, and terrestrial components of the landscape should be explored.

To facilitate implementation of the decisions for this EIS and the findings of the scientific body of work, technical support will continue after the Record of Decision is signed. This support could consist of workshops, a science advisory group; a spatial analysis team; release, maintenance, and upkeep of the GIS database; maintenance and updates of the various databases and models that were developed for the ICBEMP; and technical assistance to support plan amendments (Information Systems [Gravenmier et al. 1996] chapter of the *Assessment of Ecosystem Components*).

Several types of workshops have been considered that could be useful in dissemination of the information gained during development of the ICBEMP. Technology transfer teams are crucial for providing user support and training to the field offices over the next several years. Science advisory groups could interpret, consult, and provide advice on ICBEMP products, data, databases, and models. A spatial analysis team could coordinate and maintain the GIS database, and provide data layer maintenance for key layers. The GIS data (170 themes) and associated databases (approximately 20) collected and created for use in the *Scientific Assessment* needs to be managed, maintained and shared. A central information clearinghouse could be established to support the update and implementation of Forest and BLM District land use plans. A few of the existing models have been fully documented and have user guides (Information Systems [Gravenmier et al. 1996] chapter of the *Assessment of Ecosystem Components*). These issues will be addressed in the final Implementation Plan.

A Framework for Monitoring, Evaluation, and Adaptive Management

Introduction

The objective of this section of the appendix is to provide a framework to develop a specific monitoring and evaluation plan to measure the conditions and trends in the ICBEMP area. The information developed through the monitoring process can be used to assess management strategies, alter decisions, change implementation, or maintain current management direction. This Framework builds on *A Framework for Ecosystem Management in the Interior Columbia Basin* and the two Draft EISs. This framework is also based on concepts from *An Interagency Framework for Monitoring the President's Forest Ecosystem Plan, April 1994*. The actual monitoring plan will be developed prior to release of the Final EIS(s).

Monitoring and evaluation play pivotal roles in the adaptive management process, primarily to detect undesirable changes early enough that management activities can be modified to work toward achieving the desired goals and objectives of the plan. Adaptive management strategies must include all four parts of the process: planning, implementation, monitoring and evaluation. Resources must be allocated and priorities established so that all parts of adaptive management are completed over an appropriate time frame and no part is emphasized at the expense of another.

Monitoring is the process of collecting information to determine if ecosystem management strategies are being implemented as planned, if management goals and objectives are being met, and if there are any unanticipated results from implementing planned management strategies. Based on an evaluation of the monitoring information, current management can be maintained or adjusted to meet ecosystem management goals.

To be effective, monitoring and evaluation must be treated as an integral component of land management, be well conceived, and be adequately funded. Also, monitoring will necessitate a major, cooperative effort involving interested and affected parties, including Federal, State, local governments, tribes, Resource Advisory Councils, Provincial Advisory Committees, local communities, private landowners, and special interest groups. These parties share a common interest in attempting to achieve the objectives that emerged from the ICBEMP.

Just as ecosystems operate within a hierarchy, monitoring and evaluations follow the same logic. Each level of an ecosystem has discrete ecological functions but at the same time is part of the larger, integrated whole. Monitoring needs to follow the same pattern, answering questions and measuring trends at the various levels within the project area. Certain issues and activities within the project area can have effects at the broadest level, such as activities that affect air quality, noxious weeds, or wide-ranging species. Some issues or activities, such as forest health, juniper encroachment, and species endemism, operate within smaller geographic areas. Yet others are mostly of local concern, such as access management and municipal watersheds that may affect local communities. Monitoring strategies need to recognize this hierarchy and provide for data collection and evaluation at the appropriate levels.

A coordinated interagency interdisciplinary monitoring system is needed to determine the health and integrity of the project area ecosystems, determine condition and trends, and provide the basis for needed changes in management. Numerous Federal and non-Federal monitoring activities currently exist within the project area. Because of the wide variety of monitoring activities, the dispersed nature of data, and the inconsistency in the kinds of data collected, it is difficult and sometimes impossible to judge the health and integrity of the ecosystem at the regional level. Data should be collected for the different ownerships within ecosystems so that it can be aggregated to answer broad-scale questions. Once regional data elements are identified for monitoring, appropriate monitoring systems can be designed to allow for analyses.

Conceptual Framework of Monitoring

The conceptual framework contains four elements: goals, scope, general approach, and relationship of monitoring to other activities.

Goals of Monitoring

Monitoring efforts provide information to: (1) determine if planned activities have been implemented and standards and guidelines are being followed, (2) detect magnitude and duration of change in conditions and detect trends, (3) formulate and test hypotheses as to the cause of the changes, and (4) help managers better understand the causes of change and predict impacts.

Information provided through monitoring can be used to measure success in meeting plan goals. The *Scientific Assessment* and two Draft EISs identified the indicators used in making decisions. These indicators were considered when developing evaluation questions, identifying data needs, and monitoring process.

Under this approach, departures from expected conditions or other quantities are not treated as failures, but rather as new information to improve the quality of land management. Actions taken could be mitigation, change of actions in the future, and revised goals, or some mix of these. This iterative approach is referred to as *adaptive management*, described further in the Relationship of Monitoring to Other Activities section.

Scope of Monitoring

The monitoring and evaluation strategy focuses on Forest Service- and BLM-administered lands in the project area (see Map 1-1 in Chapter 1). Although the focus is on Forest Service- and BLM-administered lands, monitoring could cross administrative boundaries to measure the Federal component of the ecosystem. Monitoring will be a multi-agency effort.

Because ecosystems are complexes of biotic, abiotic, and human elements interacting over time and space, the biological, physical, social, and economic aspects will need to be monitored to determine if ecosystem goals are being met.

A major challenge in designing a monitoring program is to accommodate a variety of geographic levels (for example, basin, sub-basin, watershed). A program needs to be developed in a manner that allows information gathered locally to be compiled and interpreted or analyzed to answer broad regional questions. In addition, the program needs flexibility to allow for monitoring and evaluation at the regional level to better address broad-scale questions.

Also challenging to development of a comprehensive monitoring plan is the complex array of landscapes, resources, management prescriptions, species requiring attention, and geographic areas that must be addressed. Adding to the challenge is that the priority for funds and/or personnel has often been low for monitoring and evaluation activities.

Sharing of information, adoption of data standards, and training among Federal agencies and other interested parties is vital for success.

