Lessons Learned Report: Ecoregional Assessment Processes

November 2010

Note: This report was prepared to inform discussions and invite comments about the current BLM Rapid Ecoregional Assessment process at internal and external lessons learned workshops in November 2010 and January 2011. This report may be revised and/or supplemented based on the feedback from these workshops.

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Ecoregional Assessments: Lessons Learned Report

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Executive Summary

The Bureau of Land Management (BLM) recognizes that our nation's public lands are facing increasingly complex and widespread environmental challenges that transcend traditional management boundaries. They are developing a landscape-scale management approach to better understand these challenges and support balanced stewardship of these lands and their diverse resources.

To inform the development of their landscape-scale approach, the BLM is examining lessons learned from prior efforts at landscape-scale assessment and management. These lessons learned offer important insights for the BLM and their partners in developing an improved and more consistent approach to *ecoregional assessment* and *ecoregional direction* that will serve as a foundation for coordinated management of key resources.

Ecoregional assessments are landscape scale snapshots of present ecological conditions and trends, natural and human influences, and opportunities for resource conservation, restoration and development in an ecoregion. They can be used to identify and map important resource values and patterns of environmental change that may not be evident when managing smaller, more local land management areas.

Ecoregional direction provides broad-level management strategies or guidelines developed from information produced through the ecoregional assessments. Ecoregional direction can identify priority areas for conservation and development, including focal areas for conserving wildlife habitats and migration corridors, potential energy development and urban growth. This kind of broad-scale direction provides a blueprint for coordinating and implementing management priorities and resource allocations through BLM's state and field offices.[1]

The BLM enlisted the help of the U.S. Institute for Environmental Conflict Resolution (US Institute) to develop and support a collaborative process to engage internal BLM employees and external partners in crafting a standardized approach to ecoregional assessments and ecoregional direction. EnviroIssues is under contract with the Institute to support this effort.

This Lessons Learned Report was produced through a joint effort between EnviroIssues and the US Institute. It is the first of a series of activities and products that will inform the development of the BLM's ecoregional assessments and ecoregional direction. Subsequent to the release of this report, a series of Lessons Learned workshops will be organized with BLM personnel at the Washington, State, District and Field Office levels, and then with a number of stakeholders from a variety of other agencies and organizations, also from different levels of management. Collectively, this report and those workshops will generate the input from which the BLM will draft an ecoregional approach process template, which will also be subject to review and refinement by BLM and interested stakeholders.

This Lessons Learned Report is based on interviews and a literature review process that focused primarily on three previous landscape-scale efforts: the Northwest Forest Plan, the Interior Columbia Basin Ecosystem Management Plan, and the Greater Sage-grouse Initiative. The interviews and literature review were specifically intended to test BLM's assumptions about key factors that contribute to the

[1] BLM's An Introduction to Rapid Ecoregional Assessments (August 2010).

success of an ecoregional approach. The interviews proved particularly helpful to this end, in that specific questions about the assumptions generated specific responses to their applicability.

The results validate the appropriateness of a landscape-scale approach to understanding the conditions, trends and management opportunities across the landscape as well as the value in considering these trends in managing smaller, local land areas. The results also indicate that the assumptions on which BLM proposes to base its ecoregional approach are also true, with some qualifications. This inquiry informs, in specific and practical detail, the nuances of the application of those assumptions in the ecoregional assessment and ecoregional direction process.

Ecoregional Assessments must be:

1) Completed by independent senior scientists with strong publication records, with a peer review process to ensure credibility of the science.
2) Informational rather than directive. Scientists should not be decision-makers.
3) Completed within a 12-month to 18-month time frame and focused on synthesizing existing relevant data and information and identifying critical gaps for further research.
4) Approached systematically, with the understanding that initial assessments will be periodically updated to include new science and the adaptive management results.
5) Focused on key ecosystem management questions that are grounded in clear management goals and objectives.
6) Involve the managers, resource specialists, partners and stakeholders in a collaborative process to identify key issues, set management goals and objectives, frame the management questions, evaluate and refine data, and assess the utility of the information for decision-making.
7) Grounded in science and include conceptual models linked to system attributes and key change agents. The models should be able to capture and address the dynamism and fluidity of the ecosystem at multiple temporal and spatial scales.
8) Appropriately scaled to address the separate, but interrelated boundaries, drivers and secondary issues related to the major management questions (i.e. wildlife species viability, habitat, invasive species, fire).
9) Focused on process rather than product to develop shared understanding and value for a landscape-scale, ecoregional approach.

