Bureau of Land Management

Science Strategy

September 26, 2000

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Foreword

Effectively managing our Nation's public lands requires accurate scientific information. This Science Strategy document outlines a process for obtaining and using the most relevant, up-to-date science available.

The Federal Land Policy and Management Act of 1976 (FLPMA) gave BLM its basic land management mission, which is to ensure the health and productivity of the public lands so that future generations of Americans can use and enjoy them. FLPMA also calls for the use of interdisciplinary, integrated science information and cooperative scientific investigations, studies, and experiments. The National Environmental Policy Act also mandates a systematic, interdisciplinary approach to ensure an integrated use of natural and social sciences in planning and decision making. And BLM's Strategic Plan states that BLM will sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

This and other guidance both require and empower the Bureau to respond to changing ecological conditions, to provide a wide variety of products and services, and to maintain the health of the public lands. By using the most current, accurate science and technology and working with scientific and technical experts, we will be able to do a better job of managing the land for its environmental, scientific, and economic benefits.

Success in managing the public lands will ultimately be judged by the health and productivity of the land and by the public who use and receive products from the land. I am confident that this document, with its process for using science and technology, will result in better public land management and stewardship. We are committed to using science to the maximum extent possible and believe the process identified in this document will help us to do that.

Director, Bureau of Land Management
September 26, 2000

Introduction

This Bureau of Land Management Science Strategy sets forth an overall approach to science with three primary objectives:

- to delineate the role of science in BLM decision making and public land management,
- to establish a clear process for identifying science needs and priorities and to assure that those needs are reflected in the Bureau's Strategic Plan and budget, and
- to provide a mechanism for communicating the Bureau's science needs, sharing its science and results, and highlighting its science opportunities on BLM-managed public lands.

The Bureau of Land Management does not have a specific research mandate, so it seeks research support each year from science providers both within and outside the Federal government. In addition, the Bureau receives many requests from science providers to communicate its science needs. Historically, the BLM has communicated these needs with individual program information rather than a single, coordinated Bureauwide response.

Preparation of the Bureau of Land Management Science Strategy was proposed by the BLM Science Coordination Committee in FY 1999. Committee members recognized the Bureau's need for a unified, comprehensive science strategy that would enable the Bureau to proactively identify, prioritize, and communicate to its science providers both its short-term and long-term science needs. The Committee reported its findings to BLM's Executive Leadership Team, which subsequently approved preparation of this strategy document.

BLM's Science Strategy clearly acknowledges that social and economic values, political factors, and statutory and regulatory requirements must be considered, along with scientific information, as BLM managers make resource management decisions.

The strategy calls for the preparation and periodic updating of a unified catalogue that highlights national and regional science needs. Identification of these science needs will begin with issues identified in the BLM's long-range Strategic Plan. Input from the State and Field Offices through the Executive Leadership Team, the Science Coordination Committee, field managers, and resource specialists will also play a key role. The early identification of the Bureau's science needs will allow them to be addressed in the Bureau's planning and budgeting activities.

BLM's catalogue of science needs is to be the primary tool for communicating the Bureau's needs to its science providers and for assuring that it acquires scientific information that is relevant, focused, and timely. Periodic catalogue revisions and updates are scheduled to provide adequate lead time for the U.S. Geological Survey and the Bureau's other science providers to use the information in their own planning and budgeting processes.

"Science" within the Bureau is often thought of in terms of research, especially biological research. This Science Strategy broadens BLM's interpretation of "science" to include information that may be in the form of data, resource inventories, resource monitoring, or research results. BLM's definition of science encompasses the earth (physical) sciences and social sciences as well as the biological sciences.

The Science Strategy consists of five sections. The first discusses the role of science in the BLM; statutory and regulatory mandates are outlined, and the complex factors and interactions involved in decision making are described. The second section sets forth a process for identifying BLM's science needs and merging them into a national and regional needs catalogue that can be shared with science providers such as the U.S. Geological Survey. The

third section of the Science Strategy discusses how the BLM can communicate its science needs to science providers and share scientific research or study results both internally and externally. The fourth section describes the many opportunities for scientific activities on BLM's 264 million surface acres of public lands, and the fifth section suggests an approach for implementing the Bureau's science strategy.

The Role of Science in BLM

Science plays an important role in BLM land use planning and management decision making. BLM managers use science, as well as other information and considerations, in an adaptive management process that allows decisions to better fit on-the-ground conditions, current social and political scenarios, and available management options.

Science is defined in Webster's New World Dictionary as "the state or fact of knowledge; systematized knowledge derived from observation, study, and experimentation carried on in order to determine the nature or principles of what is being studied." Science should represent an objective, unbiased investigation into a subject. The collection and analysis of scientific data can be used to evaluate alternative hypotheses about the causes or consequences of observed conditions. As part of the scientific process, scientists obtain, analyze, and interpret information that, in turn, can be used to understand the potential consequences of management decisions.

Statutory and Regulatory Requirements

Science provides the information that BLM needs to meet various legislative and regulatory requirements. The National Environmental Policy Act of 1969 (NEPA) states that "...a systematic, interdisciplinary approach which will insure the integrated use of the natural and social sciences" shall, to the fullest extent possible, be utilized in planning and decision making that may have an impact on man's environment (Sec.102(a)).