General Approach of Monitoring Strategy

The following criteria should be considered when designing the monitoring strategy and should be appropriate at any level:

- Be cost effective so that meaningful monitoring can be done within agency budgets;
- Support management objectives and address the identified issues and problems;
- Be sensitive to significant changes in ecological and social systems;
- Address the hierarchy of geographic scales (basin, sub-basin, watershed);
- Provide early warning so appropriate actions can be taken in a timely manner;
- Provide a basis for natural resource policy decisions through analysis at various levels;
- Provide for integration of information among resource functions to support efficiency and ecologically based decision making;
- Integrate monitoring at the landscape level with monitoring at the subregional and regional levels;
- Emphasize sound experimental design and standardized data collection which will support statistical analysis where necessary;
- Integrate inventories into the monitoring system;
- Provide for corporate storage and systematic compilation, interpretation, and analysis of data;
- Be accessible across organizational levels and administrative boundaries;
- Be implementable within the existing agency structure;
- Ensure data are promptly analyzed and applied in adaptive management;
- Provide for distribution of results in a timely and effective manner.

The general approach is to measure variables that index whole ecosystems. Significant change in these variables indicates a need for further study. Initially, this approach does not expect to directly identify cause-effect relationships; although they are needed, cause-effects relationships are left for follow-up investigations. Instead, it focuses on measuring change in the system which would indicate that further study and evaluation is warranted.

An initial step in developing the monitoring strategy is to define the questions that need to be answered at the regional level to evaluate attainment of ecosystem management goals and objectives in the project area. These questions can be used to focus the monitoring strategy on appropriate issues and avoid gathering information which has limited value in answering pertinent regional level questions. The questions will also be used to help design a system that can be implemented within agency budgets.

Technical and scientific staffs, in consultation with field managers, need to play a key role in designing a monitoring strategy—to help select key monitoring elements and indicators that can be statistically sampled and can provide desired data at a reasonable cost, and to help develop and shape the monitoring questions.

The “reductionist” approach (that is, measuring all the insects, mammals, soil properties, water, and the like) should not be used. Given limitations on funding, the approach is not affordable, and the complexity could never be understood. Equally important, measurements of each of these ecological elements may not be necessary to address key, identified questions. However, individual species or other taxonomic groups (such as guilds and families) or physical elements could be used if they are good indicators. Research can evaluate the effectiveness of alterative measures to improve future monitoring efforts.

A standard core set of data elements should be collected. Core data are the minimum set of variables to be collected at all scales. In all cases, standardized measurement and reporting protocols will be determined because of the essential need for consistency. Where possible, monitoring protocols should be designed to integrate existing monitoring efforts, and/or address multiple questions. Also, the design should allow flexibility for local administrative units to add data elements needed to answer subregional and landscape level questions.

The variables to be monitored may be indicators or surrogates representing other physical, biological, socioeconomic, cultural, and/or ecological processes. They must describe conditions and trends for functional, healthy ecosystems and be quantifiable and measurable in a repeatable way. A range of values for the variables may often be measured to account for the spatial and temporal variability found in a particular geographic area.

Determining the specific monitoring approach for any question depends on knowing detailed information on conditions that can only be determined on the ground. For example, trend assessment requires simply gathering baseline or status information. However, where continuous coverage for monitoring structure and patten is important, monitoring technique may include remote sensing; where vegetative detail and ground-level measurement are essential, sample-based systems would be used in monitoring. Successful implementation of large-scale monitoring may require a combination of approaches.

Relationship of Monitoring to Other Activities

Relationship of Monitoring to Adaptive Management Process

Adaptive management is a continuing process of planning, implementation, monitoring, and evaluation to adjust management strategies to meet goals and objectives of ecosystem management. It can be depicted as the continuous circle shown in Figure 1. Monitoring has a special role to play in adaptive management: to detect changes so that management activities can be modified to achieve management objectives.

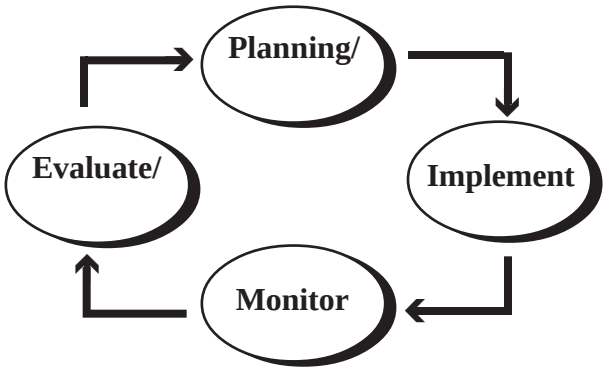

Figure 1. Adaptive Management Process

Adaptive management emphasizes results, such as the achievement of desired functions, processes and interrelationships of ecosystem components. Since knowledge is incomplete when decisions are made, adjustments are made through time. A continual feedback loop based on new information allows for mid-course corrections to standards, guidelines, and underlying assumptions (at time intervals appropriate to the systems, processes, and functions analyzed), in order to meet the planned goals and objectives. It also provides a model for adjusting goals and objectives as new information develops through monitoring or other means and as public desires change.

Relationship of Monitoring to Research

Research participation in the development of monitoring protocols is essential to the success of the adaptive management process described above. Data obtained through monitoring activities in a systematic and statistically valid manner can be used by scientists to develop research hypotheses related to priority issues. Conversely, the results obtained through research can be used to further refine the protocols and strategies used to monitor and evaluate the effectiveness of activities occurring in the implementation of ecosystem management.

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Relationship of Monitoring to Ecosystem Analysis

Ecosystem analysis is a process to characterize human and ecological features, conditions, processes, and interactions within a geographic area. The analysis is intended to help estimate direct, indirect, and cumulative effects of management activities and guide the general type, location and sequence of appropriate management activities within a geographic area. The tiered ecosystem analysis process developed in the ICBEMP is the analysis portion of adaptive management. For adaptive management to work, the decision-making system needs to be combined with the tiered analysis system so that analysis is done at the same scales as planning, implementation, and monitoring.

Reliance on achieving desired outcomes through local ecosystem analysis requires the assurance of an adequate monitoring, evaluation, and accountability system. A monitoring strategy will focus on the key issues and objectives at hand, link monitoring responsibilities at different organizational levels, and focus on the achievement of objectives and time frames outlined in the alternatives. Through this process, local BLM and Forest Service managers will be held accountable to ensure that on-the-ground decisions and activities maintain overall integrity of ecosystems at the landscape level and are linked to broader-level desired outcomes.

Currently, ecosystem analysis is often based on existing data; however, it should also incorporate monitoring and evaluation information. Ecosystem analysis information should additionally be considered in developing future monitoring plans. Information derived from Ecosystem analysis is used to: guide management prescriptions, including the setting and refining of boundaries in riparian areas; set restoration strategies and priorities; and reveal the useful indicators for monitoring environmental change.

For further information about the interrelationship between ecosystem analysis and monitoring, refer to the handbook, *Federal Guide for Watershed Analysis, Version 2.2*, which has been developed to assist in Ecosystem Analysis.