Ecoregional Direction must be:

1) Supported at the top-level to ensure coordinated goals, targets and resource allocations across jurisdictions to allow partners to work together.
2) Developed through iterative, interagency and interdisciplinary processes across national, regional, and local levels that build understanding and buy-in, while translating the assessment into guidance for implementation and monitoring.
3) Developed through a transparent collaborative process to the greatest extent possible. This collaborative process must be consistent with agency requirements for collaboration and NEPA.
4) Grounded in agency authorities, which are clearly articulated and understood by all participants.

5) Grounded in revised agency policy that emphasize larger, ecoregional assessments as the foundation for planning and management and in the most efficient and effective agency procedures that are based on current science.
6) Built on revised agency work processes that better accommodate translating broad-scale assessments into land use planning, implementation, and monitoring and coordinating across agencies. These revised work processes should allow for setting more national direction, and allow for plans at the local level to be more flexible and context-driven to better accommodate coordination and adaptive management.

Introduction

The Bureau of Land Management (BLM) recognizes that public lands are facing increasingly complex and widespread environmental challenges that transcend traditional management boundaries. These challenges include managing wildfire, controlling weeds and insect outbreaks, providing for energy development and urban growth, and addressing pervasive impacts from the effects of climate change. The BLM is developing a landscape-scale management approach to better understand these challenges and support balanced stewardship of the diverse natural resources of the public lands. While each of these challenges can be partially addressed at a field-office level, a landscape-scale perspective and approach is also necessary because some important ecological relationships may only be revealed and managed effectively at broader scales.

Landscapes are large, connected regions that have similar environmental characteristics (examples include the Sonoran Desert and Colorado Plateau). They span administrative boundaries and typically encompass areas much larger than those managed by individual BLM field offices. A landscape-scale approach looks across these larger areas to more fully recognize natural resource conditions and trends, natural and human influences, and opportunities for resource conservation, restoration, and development. It seeks to identify important ecological values and patterns of environmental change that may not be evident when managing smaller, local land areas.

A landscape-scale approach informs and enhances local management. The BLM's field offices maintain their central role in managing public lands. They continue to prepare land use plans, authorize land uses, conduct monitoring, and work with partners and stakeholders to develop and implement local management strategies. However, the broader perspective provided through a landscape approach helps focus and integrate local management efforts, moving them beyond "random acts of restoration," for example, to more coordinated and cumulatively effective management. This larger scale perspective also provides an important foundation for developing coordinated management strategies with partner agencies, stakeholders, and Indian Tribes at all levels of management.[2]

To inform the development of their landscape-scale approach, the BLM is examining the lessons learned from prior efforts at landscape-scale assessment and management. These land management concepts and experiences have been evolving for nearly three decades. Since the early 1980's, federal land managers have recognized that western forests and rangelands were experiencing broad-scale issues, such as widespread wildfires, and weed and insect infestations, which could no longer be managed effectively by local offices or through traditional management practices. Scientists, land managers, and stakeholders have been working since then to understand these wide-ranging impacts, develop shared strategies, and implement collaborative management efforts.

The BLM seeks to build upon these collective experiences and partnerships by examining the lessons learned from prior efforts at landscape scale assessment and management. Based on these lessons learned, the BLM will involve their employees and partners in developing an improved and more consistent ecoregional assessment process and ecoregional direction that will serve as a foundation for coordinated management of key resources.

[2] BLM's Landscape Approach Overview (July 2010).

Ecoregional assessments are landscape-scale snapshots of present ecological conditions and trends, natural and human influences, and opportunities for resource conservation, restoration and development in an ecoregion. They are developed to address key ecoregional management questions. The process includes integrating relevant geospatial data from all the partners within an ecoregion as well as synthesizing existing science and information about resource conditions, trends, and change agents. Ecoregional assessments can be used to identify and map important resource values and patterns of environmental change that may not be evident when managing smaller, local land areas.