The Federal Land Policy and Management Act of 1976 (FLPMA) often refers to science and implies the need for scientific data to adequately implement the intent of the statute. FLPMA states that ". . . a systematic interdisciplinary approach to achieve integrated consideration of physical, biological, economic, and other sciences . . ." shall be used in developing and revising land use plans (Sec.202.(c)(2)). Each of these mandates implies the use of credible information and a scientific basis for making judgments, comparisons, and analyses. FLPMA also states that ". . . investigations, studies, and experiments, . . . in cooperation with others, involving the management, protection, development, acquisition, and conveying of the public lands may be conducted (Sec.307(a))."

The Bureau's Strategic Plan for Fiscal Year 2001-2005 builds on BLM's Blueprint for the Future and BLM's 1997 Strategic Plan. The mission statement in the fiscal year 2001-2005 plan states in part that BLM will ". . . sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations." The plan is organized around three broad categories: (1) serve current and future publics, (2) restore and maintain the health of the land, and (3) improve organizational effectiveness. These goal categories are made more specific as mission goals/program activities (Figure 1).

The Context for Science in Land Management Decision Making

Natural, physical, economic, and social science information is needed by BLM to support its compliance with statutory mandates and regulatory requirements and to enable BLM to implement sound management actions. Although science needs are often determined by specific issues and existing circumstances, science should also be used proactively to help identify future BLM management goals and needs.

Science is useful for evaluating alternatives and estimating outcomes. However, it is not the sole factor in making decisions because the state of natural resource science is often insufficient to give definitive cause-effect predictions. Unknowns and uncertainties will always be associated with predictions of decision outcomes. Science may reduce but can never completely eliminate the uncertainty regarding future events. However, the use of the best-available science – along with a consideration of political, social, and economic information – will result in the best-informed decisions. The role

Bureau of Land Management 2000-2005 Strategic Plan Framework

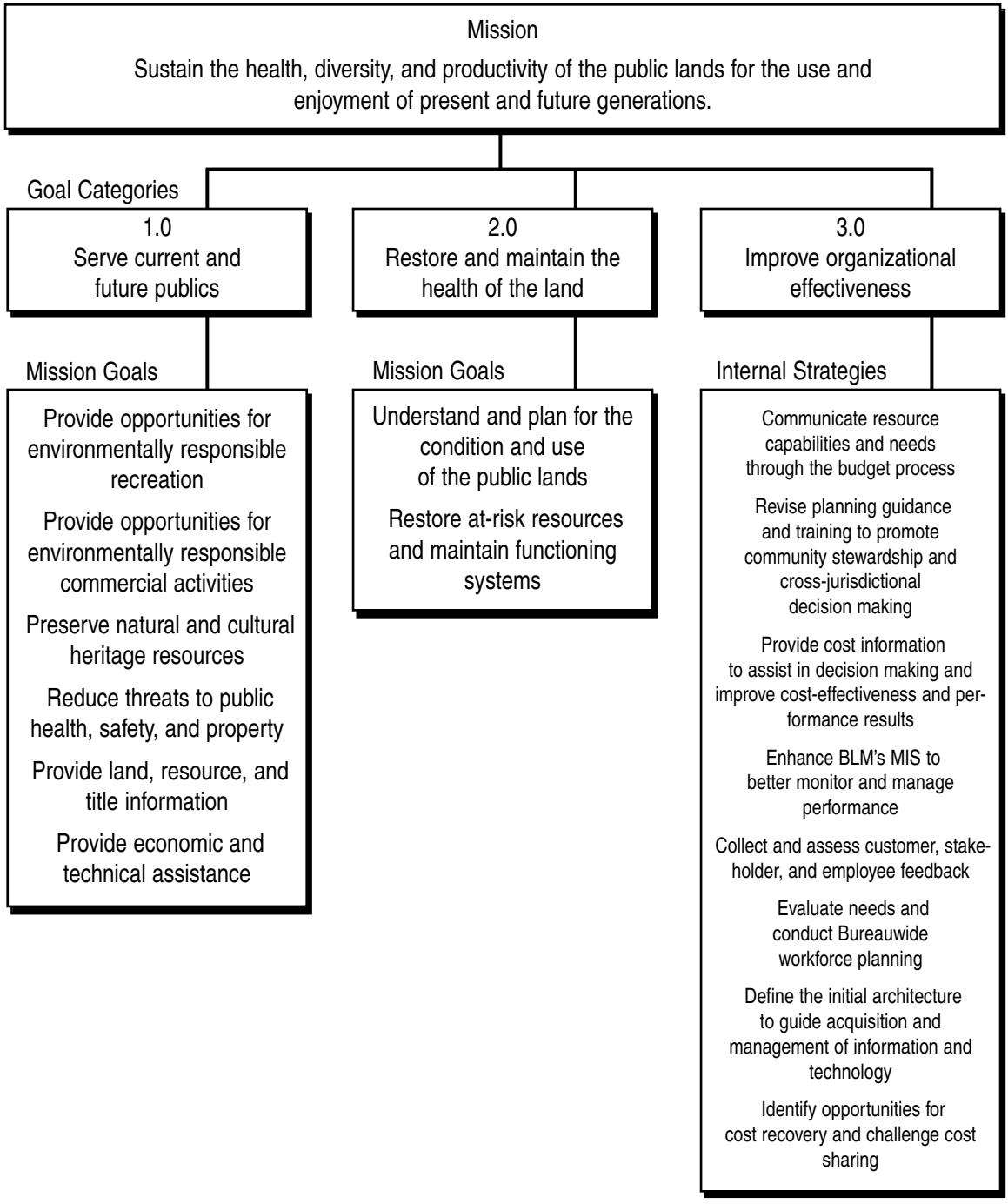

Figure 1. Mission statement, goals, and program activities of the Bureau.

of science in making resource management decisions is shown in Figure 2.