Relationship of Monitoring to Inventory and Survey

Inventories and surveys are parts of the adaptive management framework and need to be closely linked with monitoring. Information gathered in the inventory and survey process form a baseline from which trends in ecosystem conditions can be measured. Virtually all the concerns identified in this framework must be considered in the design of a sound inventory system.

Permanent, sample-based inventory plot systems established at the subregional level within a regional level context and maintained by the Forest Service and BLM will be part of the overall monitoring framework.

Relationship of Monitoring to Evaluation

Evaluation is a process in which the plan and monitoring data are reviewed to see if the management goals and objectives are being met and if management direction is sound. This portion of the adaptive approach examines the monitoring data gathered over time and uses it to draw conclusions on whether management actions are meeting stated goals and objectives and, if not, why. The conclusions are used to make recommendations on whether to continue current management or what changes need to be made in management practices to meet goals and objectives. The results could be changes in mitigating measures, future actions, monitoring elements, objectives, standards, guidelines, or some mixture of these.

Monitoring Components

This framework provides a starting point for building a Monitoring Program based on identifying the fundamental kinds of information that must be gathered to evaluate the success of ecosystem management. The next section of this document focuses on specific reasons for monitoring (evaluation questions) and proposes items to monitor (units of measure). In addition, the issue of scale or the appropriate geographic level of monitoring is addressed.

Types of Monitoring

Four types of monitoring (implementation, effectiveness, validation, and baseline) will be applied to meet management objectives and to evaluate management practices used in implementing local plans. These four types of monitoring encompass the broad spectrum of monitoring, some of which may be termed differently by certain agencies. All four types of monitoring need to occur to achieve the goals of the adaptive management process.

Implementation Monitoring

Implementation monitoring is the most basic type of monitoring and simply determines whether planned activities have been implemented and whether the standards and guidelines were followed. Some agencies call this *compliance monitoring*. Standards address land conditions that must be maintained, activities that are required, and processes that must be followed. Guidelines address the techniques that may be used in achieving planned activities.

Effectiveness Monitoring

Effectiveness monitoring is aimed at determining if the implementation of activities has achieved the desired goals and objectives, and whether the standards and guidelines have attained the goals and objectives of ecosystem management. Success may be measured against the benchmark of desired future condition. Cause-effect relationships will ultimately need to be understood to ensure that management actions result in desired conditions.

Validation Monitoring

Validation monitoring is intended to ascertain whether a cause-and-effect relationship exists among management activities or resources being managed. It confirms whether the predicted results occurred and if assumptions and models used in developing the plan are correct. While recognized for being demanding and expensive, validation monitoring is equally as important as implementation, effectiveness, and baseline monitoring.

Baseline Monitoring

Baseline monitoring is used to establish reference conditions by monitoring elements or processes that may be affected by management activities. Generally, the reference conditions are natural or relatively unaffected by human activities.

Defining Specific Evaluation Questions for the Interior Columbia Basin Ecosystem Management Project

Each monitoring type can be expressed in definite terms that will lead to specific and directed measurements. Each type has a specific set of objectives, which are applied differently depending on the question addressed. This section identifies general but important questions which should be addressed in the monitoring process. The questions are viewed as a starting point for development of an interdisciplinary, interagency monitoring program. Additional questions or adjustments to the list are expected to be identified by an interagency monitoring committee. Using the ICBEMP issues, goals, and objectives and the list of questions developed to address them, the committee will recommend for decision 10 to 15 of the most important items to track at the regional level. Monitoring plans often go unimplemented because they are too costly. This focused approach is essential to ensure agencies can afford to implement an appropriate, coordinated monitoring plan.

Implementation Questions

Implementation of ICBEMP decisions consists of management of three interrelated systems: Aquatic, Terrestrial, and Socioeconomic - within the context of Management Strategies (Conserve, Restore, Produce and combinations) and associated direction. The components of the decision which will drive implementation include:

- Goals and objectives for managing ecosystems;
- Management Strategies applied to subbasins;
- Standards and guidelines for managing ecosystem components;
- Ecosystem Analysis;
- Consideration of socioeconomic effects; and
- An adaptive management or learning process.

Monitoring and evaluation are organized around these components and required processes.

The general thrust of implementation monitoring and evaluation is to determine if Forest Service- and BLM-administered lands and systems are being managed according to plan. More specifically, given its particular focus, implementation monitoring addresses the following question:

- Are the planned activities being accomplished and are the standards and guidelines being followed?

Implementation Monitoring for Aquatic Systems

Specific questions include:

- Are Riparian Management Objectives developed and applied?
- Are Riparian Conservation Area widths and associated direction established and applied?
- Are management activities, including restoration projects, consistent with RMOs and RCA standards and guidelines?
- Are management activities, including restoration projects, consistent with standards and guidelines for Category 1–3 subbasins? (Generally addressed in questions about RCAs, RMOs, and Ecosystem Analysis at the Watershed Scale.)

Evaluation will determine if the required area designations and conditions for riparian and other areas have been established and used, if required conditions are being met, and whether

activities occur which are permitted or not allowed. Key monitoring items to evaluate the above questions include:

- For activities - presence of timber harvest, kinds of other timber management activities, presence of grazing by ungulates, the specific conditions in which activities occurred, and the like.

Implementation Monitoring for Terrestrial Systems

For Forested Lands and Rangelands, specific questions include:

- Are vegetation management activities for forested lands and rangelands being accomplished as predicted or planned, and are unplanned disturbance mechanisms (such as, wildfire, insects, and floods) occurring within acceptable ranges?
- Are vegetation management and other activities for forests and rangelands being conducted according to standards and guidelines?

Evaluation for forests and rangelands is aimed at determining if planned management activities are being carried out and standards and guidelines are being met. Key monitoring items are:

- *For activities* - type and amount (acres) of vegetative manipulations (such as harvest, reforestation, rangeland seeding, prescribed fire, grazing) and "natural" events (such as wildfire, wildlife, and insects and disease).
- *For conditions* - post treatment or disturbance conditions by potential vegetation group such as:
  - Forest composition, densities and structures in harvest or thinned area
  - forage utilization
  - woody residue levels
  - noxious weeds and exotic plant species
  - snags, dead and downed trees
  - wildfire intensity and residual vegetation conditions

For terrestrial species, specific questions include:

- Are activities and protection requirements being implemented as planned for management of animal and plant species habitats?
- Are management practices and activities meeting terrestrial (animal and plant) habitat standards (and guidelines) for occurrence, distribution, size, and connectivity of late/old structure?
- Are management practices meeting requirements for special habitat features (including large trees, snags, downed wood, habitat linkages, road densities, caves, wet areas, and others) and endemic species habitats?
- Are approved Recovery Plans being followed?