Ecoregional direction provides broad-level management strategies generated by information produced through the ecoregional assessments. Ecoregional direction identifies priority areas for conservation and development, including focal areas for conserving wildlife habitats and migration corridors, potential energy development and urban growth. It provides a blueprint for coordinating and implementing priorities through BLM's state and field offices.[3]

Overview

This Lessons Learned Report provides the results of an interview and literature review process[4] which focused primarily on:

1. Exploring lessons learned from other landscape-scale processes to further refine BLM's approach.
2. Testing BLM's assumptions about key factors that contribute to the success of an ecoregional approach.
3. Validating the interview results through a review of relevant literature.

The BLM, working with the US Institute and EnviroIssues, selected the following three landscape-scale assessment and planning processes from which to garner lessons learned to inform their approach. These particular assessment and planning processes were selected because they provided the best opportunity to test the assumptions outlined by the BLM; they are comparable in scale to the BLM ecoregional assessments; also they were processes in which scientists, managers, and resource specialists grappled, with varying degrees of success, with producing assessments to address ecoregional management questions which could then be used to develop management guidance at the regional, land use and project planning levels.

- Northwest Forest Plan
- Interior Columbia Basin Ecosystem Management Plan
- Greater Sage-grouse Initiative

The two sections that follow, the Lessons Learned Analysis and the BLM assumptions analysis, are distilled from interviews and represent the lessons learned from personal experience by those interviewed. The final section, Literature Analysis, includes some additional conclusions about BLM's assumptions and their effectiveness in developing standardized assessment and direction processes.

[3] An Introduction to Rapid Ecoregional Assessments (BLM, August 2010).
[4] See Appendix B for an overview of the interview process and Appendix C for an overview of the literature review process and a summary of the literature.

Lessons Learned Analysis

Northwest Forest Plan

The Northwest Forest Plan (NWFP), initiated by a directive from President Bill Clinton in 1993, established a team of scientists to create a management plan that could be implemented to break the gridlock over management of the spotted owl and timber supply in the Pacific Northwest. The specific purpose of the plan was to take an ecosystem management approach to forest management, with support from scientific evidence; meet the requirements of existing laws and regulations; maintain a healthy forest ecosystem with habitat that will support populations of native species (particularly those associated with late-successional and old-growth forests), including protection for riparian areas and waters; and maintain a sustainable supply of timber and other forest products that will help maintain the stability of local and regional economies on a predictable and long-term basis.[5]

The Forest Ecosystem Management Assessment Team (FEMAT), a team of four high-level scientists, was formed to develop an assessment and complete the Northwest Forest Plan with these specific objectives.

The assessment and plan addressed lands in Washington, Oregon and northern California, from the Pacific Coast to the east side of the Cascades, and spanned multiple jurisdictions including private, state, federal and tribal. The geography was determined primarily by the range or potential range of the spotted owl, although, to assure viability, the team needed to address the complete range of multiple species. However, given the focus on the spotted owl, the ecological assessment was defined primarily by old growth issues.

FEMAT completed the assessment in less than a year. They worked with resource specialists to compile the best available geospatial data at the time and filled in the gaps with best knowledge of the scientists and resource specialists. FEMAT developed nine alternatives for management consideration. The agencies created a regional-level interdisciplinary, interagency team to analyze the nine alternatives and complete the Environmental Impact Statement (EIS). FEMAT also wrote the plan, which included a strong emphasis on adaptive management, but with very specific directions and prescriptions to assure accountability at the field level.

The scientists were not involved after the plan was written. The regional-level team provided support to the field throughout implementation because new survey and management protocols were needed to comply with the direction. For example, they developed survey and management protocols to survey the over 400 species in the plan area.

The portion of the plan on BLM lands was litigated. The BLM began the Western Oregon Plan Revision (WOPR) to develop a new land use plan that could be implemented on BLM lands. However, in 2009 Secretary Salazar discontinued that planning effort because of perceived problems with the approach.