Specifically, science can do the following:

- Help identify management goals and needs
- Help evaluate alternatives and estimate outcomes
- Reduce uncertainty about events and the consequences of management actions

However, science cannot be relied upon to:

- Eliminate uncertainties altogether
- Give definite cause-and-effect predictions
- Tell managers what they ought to do

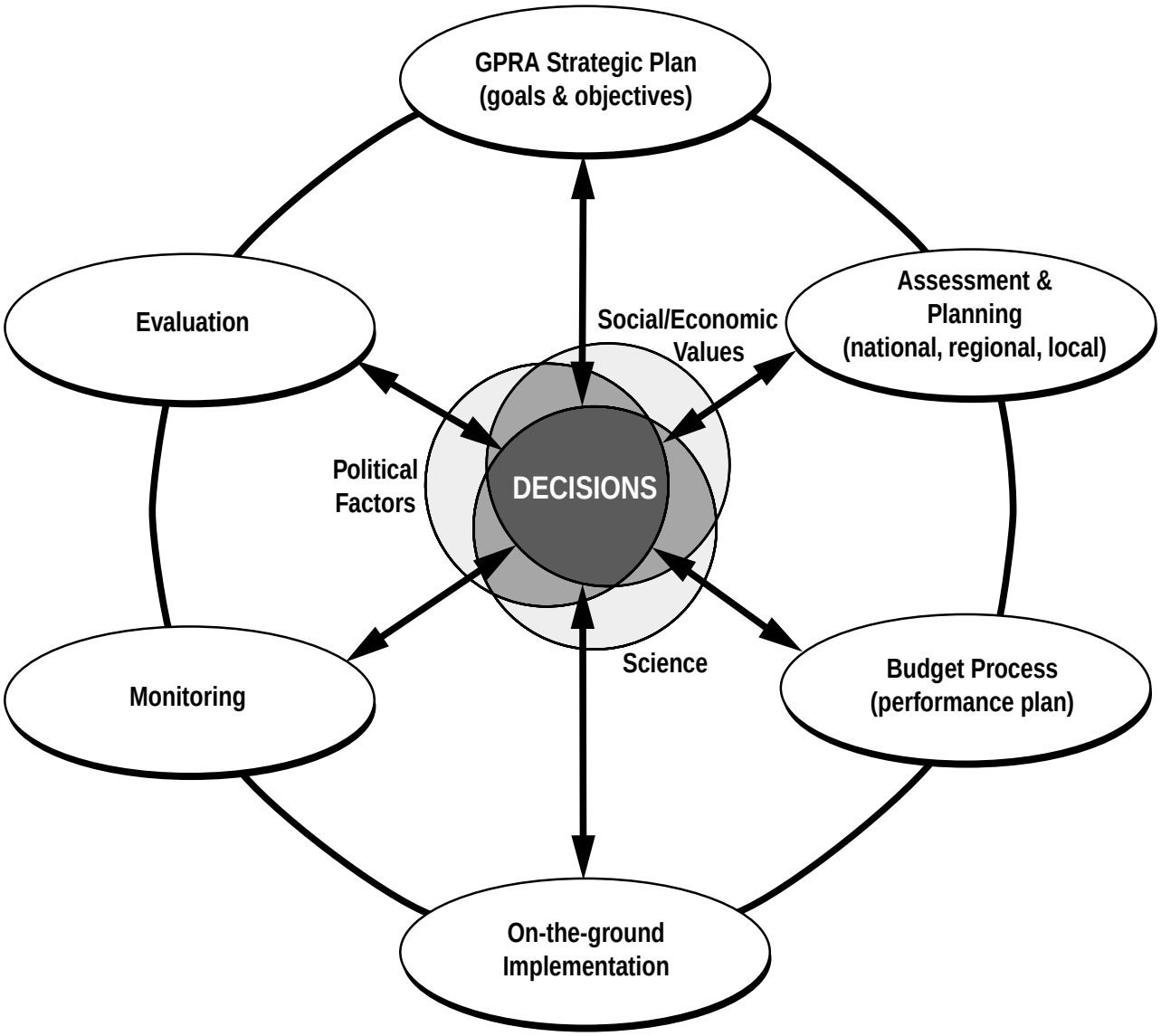

Figure 2. Science and decision making in the BLM.

Time and Scale Considerations

The Science Strategy provides the Bureau with the opportunity to address immediate science needs at the tactical level, as well as to proactively develop scientific information at the strategic level. If the time frame for decision making is short (less than 1 year), a tactical approach may need to be taken that relies upon readily available science. As the time frame lengthens, the ability to acquire more detailed scientific information increases. Lead times on the order of 2 to 5 years or longer may be necessary for planning and conducting research, acquiring data, or performing inventories.

The Science Strategy also provides a means of addressing science needs at different spatial scales. The type of information needed at the national scale is far different than that needed at the regional or local level. National issues normally require information that is general in nature and possibly a summary of more detailed information from many sources. Regional and local issues, on the other hand, normally require more site-specific information and more detailed biological, physical, social, and political input.