Implementation Monitoring includes the type and amount of various vegetative practices and activities and natural disturbance events and the direct effect of the disturbance (including post treatments) on habitats.

Implementation Monitoring for Socioeconomic Systems

Specific questions include:

- Are agencies, tribes, communities, Resource Advisory Councils, Provincial Advisory Committees and the public involved in planning, implementing, monitoring and evaluating the plans/processes?

Key items to evaluate include:

- information sharing opportunities,

- active partnerships,
- collaborative efforts,
- educational forums and workshops,and
- community support and involvement.

Implementation Monitoring for Sub-basin Review and Ecosystem Analysis at the Watershed Scale

Specific questions include:

- Has the Sub-basin Review or Ecosystem Analysis at the Watershed Scale been completed (according to Federal Guide requirements)?

Key items to monitor include:

- the completion and documentation of results,
- the timing of planned analysis.

Effectiveness Questions

The purpose of effectiveness questions is to address how well planned actions and standards and guidelines achieve goals and objectives. The general effectiveness questions are: Is the implementation of management activities and are the standards and guidelines effective in attaining goals and objectives of the ICBEMP? To address these questions, the indicators are the items to be monitored because they are the important evaluation threads or ties through the Draft EISs. By measuring the same items in the same way, consistency in information and evaluation can be maintained.

Ecosystem Analysis is expected to provide information about processes and patterns within a watershed and also provide an additional focus for monitoring at that level. Effectiveness monitoring should be undertaken at a variety of reference sites in geographically and ecologically similar areas. The sites could be selected to represent a number of different monitoring levels and require the assistance of statisticians to design an appropriate sampling regime. Where possible, reference sites should be chosen that are presently being monitored by administrative units to minimize data gathering costs.

Effectiveness Monitoring for Aquatic Systems

Specific questions include:

- Are the ecological health and integrity of the aquatic system recovering or sufficiently maintained to support recovery and maintenance of viable populations of anadromous fish species and other fish species and stocks considered sensitive or at risk by Forest Service and BLM or listed under the Endangered Species Act?
- Are desired habitat conditions for fish stocks identified to be at risk maintained where adequate, and are these conditions restored where inadequate?
- Are management practices effective in attaining and/or maintaining proper functioning channel and riparian conditions (Proper Functioning Condition) for streams?

Key items are based on the Aquatic Strategy. For sample streams (and watersheds) within each aquatic Category 1–3 subbasin, key conditions to monitor include:

- Water quality
- Deep pools

- Riparian vegetation abundance
- Uniqueness
- Integrity
- Strongholds
- Present salmonids or other native species.

Additional items to monitor may be identified in Ecosystem Analysis. For example, the Clean Water Act directs that States adopt water quality standards and criteria as necessary to protect designated beneficial uses, such as cold water biota, recreation, and drinking water supply. These standards and criteria should be used in some instances to determine if water quality and the health of aquatic systems are being maintained.

Effectiveness monitoring may also begin to link the effectiveness or impacts of management activities on key conditions. For example, harvest activities, roads, or other disturbances are important activities to monitor relative to aquatic systems.

Effectiveness Monitoring for Terrestrial Ecosystems

An overall goal of the ICBEMP is to protect, enhance and restore the conditions and processes of the forest land and rangeland ecosystems.

For forests and rangeland ecosystems, specific questions include:

- Are management actions achieving forest vegetation structure, composition pattern, and fuel regimes that are resilient to most likely disturbances?
- Are management activities maintaining or restoring rangeland conditions within desired (levels) ranges?
- Are changes resulting from "natural" disturbance processes in the forest and rangeland ecosystems moving those vegetative types toward goals and objectives (appropriate regimes)?

Monitoring and evaluation of forest and rangeland conditions focus on vegetative composition, structures, patterns and fuel loadings related to disturbance regimes. Key indicators and evaluation items for forests and rangelands at the landscape level include:

- Forest composition, structure, density and pattern by forest potential vegetation group (acres) with emphasis on:
  - Dry Forest - late/old single story ponderosa pine;
  - Moist Forest - late/old multi-story stands of appropriate species; and
  - Cold Forest - appropriate forest structures, densities and composition.
- Composition, condition and trend of rangeland vegetation by potential vegetation group with emphasis on native vegetation (acres).
  - Spread of exotic species and juniper on rangelands.
  - Disturbance types, extent and intensities (acres/trends).

For terrestrial species, specific questions include:

- Are management practices maintaining and protecting key habitats and special habitat features where adequate and restoration activities improving these habitats where inadequate?
- Are habitats of unique assemblages of species and areas high biodiversity protected and maintained?
- Are recovery plans helping to (effectively) restore habitats and recover threatened or endangered species?

Key monitoring and evaluation items include:

- The size, abundance and distribution of important habitats and habitat features:
  - Late/old forest structures appropriate for given forest potential vegetation groups.
  - Habitat linkages and connectivity
  - Large trees and snags 21"+ diameter at breast height
  - Native shrub steppe and native herb grassland potential vegetation groups.

Effectiveness Monitoring for Natural Resource Use Levels

Specific questions include:

- Are the projected levels of timber, livestock forage, recreation, and other resource outputs available and being produced at sustainable levels?

Key items to measure and evaluate for each cluster and sub-basin include:

- Timber harvest levels
- Livestock grazing levels
- Special Forest products
- Mineral extraction
- Recreation use/opportunities.

Effectiveness Monitoring for Rural Economics and Communities

Specific questions include:

- What is the contribution of Forest Service and BLM outputs to regional and sub-regional economics (county clusters) and economic opportunity? Is a diversity of recreation opportunities and scenic quality provided?
- Are management actions (activities) contributing to community vitality and resiliency?
- Are opportunities available for public participation?

Key indicators to monitor include:

- Demographics
- Timber and other natural resource based employment/personal income.
- Payment in Lieu of Taxes/Government revenues
- Community resiliency (index)
- Lifestyles
- Recreation opportunities - Recreation Opportunity Spectrum primitive/semi-primitive and roaded natural recreation availability
- Scenic integrity
- Public participation - effectiveness progress/collaboration.

Effectiveness Monitoring for Indian Tribes

Indian tribes have concerns within the scope of the project area. Specific monitoring questions include:

- Do Indian tribes have access to and use of plant and animal species, products, ethno-habitats, and places for cultural and economic reasons?
- Is habitat being managed for healthy, usable levels of resources upon which the tribes can exercise their tribal rights and interests?

The key monitoring items include:

- presence and availability of culturally significant plants, animals or fish, water and water quality, ethno habitats, and cultural resources in areas accessible to Indian tribes.