Identifying BLM's Science Needs

BLM's science needs will be identified through a sequential, issue-driven process that begins with the Bureau's Strategic Plan, which is nationwide in scope, and then proceeds to the regional and local levels (Figure 3 and Appendix 1). National resource management issues will first be derived from overall strategic mission goals in the Plan and then expressed in a regional context. For example, the national management issue of invasive weeds will need to be focused on the invasive weed species that are specific to each particular region. Issues will be identified and included from all

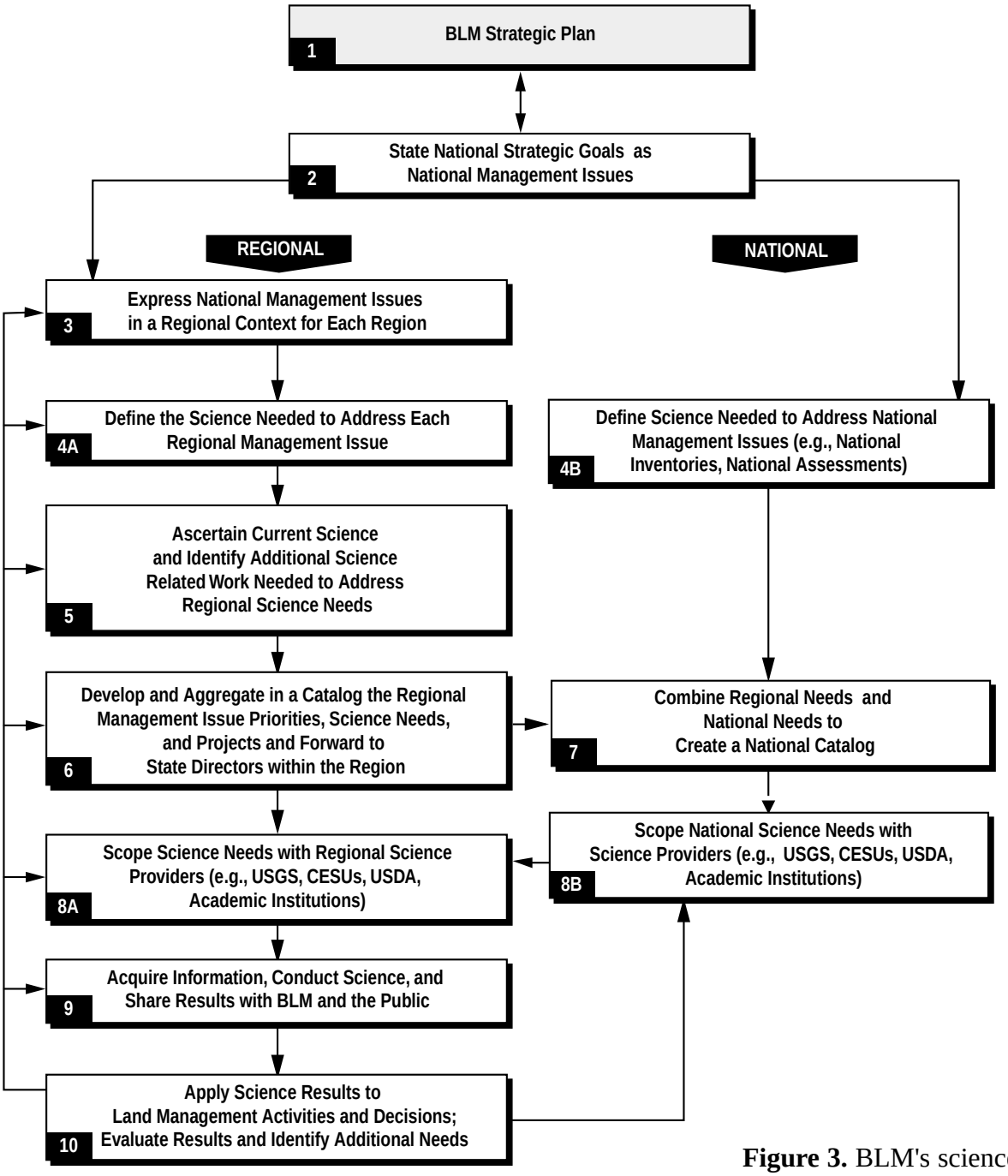

Figure 3. BLM's science process.

levels of the Bureau through a continuous process in which information flows freely, i.e., both "top down" and "bottom up," between the Headquarters, State, and Field Offices.

The science needs for each management issue will then be determined. Science needs can include resource inventories, various spatial/nonspatial data sets, resource monitoring studies, and new research needed to fill in data gaps and assist decision makers. Science needs will be identified to address all of the various management issues at all levels – national, regional, and local.

In some instances, a local or regional issue may be important enough to be elevated to the national level, even though it might not be specifically referred to in BLM's Strategic Plan. These issues will be listed in the catalogue as national-level concerns.

As BLM's local and regional needs are compiled, they will be aggregated into a catalogue that addresses national, regional, and local science needs. At the national level, the catalogue will be used to communicate the Bureau's resource management issues to national science providers. At the regional level, the catalogue will be used to communicate the Bureau's science needs to regional science partners, including other agencies, universities, and interested providers within the region. At the local level, the catalogue will be used to communicate BLM's site-specific science needs to principal researchers and others who can help acquire the information that the Bureau needs.

Within BLM, the catalogue will be a source document to identify budget needs and support budget initiatives. Science providers will also be able to use the catalogue to support their own budget requests and initiatives.

More detailed information on identifying BLM's science needs is presented in Appendix 1.

Biogeographic Regions

The biogeographic regions selected to identify management issues and science needs are shown in Figure 4. In choosing these regions, the BLM evaluated several administrative and political, as well as ecological or resource-based, delineations. Biogeographic regions were chosen to help

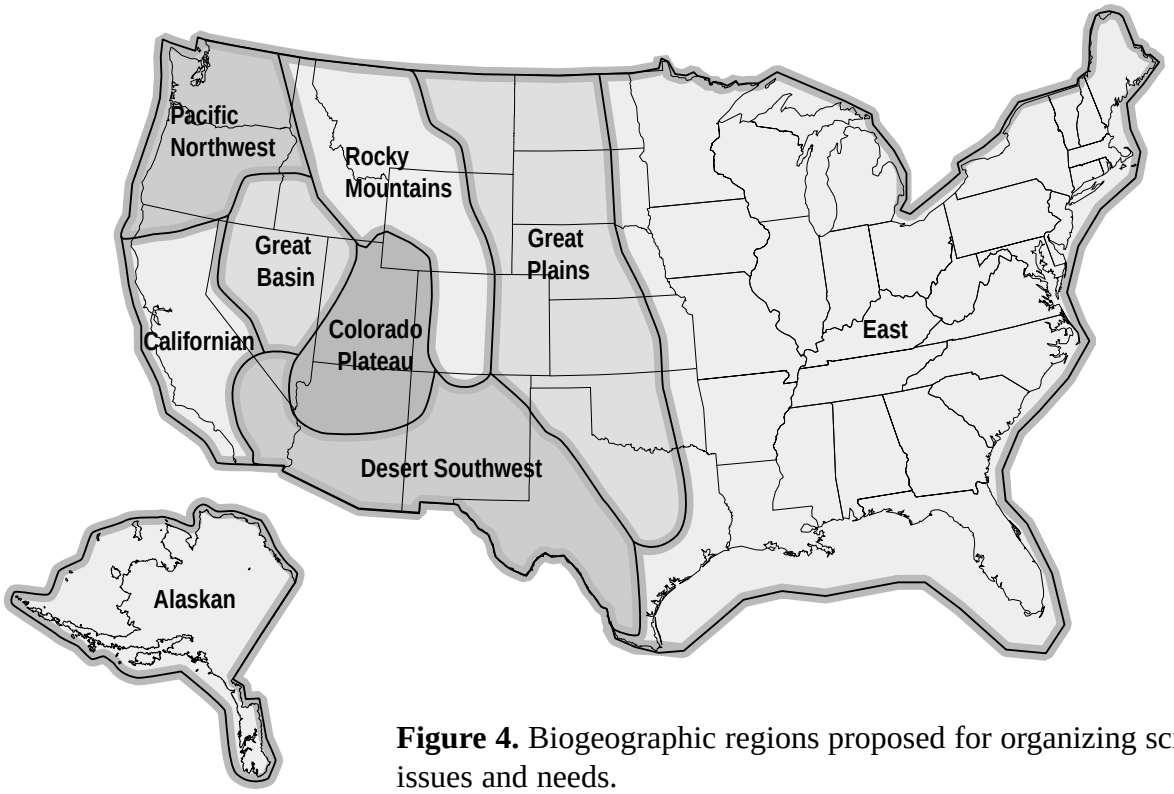

Figure 4. Biogeographic regions proposed for organizing science issues and needs.

organize and catalogue national, regional, and local management issues and related science needs.

Biogeographic regions are not meant to be rigid or inviolate. They are simply a means of identifying and grouping management issues and science needs in a way that is understandable and logical and that allows BLM to address science issues and needs in a comprehensive way. They also provide a geographical context for framing management issues and a means of grouping science needs. This will be very helpful in identifying partners, science providers, and interested parties for current issues, especially given that regional boundaries roughly parallel Cooperative Ecosystem Study Unit boundaries. In addition, they will provide a mechanism for using ecosystem and adaptive management approaches and principles.

The biogeographic region concept has been effectively used within the BLM for the Colorado Plateau initiative, providing a successful model for this approach.

Communicating Science Needs and Sharing Results

Communication and feedback are key elements in the Bureau's efforts to identify and prioritize BLM's science needs and to ensure science results/information are applied to land management activities and decisions. The Bureau needs to communicate two specific types of information:

- Management issues and science needs to potential science providers
- Science results/information to all internal/external audiences that could benefit from this information

Communicating BLM's Science Needs

The Bureau's science needs must be communicated both proactively and in response to specific data calls and other requests for information. The U.S. Geological Survey is the designated science bureau in the Department of the Interior, so it is a primary partner in addressing BLM's science needs.

Other significant science providers include the USDA Forest Service and Agricultural Research Service, the National Science Foundation, multiagency institutes, academic institutions, and others. Agencies and organizations that could be important partners include many other government and nongovernment agencies, organizations, and representatives. Partners would be chosen based on the specific management issues or science needs being addressed.

Appropriate communication methods for communicating BLM's science needs include written plans (including the BLM science catalogue of needs described in the previous section); the Internet (home pages, web links to science projects, bulletin boards, and comment pages); and PowerPoint or similar presentations.

In addition to these structured formats, the Bureau will encourage informal communications through telephone, e-mail, or face-to-face conversations with science providers and management partners on the ground to share information. Both formal and informal channels of communication will be kept open and encouraged to the maximum extent possible.