Validation Questions

The principal question related to validation is: Are the critical assumptions made in development and evaluation of the selected alternative valid?

Key assumptions need to be validated regarding the relationships within and among ecosystem components. This will require a mix of inventory, monitoring, and research. For example, while some relationships (such as fish habitat needs) are fairly well understood, many relationships are not known. Where knowledge gaps exist, research and/or inventory will be needed. Where some knowledge exists, hypotheses can be proposed and tested through a combination of research and monitoring.

Validation will be further developed in consultation with research. Basically, validation will address questions surrounding the accuracy of the key assumptions made in the ICBEMP.

Four other types of validation should be pursued:

1. Animal population ties to habitats, especially the species thought to be associated with late/old forests. An approach toward historical conditions for vegetation is assumed to provide adequate habitat for species with different mobility capabilities. Are these assumptions valid?
2. Relationships between activities and created conditions. The question is: What conditions are created with different vegetation management activities, in what existing conditions, and for which kinds of forest and rangeland? The plan assumes certain cause-effect relationships.
3. Relationships between activities and human communities. The analysis of the alternatives assumed that certain economic effects and social structures result from different activities. Are these relationships between forest and range activities and society valid?
4. Relationships between forest and rangeland conditions and human communities. Plan analysis assumed that communities react in certain ways to forest and rangeland conditions, and that these actions may be related to scale of the human community (local, regional, or national). One example is visual conditions. The monitoring questions are: Are these assumptions valid? Do they continue to hold true in the future, or will the wants and demands of the public lands change?

Key items to monitor for each of the above questions is yet to be identified. Identification and measurement will rely on a mix of inventory, survey, other monitoring and research.

Baseline Monitoring Questions

The primary baseline question is: Have key baseline reference monitoring elements and processes been established and are data available which can be used to evaluate the effects of future management activities?

Two types of baseline monitoring should be pursued:

1. The current ecological condition of the project area is documented. The ICBEMP has developed extensive baseline data. It should be evaluated to see if it is sufficient to answer key future questions about ecosystem trends. The interagency monitoring committee should propose solutions for filling critical gaps in baseline data.
2. Data on reference conditions of representative ecosystems that are natural or substantially unaffected by human activity should be collected where it is critical for evaluating ecosystem management effects and future management options.

Scale for Monitoring

Monitoring will occur at various scales throughout the project area. The following table represents the first approximation of the level at which the different types of monitoring and the individual monitoring questions would be addressed. As the monitoring questions are refined, the locations for monitoring can be adjusted.

Table 1. Scale for Monitoring

Monitoring Questions	ICBEMP Project Area	Region/ State	Sub-Region	Forest/BLM District/ River Basin	Watershed/ Subwater-shed	Stand/ Reach
Implementation						
Aquatics				◆	◆◆	◆◆
Terrestrial						
Vegetation			✔	◆◆	◆◆	◆◆
Wildlife			✔	◆◆	◆◆	◆◆
Socio-Economic			◆	◆◆	◆	
Ecosystem Analysis			✔	◆	◆◆	◆
Effectiveness						
Aquatics	◆	◆◆	◆◆	◆◆	◆◆	◆
Terrestrial						
Vegetation	◆	◆	◆◆	◆◆	◆	
Wildlife	◆	◆◆	◆◆	◆◆	◆	
Natural Resource Use Levels	◆	◆◆	◆◆	◆◆		
Rural Economics and Communities	◆	◆◆	◆◆	◆◆		
Native American People		◆	◆◆	◆◆	◆	◆
Validation	Not Rated ~ Emphasized at Larger Scales					
Baseline	Not Rated ~ Occurs at All Scales					

◆◆ Primary Monitoring Level
◆ Secondary Monitoring Level
✔ Potential Monitoring Level

Developing Interagency and Intergovernmental Monitoring

Development and implementation of monitoring to collect, report, and evaluate data in a manner that is both scientifically credible and economically feasible needs to be carefully designed and coordinated. As the previous sections explained, foremost needs are:

- to develop and implement a common design framework and common indicators or environmental measurements,

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- to identify specific indicators within each monitoring component or activity, along with protocols and methodologies for their measurement and quality assurance, and
- to establish a required level of detection ability, data quality objectives, and precision.

As also explained in previous sections, the monitoring framework that is established should: (1) be cost effective, (2) permit data to be integrated through statistical or modeling approaches to provide quantitative inputs to the adaptive management process, and (3) accommodate multiple geographical scales and provide a consistent process for establishing monitoring sites, frequency of sampling, level of sampling, and specific techniques for analysis, synthesis, and reporting. Following this approach is critical to ensuring that consistent collection, integration, and evaluation of monitoring data occur among projects, watersheds, regions, agencies, and over long time periods.

Following is a five-step process for establishing a monitoring network:

Step 1: Establish linkages between and among agencies, tribes, advisory groups, and others.

Step 2: Identify information needs.

Step 3: Survey and evaluate ongoing monitoring efforts.

Step 4: Establish technical details.

Step 5: Establish a repository system for collected data, storage, and analysis.

Step 1. Establish Linkages Between and Among Agencies and Tribes

Both technical and administrative linkages need to be developed and maintained to implement this ICBEMP monitoring effort. This interagency effort will play a major role in coordinating implementation and overseeing a monitoring program.

To implement the ICBEMP interagency, regional-scale monitoring effort, an interagency monitoring committee could be formed under the direction of the interagency regional executives. A goal of the committee would be to integrate project area monitoring into the existing agency organizational structures. The Committee would develop specific technical details (design, indicators, protocols) and guidance for monitoring the ecosystem at the project area level, integrating data-gathering needs into existing field data-gathering efforts, and assembling it into useful forms for project area evaluations. It would also develop a system to manage the monitoring data using existing agency organizational structures. All protocols developed by the committee could be coordinated with ongoing monitoring efforts, including those of Federal, State, and local governments and tribes.

The committee could be co-chaired by BLM and Forest Service monitoring coordinators and be assisted by participating agencies and universities as needed. The interagency monitoring co-chairs would need to ensure that a coordinated, multi-organizational approach to monitoring is developed. The committee could contain a staff with technical expertise in monitoring, statistics, and social and environmental sciences. Staff assignments could provide flexibility to draw on different disciplines and expertise as the need arises. The regional executives of the participating agencies would need to ensure the approach developed by the committee is adequately funded at all organizational levels.

Monitoring responsibilities are expected to vary by the type of monitoring. The Forest Service and BLM administrative units or combinations of administrative units would accomplish most of the implementation monitoring and some of the effectiveness and baseline monitoring. Validation monitoring and some effectiveness monitoring are expected to be accomplished at broader scales and involve the coordinated interagency processes.