Important factors in developing and communicating science needs include the following:

- Geographic scale (local, regional, or national)
- Time scale (less than 1 year, 1 to 5 years, or greater than 5 years)
- Subject matter or mix of science needs (natural resources, cultural/social resources and context, and physical/abiotic resources)

The timing of communication efforts is critical. Science information will be communicated both as opportunities arise and according to defined schedules. The BLM will obtain detailed information on the planning and budgeting mechanisms for key divisions in the U.S. Geological Survey, Forest Service Research Stations, and other science providers. Information will be communicated at both the national and regional levels to these science provider organizations to coincide with their work planning and budgeting processes.

Lead times for providing information will vary. Some calls for information from science providers will incorporate enough lead time to prepare customized information packages. Other inquiries will require fast response times. In some instances, the Bureau will have to customize information presentations to address specific issues, audiences, etc. The BLM's national and regional science needs catalogue will be a primary source for providing information to, and acquiring the services of, science providers.

Sharing Science Information and Research Results

Science information and research results will be communicated to BLM decision makers, resource specialists, the scientific community, and the general public in a concise, understandable,

and usable format. The Bureau's Internet homepage will provide quick access to, and wide distribution of, BLM's science needs, ongoing work, and research results.

Key BLM internal audiences include Washington Office program leads, the Executive Leadership Team, the Field Committee, the Science Advisory Board, the Science Coordination Committee, State Office program leads and science coordinators, Field Offices, staff managers (e.g., budget), Resource Advisory Councils, resource specialists, environmental impact statement teams, planning teams, regional groups (e.g., the Colorado Plateau Group), special initiative teams (e.g., the Great Basin Restoration Group), the Northwest Forest Plan staff, the National Science and Technology Center, the National Interagency Fire Center, and the National Training Center.

External national audiences include the National Research Council/National Academy of Sciences, the DOI Science Board, the National Science Foundation, Congress, the Office of Management and Budget, the Council on Environmental Quality, key user groups, and others. The Bureau will also need to inter-face with national-level nongovernmental organizations.

Land management partners with whom the BLM should share science information and results include the USDI National Park Service, Fish and Wildlife Service, Bureau of Indian Affairs, and Bureau of Reclamation; the USDA Forest Service and Natural Resource Conservation Service; the Environmental Protection Agency; the Department of Defense; and the Department of Energy. Key audiences at the state government level include fish and game agencies in the states where BLM has a presence, along with state geological surveys, land management agencies, and commissions. At the local level, BLM must collaborate and share information with counties, municipalities, and the general public.

Educational outreach is also important. The Bureau will share science results and information by developing and participating in educational programs designed for both adults and young learners.

Science Opportunities on the Public Lands

The 264 million surface acres of BLM-managed public lands provide a vast assortment of opportunities for scientific investigations and management. Specific opportunities include the units of the National Landscape Conservation System, BLM's research natural areas (RNAs), and other designated science areas, as well as nondesignated public land areas.

The National Landscape Conservation System

The BLM has established the National Landscape Conservation System (NLCS) to help protect some of the nation's most remarkable and rugged landscapes. The system – which includes the agency's national monuments, Congressionally designated national conservation areas, and other areas designated for important scientific and ecological characteristics – will ensure that future generations can enjoy some of the United States' last, great open spaces. NLCS lands will enable the public to experience the solitude and splendor of these undeveloped landscapes by providing numerous opportunities for exploration and discovery

Many of these areas were created, at least in part, to preserve extraordinary scientific resources and landscapes. NLCS lands contain significant geological, paleontological, archaeological, biological, and historical features.

With their often unique resources and values, as well as their similarities to many surrounding areas, NLCS lands represent valuable open, natural laboratories. They will be managed to encourage collaborative science efforts, resulting in potentially significant advancements in natural resource knowledge.

Included in the NLCS are the following types of lands:

- National monuments – approximately 3.4 million acres
- National conservation areas – approximately 12.3 million acres
- The Headwaters Forest Reserve, wilderness areas, and wilderness study areas – about 22.5 million acres
- Wild and scenic rivers, national historic trails, and national scenic trails – about 6,200 miles

Research Natural Areas

RNAs are maintained as natural areas; only low-impact research activities are allowed. RNAs contain important ecological and scientific values and are managed for minimum human disturbance. They are used primarily for nondestructive sampling, non-manipulative research, and baseline data gathering on relatively unaltered communities. They make excellent controls, allowing the establishment of baseline conditions for similar natural communities that are being actively managed. RNAs provide a network of diverse habitat types preserved in a natural state.

Research natural areas are administratively designated and do not require the approval of Congress. The BLM has designated approximately 150 RNAs, mostly through its area of critical environmental concern (ACEC) process.

Other Designated Areas for Research and Studies

The BLM occasionally designates research or study areas, often to accommodate the needs of researchers. These are usually based on a need for scientific information on which to base management policy and decisions. Resource values to promote long-term ecological studies, monitoring, and assessment are often integral parts of the purpose of the designation. Multiple bureaus often work together to acquire ecological, socioeconomic, and cultural knowledge and to apply that knowledge to managing public resources. Collaboration among the public, scientists, educators, and land managers to attain common objectives and goals is very

important. This process helps to promote an understanding of complex ecological processes and enables the development of ways to meet the needs of people while maintaining both ecological and economic viability.

The BLM can authorize the designation of study or research areas. Areas designated can be used for either low-impact or high-impact studies. Special-use permits and land use plan amendments may be required for high-impact experimentation, but usually the designation alone would not require any changes to the BLM land use plan. Regulatory control will be in accordance with applicable sections of the Code of Federal Regulations (CFR), Title 43.

Scientific Use of Public Lands

Use of BLM public lands for research and scientific/environmental studies of many kinds would greatly benefit the Bureau's management of these lands. Within the scope of BLM's mission, these studies will be encouraged and the Bureau will collaborate with the investigator(s).

The BLM will investigate a protocol system for scientific-use registration. This protocol system would be reviewed by Field Offices to accommodate local, state, regional, or national needs and would require approval by the Director.

Implementation Concepts

Implementation of the Science Strategy is intended to include as many disciplines, people, and Bureau partners as possible. It is very important to have the process function in a timely manner, with a logical sequence of steps so the entire process moves smoothly; for example, information and new science needs must be available to feed into the budget cycle of BLM and science providers at the most opportune times.

Additionally, implementation should not be a burden or impose undue workload demands on those individuals and offices involved in the process and needing the science information. It is important to note that not all steps have to be complete for the next step to occur. Since this is a dynamic process, new information will continually be surfacing.

In implementing this Science Strategy, it is our intent to identify the priority science needs of the various offices of the Bureau, within the limitations of budget and staffing levels. The Bureau will take maximum advantage of partnering with other agencies and entities to leverage BLM funding in situations where common objectives are shared and the Bureau's goals and objectivity are not compromised.

Implementing the Science Strategy will involve, to the maximum extent possible, people and offices that are already functioning in related roles and activities. This is intended to take maximum advantage of existing knowledge and experience without creating another level of bureaucracy or undue additional workloads, responsibilities, or personnel demands. BLM's National Science and Technology Center will be available to assist national and regional teams as needed.

For a more detailed identification of how the science process is anticipated to work and who would implement the various steps, refer to Figure 3 and Appendix 1.

Appendix 1
Identifying and Communicating BLM's Science Needs

The following narrative describes the process for identifying and communicating BLM's science needs. It describes each step of the process and provides an example showing how invasive weeds would be traced through the process. Figure 3 presents the process in a flow diagram; this appendix refers to the same step numbers that are presented in Figure 3.

Science Process Step 1. BLM Strategic Plan

Actions to be Taken. The Strategic Plan has been written by the Bureau to address the Department's strategic goals and to comply with the requirements of the Government Performance and Results Act (GPRA).

Responsibility. The Director, the Executive Leadership Team, Headquarters strategic planning leads, and Field staff/reviewers.

Science Process Step 2. Identify National Management Issues

Actions to be Taken. National management issues will be derived from the background information that was used to develop the Strategic Plan goals, along with additional information input from Headquarters personnel.

EXAMPLE: Invasive weeds have become a nationwide problem; in some areas, native species are being replaced by the invaders. Populations of valuable range, pasture, special status, and other plant species are being crowded out or reduced in productivity and value because of these invasions.

Responsibility. Headquarters managers and staff will express the Bureau's strategic goals as national management issues. This effort will be led by the science coordinators from the Assistant Director, Renewable Resources and Planning (AD-200), and Assistant Director, Minerals, Realty and Resource Protection (AD-300), staffs. They will be assisted by those staff who were instrumental in developing the strategic goals.

Science Process Step 3. Express National Management Issues in a Regional Context

Actions to be Taken. National management issues will be focused to reflect how they apply to the various biogeographic regions of the U.S.

EXAMPLE: Two very important invasive species in the central and northern Great Plains region are leafy spurge and Russian olive. Both are spreading very rapidly and competing with native vegetation and reducing the productivity and value of range, pasture, and wildlife habitat.

Responsibility. Appropriate managers or their designees will frame national management issues in a regional context for each region. The most important regional management issues will be prioritized.

Science Process Step 4A. Define the Science Needed to Address the Regional Management Issues

Actions to be Taken. The science needed to address the regional management issues will be defined. Science may include existing resource inventory, monitoring, and other data, as well as new information derived from research/project efforts.

EXAMPLES:
~ How do land management practices and development affect the opening of niches in the native vegetation to allow the invasion of the two species of concern?
~ What are the biological attributes of the invasives that allow them to invade and outcompete the natives?
~ What biological characteristics may be used to exploit weaknesses in the life cycle for control of the species?

~ After various control measures have been used to reduce the invasive populations, what revegetation and management practices should be used to stimulate growth and production of desirable vegetation?

Responsibility. Science coordinators from the states within the region, along with State and Field Office technical staff, will comprise a core team for determining the science needs for each issue. With the cooperation of partners, i.e., other land management agencies with lands adjacent to BLM with similar problems, the team will determine the research/projects needed to address regional management issues.

Science Process Step 4B. Define the Science Needed to Address the National Management Issues

Actions to be Taken. Science needs for national management issues requiring a national approach will be defined and addressed, similar to Step 4A above.

EXAMPLES:
~ At what rate are weeds spreading, and where are some of the more extensive invasive weed problems?
~ Where and how can we best respond to minimize damage and further spread?

Responsibility. The science coordinators from AD-200 and AD-300 will constitute a core team to determine the science needs for each of the national management issues. They will be assisted by technical specialists from the appropriate staffs in Washington and in the field.

Science Process Step 5. Ascertain Current Science Information and Identify Additional Science Needed

Actions to be Taken. Current science information and science projects for each management issue will be identified and assessed to avoid duplication of effort and determine information gaps that need to be filled. The outcome will be a list of the additional science needed to fully address management issues. Any short-term tactical science needs that are identified during this process should be segregated and forwarded to the National Science and Technology Center to determine if there is a way to address these needs outside of the formal process.