Specific monitoring assignments may be made to individual agencies within the context of an integrated approach. For example, the U.S. Fish and Wildlife Service may be assigned to measure and record preselected habitat conditions and/or animal populations. The National Marine Fisheries Service could be assigned different habitats and/or populations of fish. Affected State agencies may assume responsibilities for selected items within their respective States. The land management agencies and EPA would have their own selected responsibilities, as could the various tribes, should they choose to accept these roles.

In addition, private citizens and groups will be encouraged to participate in monitoring. This participation will be coordinated by individual agencies, as determined by the monitoring items, type and scale of monitoring, and agency responsibility. At the subregional or regional scales, Resource Advisory Councils (RACs), Provincial Advisory Councils, Coalition of Counties, or other bodies may also participate in monitoring through methods developed by the Committee.

Step 2. Identify Information Needs

The key monitoring items listed previously are the first approximation of regional monitoring questions and information needs as they relate to plan goals, objectives and standards. The lists will be subjected to further peer and agency review, which may result in changes or additions to the list.

When additional monitoring objectives and questions are agreed upon, a list of relevant indicators must be developed. This list should be based on current ecological knowledge and models, and it should represent a full range of possible indicators that address the management questions.

Each indicator on the list should be assessed using the following criteria:

- Is there an explicit relationship to the questions and monitoring objectives?
- Do the indicators reflect changes in the resource condition, status or value at multiple scales?
- And, do these indicators distinguish between the system response and natural variability?
- Are protocols available and adequate for reliable and repeatable measurement?
- Will the information from monitoring this indicator provide results within a useful time frame?

In reviewing assessments, it should be asked whether all questions and monitoring objectives are addressed by the list of indicators, or whether there are identified gaps or barriers. The compiled indicator list should be submitted for peer review. An outcome of this process will be a list of indicators that address the specific quantitative questions and identify the appropriate protocols.

To be successful, the monitoring program will need to be objective driven; be founded on the best science available; operate at multiple scales; and have oversight of design, quality, control, and modification. This need requires agencies to make a major commitment to developing a process for coordinating their monitoring activities. Specific assignments and funding for carrying out these activities need to be identified.

Step 3. Survey the Ongoing Monitoring Efforts

This step consists of conducting an initial survey of the monitoring activities currently used by other agencies or groups within the project area to evaluate similar monitoring objectives and provide information about several aspects. This survey of existing projects should identify ongoing monitoring and provide for the identification of information gaps and barriers. Monitoring activities identified through this process will be potential candidates for incorporation into the interagency monitoring framework.

Information requests can be designed and distributed to all the potential agency components and other parties that collect relevant environmental data. The most efficient approach would be to have an initial survey to identify the relevant activities, followed by collection of in-depth information on the appropriate ones. These surveys should include the individual monitoring program, objectives, questions, ecological resources, indicators and associated protocols, design, quality assurance information, costs, and historical data.

After collecting information about existing monitoring, a detailed review and comparison of the developed information needs and existing monitoring should be conducted. Results from these activities will help to identify specific monitoring programs and requirements for information that is not available through existing programs. Collected information for each monitoring program can be summarized in a report containing the following general categories:

- Program scope, objectives, and temporal and spatial resolution;
- Program methodology and design;
- Program documentation and reporting;
- Program organization and coordination;
- Program barriers, effectiveness, and weaknesses.

Step 4. Establish Technical Details

This step in the monitoring design process involves several elements: information or data quality objectives, indicators, statistical design, measurement and sampling protocols, and a quality assurance program.

Indicators and protocols that currently exist need to be evaluated to determine their adequacy in meeting the objectives. Where possible, this evaluation should be based on a previous set of data collected using the protocols. This evaluation should look at the interaction among indicator variables, statistical power and precision of the data (information quality objectives), frequency and scale of sampling necessary, cost of sampling, and the overall ability of the data to answer the monitoring questions. A consensus standard or method of achieving comparable data should be developed where alternative protocols have been used in different programs. In addition to supporting these various evaluations, information derived through this step will also help in evaluating the cost effectiveness or feasibility of the monitoring effort.

Although the general concepts of monitoring are broadly understood, application of the complex of natural resource monitoring protocols necessary to carry out the monitoring recommendations for any of the alternatives developed in the ICBEMP is complex. For example, there are many legal mandates for monitoring individual species across biologically complex areas. These mandates - coupled with considerations for management of habitats, plant communities, and ecosystems over a variety of spatial and temporal scales - require monitoring systems and approaches that may test and exceed the existing theory and technology for monitoring.

Adequate indicators and protocols need to be developed in those cases where they do not exist. Development of appropriate protocols will require coordination with the research components within the overall effort. If research results indicate that specific methods are successful, a pilot study should then be planned to field-test the methods and evaluate the results. After evaluation of the pilot study, any necessary changes can be made in the protocols. If the protocol is determined to be suitable, then the type and level of training necessary for field staff to implement the methods should be determined.

As technical monitoring groups identify the evaluation questions, there may be gaps and barriers found in existing research and monitoring technology. These gaps and barriers should be addressed by an interagency research and monitoring committee. This committee should identify research priorities for monitoring needs and determine the appropriate strategies for support of needed monitoring research.

Some of the issues related to sufficiency of monitoring technology that may be considered in developing a comprehensive monitoring strategy are:

- Efficiency;
- Simplicity;
- Sensitivity of monitoring measures relative to natural ranges of variation;
- Indicator development and testing;
- Development of new technology and adaptation of existing technology;
- Changes needed to current laws and regulations to make more effective monitoring operations, data collection and analysis;
- Development and effective transfer of sampling approaches, monitoring protocols and ideas on application where these elements do not exist;
- Adequate monetary support.

Step 5. Repository for Data and Analysis

The ICBEMP has created a large database that is expected to be used as baseline information in the evaluation process. That data could be stored at the Oregon/Washington BLM State Office and Forest Service Pacific Northwest Regional Office in Portland, Oregon. The data could be made available via a World Wide Web site (Internet). Each agency's information resource management staff, in coordination with monitoring coordinators, could be responsible for the administration of their agency's portion of the data.

The committee could develop a protocol for collection and storage of new regional level monitoring data. The comparability of data collected by all agencies is a crucial issue to be resolved by the committee. The protocol must be clear about how each agency's data contribute to the whole data set needed for evaluation of ecosystems at the regional level. Each agency would collect and maintain monitoring data according to the protocol developed by the committee and make it available upon request to other agencies for use in evaluation of ecosystem management. The monitoring coordinators and information resource management group would collect appropriate data from agency records, construct databases and manage the information for analysis or formal evaluation.