EXAMPLES:
~ What is the "state of the science" related to the leafy spurge and Russian olive invading vast acreages, particularly along riparian zones?
~ What information is available and needed to determine the competition mechanisms or habitat conditions that allow or stimulate the invasion?
~ What information is available or needed to identify the mechanisms of the plants' biology and natural predators/consumers of the plants that may help deter further invasions?

Responsibility. The State science coordinators and various technical staffs will determine the current body of science relating to each regional management issue and the additional science needed to support decision making and implementation.

Science Process Step 6. Aggregate Regional Management Issues with Science Needs into a Regional Science Catalogue

Actions to be Taken. The science needs (gaps) identified in Steps 4 and 5 above will be prioritized and assembled into a regional catalogue that will form the basis for communicating the Bureau's regional science needs in the steps below. Priorities may be assigned by State Directors responsible for managing lands in each of the regions.

EXAMPLE: Catalogue invasive weed science needs with input from Field and State Office personnel and regional interagency teams.

Responsibility. The State science coordinators, with help as needed from technical specialists, will develop and aggregate in a catalogue the regional management issues, science needs, and projects. This catalogue will be approved by the State Directors within the region.

Science Process Step 7. Combine Regional Issues and Science Needs into a National Catalogue

Actions to be Taken. Regional catalogues will be combined into one overall catalogue that identifies science needs at the national level. National priorities will be determined, in part, by the number of regions identifying the same management issues or science needs as high priorities. The Bureau's regional and national science catalogues will be used as a source document to respond to BLM's various science providers at both the national and regional levels.

EXAMPLE: Combine regional issues and science needs from the Great Plains region (Russian olive and leafy spurge) with regional issues and science needs from the Great Basin (cheatgrass and spotted knapweed) and other regions, and include this information in the national catalogue.

Responsibility. The Science Coordination Committee will take all of the regional catalogues and prepare a consolidated national catalogue, with recommendations for national priorities. This product will be forwarded, through the appropriate Assistant Directors, to the Director for approval.

Science Process Step 8A. Scope Regional Science Needs with Providers

Actions to be Taken. Regional science needs will most likely be addressed and scoped with science providers in the region. However, some significant science providers may be located outside the region; these will be included in the effort to obtain needed science. Tactical science needs at the regional and local level will be scoped and provided to the best identifiable science providers for the subject area being addressed.

EXAMPLE: For the needs identified above, scope science needs for weed control with regional offices of the U.S. Geological Survey, regional universities, and others; develop project plans for weed control in cooperation with science providers.

Responsibility. At the regional level, the science coordinators and technical specialists from the states within the region will work with the most appropriate science provider(s) to scope the science needs and projects, develop the best approach to addressing those needs, and develop the project plans. The Regional Science Catalogues will be the basis for these discussions. Probably the most relevant providers for these questions would be university researchers, the Agricultural Research Service, the U.S. Geological Survey, and other appropriate researchers/organizations.

Science Process Step 8B. Scope National Science Needs with Providers

Actions to be Taken. National science needs will be scoped and provided to the best science providers nationwide that have expertise in the subject area being addressed. The U.S. Geological Survey is the primary science bureau for the Department of the Interior. Other significant science providers include Cooperative Ecosystem Study Units (university partner networks established by memorandums of understanding involving several bureaus for research, education, and information transfer).

EXAMPLE: For the needs identified above, scope science needs for weed control with the U.S. Geological Survey, the Agricultural Research Service, universities, and others; develop project plans for weed control in cooperation with science providers.

Responsibility. Headquarters staff will work with the most appropriate science provider(s) to scope science needs and projects, develop the best approach to addressing those needs, and develop the project plans. The National Science Catalogue will be the basis for these discussions. Probably the most relevant providers for these questions would be university researchers, the Agricultural Research Service, and the U.S. Geological Survey.

Science Process Step 9. Conduct Science and Share Results

Actions to be Taken. Research will be conducted, information and data gathered, and the results shared with BLM managers and staff; information will also be made available to the public and any specific groups or

individuals needing or requesting the information. Interpretation and translation may be required for highly technical information so that it can be understood and applied by resource specialists, managers, and others.

EXAMPLE: Interpret and translate technical research results related to leafy spurge and Russian olive invasions in riparian zones into more useable information that specialists and managers can readily assimilate and incorporate into management of riparian areas.

Responsibility. The BLM project coordinator and the science provider, along with the National Science and Technology Center staff, will develop an information transfer plan as a deliverable for each initiative. These plans, which need not be cumbersome, will identify the intended audiences for the information, what methods will be used to communicate the results, and who will be responsible for the information transfer.

Science Process Step 10. Apply Science to Land Management

Actions to be Taken. Science results will be used in land management activities and decisions. The Bureau will provide feedback to science providers, both at the regional and national levels, on how BLM has applied the science they provided. This will enable the BLM and its science providers to evaluate the effectiveness and appropriateness of providers' contributions and will allow BLM managers to modify decisions and management practices where needed.

EXAMPLE: Incorporate science information on leafy spurge and Russian olive into Bureau policy and procedures as well as on-the-ground management of riparian areas. Modify land use plans as necessary.

Responsibility. BLM field managers and resource specialists will use the results of science investigations to address management issues and to sustain the health, diversity, and productivity of the public lands.

Appendix 2
Team Members

Executive Leadership Team Sponsor – Martha Hahn, BLM Idaho State Director
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Framework 1 – Role of Science in BLM

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Framework 2 – BLM's Science Process

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Framework 3 – Communicating Science Needs

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