Evaluation

Evaluation is the next key component of the adaptive management process. It is the process by which a comprehensive, holistic review of the plan and monitoring data is developed. If the planning is completed, the plan is implemented, and monitoring data is gathered without the follow-up to judge the success of the plan, a high likelihood exists that problems will not be detected until a crisis develops. This portion of the adaptive approach focuses evaluation on the actions and outcomes where departures from expected conditions or results are treated not as failures but rather as new information to improve the quality of management. The results could be changes in mitigating measures, future actions, objectives, standards, guidelines, or some mixture of these.

The evaluation process is used to determine whether or not ecosystem management objectives and standards in the project area are being met and remain appropriate. It is the process of gathering together all the data available from the monitoring process and using it to answer these questions:

- Were the standards followed?
- Were the goals and objectives met?
- Were the standards effective at meeting the goals and objectives?

- Were the underlying management assumptions correct?
- Have public expectations for ecosystem management changed?
- Are the decisions still appropriate?

The public has an important role in evaluation. Many critics of the BLM and Forest Service lack confidence in the agencies' abilities to implement adaptive management. Public involvement can ensure that the public's concerns are addressed in the evaluation process.

The final stage of evaluation is to develop recommendations for changing current management, if needed, to meet ecosystem management goals. Adjustments should be related to implementation of management plans, management plan objectives, standards and guidelines, and monitoring data collection and integration. Recommendations should be used to modify land use plans, thus completing the adaptive management circle.

Since knowledge is incomplete when decisions are made, adjustments need to be made through time. A continual feedback loop based on new information allows for mid-course corrections at time intervals appropriate to the systems, processes, and functions analyzed. An evaluation schedule needs to be set in advance to ensure that evaluations are conducted at intervals that allow for corrections in management direction before crises develop, that monitoring data is gathered in advance to be used in the evaluation process, and that the appropriate evaluation team is assembled to conduct the evaluation.

Regional-level changes in ecosystems occur slowly over time. Management evaluations made too frequently will not detect changes in the ecosystem because cost-effective monitoring systems cannot detect them. On the other hand, if ecosystem management evaluations are not conducted, or are delayed for too long, irreversible changes may take place without detection. To avoid this problem, two periodic management evaluations are proposed. The first is an implementation evaluation to be conducted every five years, beginning five years after completing the ICBEMP, to see if the plans resulting from the project were implemented. The second is an effectiveness evaluation, to be conducted 10 years after completion of the project, to see if management practices are leading to achievement of ecosystem management goals and objectives.

The five-year implementation evaluation could be conducted by BLM Districts and National Forests. Monitoring data would be evaluated and changes made to local actions where necessary to meet goals, objectives, standards of ecosystem management plans. BLM Districts and Forests within Resource Advisory Council or Provincial Advisory Communities boundaries should coordinate their evaluations and involve the Resource Advisory Councils or Provincial Advisory Communities (or other public advisory groups) in the evaluation process. This coordination ensures that project area ecosystem management implementation issues are considered at the broader level while incorporating public participation. The general public and American Indian tribes also need to be involved in the evaluation.

A 10-year project area ecosystem management effectiveness evaluation could be conducted by an interagency evaluation team. The regional executives would form the monitoring team. It would evaluate ecosystem management plans and monitoring information with involvement of the public and develop findings and recommendations to the participating agencies on: 1) whether or not the management was effective in meeting goals and objectives; 2) whether or not the assumptions and models used in developing the plan were correct and are still valid or need to be changed; and 3) what changes are needed in mitigation measures, future actions, objectives, standards and guidelines to meet ecosystem management goals.

Funding

The majority of the funds and personnel necessary to conduct the monitoring, data management, and evaluation activities for the implementation of ecosystem management in the project area are expected to remain within the Federal land management agencies. However, the expertise needed

to develop and refine scientifically credible monitoring approaches is expected to reside with individuals who are often located elsewhere (such as Forest Service Experiment Stations, National Biological Survey, State agencies, university researchers, and tribes).

Traditionally, funds have been allocated for the planning and implementation phases of the adaptive management process while monitoring and evaluation have been given minimal attention. Resources must be allocated and priorities established so that all parts of adaptive management are completed over an appropriate time frame and so that no individual part receives emphasis at the expense of another.

Costs relative to monitoring are associated with the agency monitoring coordinators and the interagency monitoring committee, information gathering, and data management. The Regional Executives would set priorities, the committee would develop the protocols, and the agencies would implement them. Because funds for ecosystem management are limited, monitoring and evaluation activities have to be carefully planned so that only critical information needed for evaluation is gathered.

Challenges to Implementation

Because of the diversity of resources, conditions, communities, and concerns throughout the planning area, challenges to successful implementation are expected to arise. This section summarizes some of these that have been compiled from an informal survey of BLM, Forest Service, and other agency employees; from challenges discussed in interdisciplinary and public meetings; from public and other comments received during the course of the project; and from an ICBEMP science contract report concerning barriers to ecosystem management.

Funding

Budget challenges come in three different ways: budget structure in which Congress determines the amount of money appropriated, and how it will be spent; the budget amount and composition of funds; and shrinking trust funds that have historically been generated by such things as the sale of timber.

The actual budget amount and associated flexibilities in how money can be invested in ecosystem management may be the largest of the budget challenges. Concern over the Federal budget deficit has constrained the amounts that the administration can request, and that Congress can appropriate. Other options need to be explored. Chapter 1 of this Draft EIS states that if full funding is not available, then the rate of implementation will be reduced appropriately. However, standards will be met at any funding level. Many management activities (including restoration) rely on agency ability to conduct Ecosystem Analysis at the Watershed Scale. In lieu of conducting this local analysis, all alternatives but Alternative 1 provide interim standards for such items as protecting riparian and aquatic resources and retention of snags and coarse woody debris.

Funding concerns discussed here are focused on implementation of expectations from this Draft EIS. They do not necessarily include the many other aspects of responsibilities and programs conducted by the BLM or Forest Service. Both the Forest Service and BLM have some flexibilities and authorities to reprioritize programs and the funding support to those programs. The authorities differ by agency, but the agencies recognize the need to work within these flexibilities in order to better respond to implementation. The agencies will need to evaluate the mixes of monies and flexibilities for using available funding to assure that goals and objectives of the selected alternative are met over the 10-year planning period.

Funding reductions sometime result in organizational restructuring which can present challenges in retaining the appropriate staff for implementing an integrated program. In addition, many employees move frequently within their careers. On the one hand, this creates new ideas and innovation; on the other hand, local relationships are interrupted, and local knowledge of how ecosystems respond to treatments often is lost.

Monitoring

Monitoring has been a challenge in the past. Often there has been more emphasis and energy in putting forth new projects than in conducting monitoring and evaluation activities. The action alternatives (Alternatives 3 through 7) have objectives and standards (AM-O2, AM-S3 through 7) that prescribe ways of approaching monitoring to meet this concern, as well as tying monitoring to decisions made during implementation. This will require that agencies reexamine how projects are funded and the rate of implementation, as monitoring will become an essential part of implementation.

Concerns have arisen about the effectiveness of restoration activities. In several alternatives, restoration is a primary feature. Restoration includes a great number of activities that address most of the components of ecosystems, including vegetation, disturbance, aquatic/riparian resources, and human needs associated with Forest Service and BLM management. The success of meeting many objectives in Alternatives 3 through 7 relies on agency abilities to conduct an integrated restoration program and to ensure that activities are successful in meeting objectives. With the tremendous variety and diversity of conditions within the project area, it is not realistic to think that activities appropriate in one area will necessarily work in others. This Draft EIS outlines restoration expectations at the broad-scale, and recognizes that implementation will occur at the fine or local level. Since successful implementation of any alternative is based on how effective implementation activities are conducted, the BLM and Forest Service expect to review restoration actions and programs through the monitoring and evaluation process, and to work within existing authorities to apply appropriate adaptive management techniques to respond to the results. The agencies also recognize that there is much variation in when results may be effectively evaluated. For example, replacing a culvert that impedes fish migration can show immediate results; determining trends on rangelands, or altering patterns and structure of forest landscapes, may take decades to evaluate the effectiveness of change. Long-term as well as short-term monitoring strategies are necessary, and collaborative approaches with tribes, other agencies, Resource Advisory Councils, Provincial Advisory Communities, the public, and other governments will be necessary.

Many people who have been involved with this project have indicated a concern about traditional approaches not providing a reasonable degree of consistency in how programs are implemented among administrative units. Others are concerned that decisions resulting from the ROD(s) may not be applied consistently. The ICBEMP was initiated to deal with the first concern for certain broad-scale issues. The second concern should be addressed through monitoring and evaluation.

Due to the diversity of conditions, resources, and issues throughout the project area, some degree of variation is expected, however the goals, objectives, and standards should be met.

Existing Laws

The BLM and Forest Service are authorized and bound by many existing laws and treaties, and are tied closely to budget allocations, agency priorities, and congressional expectations. Agency activities must be conducted within this context. Many of these laws have been developed over time to respond to issues of the time. Sometimes these laws have competing requirements. Often agency staffs spend considerable energy in assuring that the intent of existing laws, regulations, and policies are met. Many of these are simple and straightforward; others are more complex. For

instance, under existing mineral leasing laws, the agencies retain ultimate discretion whether or not to lease or which stipulations to attach, including no surface occupancy for leasable mineral resources such as oil, gas, geothermal and coal. Agencies can decide whether or not to sell common mineral resources such as gravel. Locatable minerals (such as gold and other metallic metals) are different because of the 1872 Mining Act, and agencies work with operators through notices and plans of operation to minimize adverse effects. Through these processes, agencies may, for example, comply with the mining law while meeting the intent of aquatic conservation strategies, or the Endangered Species Act.

Understanding Ecosystem Management

The challenge most frequently cited by respondents to the study prepared by Schlager and Friemund (1994) for the Social Science Staff of the Science Integration Team was the confusion surrounding the meaning of ecosystem management. Multiple definitions and interpretations have the potential to define ecosystem management so broadly that it becomes meaningless. The ambiguity causes many members of the public to be suspicious, and it can create unclear expectations by both the public and many agency employees. Many people have asked if humans are part of the ecosystem and are part of the goals for ecosystem management. This Draft EIS and associated supporting science documents include people and their needs as part of any successful ecosystem management strategy on these public lands. A related concern is that ecosystem management is an internal agency policy shift, and not one specifically based on new legislative direction. Ecosystem management is being implemented by the Forest Service and BLM in response to existing laws, changing public values, and new information/understandings. It will need to be well defined, with associated clear goals and expectations in order to be able to achieve successful implementation. The intent of this project and Draft EIS is to explain the concepts of ecosystem management and how these concepts would apply to management activities and expected outcomes on lands managed by the BLM or Forest Service. By doing this and by refining this implementation plan, many of the ambiguities about the term ecosystem management can be better addressed.

Agency Accountability and Credibility

Through the course of the ICBEMP, it has become clear that there is mistrust in the ability of the Forest Service and BLM to do what is specified in plans, policies, and programs. This results in frustrations on the part of some who rely on goods and services expected from these public lands. In addition, frustrations occur from those concerned about agency abilities to provide protection to such resources as threatened and endangered species or species of concern to tribes. Others are unclear about expectations and how programs will be implemented, and they ask for further clarity or stronger sideboards for management actions. There are two facets to this concern: (1) some events or processes such as appropriations, or the results of litigation are outside the control or the authorities of the agencies; (2) priorities may not be clearly communicated, accountability may not be clearly assessed, or organizational challenges may inhibit progress toward meeting goals. The latter are within the control of the agencies. Through discussions with many of the people associated with the project both internally and externally, there is a clearly expressed need to assure agency priorities and direction are clear and staffs are accountable for meeting these needs. This may be further addressed by the desire of many to expand the role of tribes, the public, and other agencies and governments in participating in agency planning, implementation, and monitoring activities such that problems are identified early and adjustments are made as necessary.

Tribal Concerns

In many areas, there is a lack of trust between tribes and the agencies. The Federal Government is reluctant to define the Federal trust responsibility beyond that which can be supported by case law. In some units, there is still a lack of understanding or awareness of the tribal interests in Federal land management as a result of treaties, executive orders, or other agency policies. This can create adversarial relationships, rather than partnerships. The involvement and participation by affected tribes take time, people, and money for both tribes and agencies often in excess of desired levels. Government-to-government consultation is necessary and is different for most tribes. Expectations for tribes and agencies often are different, frequently resulting in mistrust or differing determinations of success.

Perceived Threat to Private Interests

Ecosystem management conjures fears in some of increased direct or indirect governmental regulation or control of private landowner management practices or rights. With many rural communities within the planning area undergoing challenges or changes to their local economies, many people are understandably anxious about the future. Although the Forest Service and BLM have no authority, intent, or desire to make decisions or implement programs outside agency boundaries, this concern remains. In addition, there is a clear understanding that programs administered by the Forest Service and BLM can have effects on local communities, especially in more rural areas.

Ability to Implement Adaptive Management

Although there is widespread support for adaptive management as a principle and a process, sometimes agency operating regulations pose challenges. For instance, if through monitoring and evaluation a need is identified to alter a local land use plan standard, or change a management allocation, a plan amendment often is needed. Depending on the significance of the amendment, the actual process may take substantial time and be subject to rigorous planning steps. Sometimes this discourages agencies faced with declining budgets and staffs to accomplish the needed changes.

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