[5] Forest Ecosystem Management Assessment Team. Forest Ecosystem Management: An Ecological, Economic, and Social Assessment. 1993.

Interviewees report:

What worked well:

- The NWFP was one of the first landscape-scale efforts to develop a broad science-based assessment as the foundation for planning across agency boundaries. It was foundational in establishing ecosystem management as the basis for understanding and managing dynamic systems and species in a more integrated, holistic way using a geospatial format.
- The assessment and plan were done in less than six months. The scientists were able to make decisions in a timely manner and proceed with little interruption.
- Scientists were able to identify what data was needed to answer questions across agency jurisdictions.
- Project leaders learned to integrate the best information from all the relevant agencies by generating common terminology, definitions, and protocols. They explored how specific information needs were to be commonly understood throughout their various levels of management and across agencies, and they generated survey protocols for establishing that data.
- The regional-level interdisciplinary, interagency team helped to ensure coordinated management by developing and distributing interim guidance to the field.
- The development and implementation of new monitoring strategies enhanced the capacity of local resource specialists from all agencies to conduct monitoring for adaptive management.

What did <u>not</u> work well:

- Managers, resources specialists, and the public were largely excluded from the assessment process and the development of management direction. As a result, much of the science was not directly relevant or readily accessible for managers to support decision-making.
- There was limited sense of ownership by the people and agencies that had to implement the plan. Because there was little management or public input, there was little buy-in, so the agencies had to build internal capacity and engage the public in implementation.
- The scientists made the plan so prescriptive that it took extended time for field personnel to work out protocols, since the direction did not fit within the traditional management for either the U.S. Forest Service (USFS) or the BLM. This resulted in significant delays in completing the EIS and implementing the plan.
- The scientists overlooked key relevant legislation. For example, they failed to address the Oregon and California Revested Grantlands Act (O&C Act), which sets requirements for timber harvest on BLM lands. Because they used only the USFS regulations as the foundation for planning, the BLM was more vulnerable to litigation.
- Because of the litigation over the O&C Act and the controversy over the economic assessment, there was no resolution over timber harvesting issues.
- Jack Thomas Ward, who led the panel to produce the NWFP, reported in 2006 that the plan succeeded in conserving old-growth forest and aquatic systems, but that it did not reach its intended goal for habitat restoration and adaptive management practices. He also reports that

social and economic policies were not adequately adopted to meet the plan's goals (*Northwest Forest Plan: Origins, Components, Implementation Experience, and Suggestions for Change*.)

Lessons Learned for the NWFP

1. Landscape-scale, science-based, geospatial assessments provide a critical foundation for understanding and managing dynamic systems and species in a more cost-effective, integrated, holistic way.
2. Scientists should not be planners or decision-makers.
3. Plans must be grounded in agency mission and authority.
4. Managers and resource specialists need to be involved in developing the assessment and the direction. Line officers are particularly important to include in the process because they need to understand the science in order to apply it to decisions. They have final decision-making authority.
5. Using an interdisciplinary and interagency approach, with regional-level teams, is important for developing and implementing direction and monitoring.
6. Representatives from regulatory agencies, such as NOAA Fisheries and USFWS, and possibly the state forestry and relevant hydroelectric agencies, should be key members on the interagency management team.
7. The public needs to be involved throughout the process.

Interior Columbia Basin Ecosystem Management Plan

The Interior Columbia Basin Ecosystem Management Plan (ICBEMP) was intended to create a landscape-scale assessment and plan, much like the NWFP, but for a larger area. It was "based on Presidential direction to develop a scientifically sound, ecosystem based strategy for management of 64 million acres of lands," for the purpose of addressing concerns "over forest and rangeland health, uncharacteristically intense wildland fires, threats to certain fish and wildlife species, and concerns about local community social and economic well being."[6] The intent was to better understand key ecosystem processes and resource conditions across the landscape as a foundation for developing interagency plans for managing shared issues that crossed agency boundaries, such as water/fisheries, wildland fire, and invasive plant species.

The assessment area included all of the Columbia River Basin, which encompasses lands in Washington, Idaho and Montana, and portions of the Klamath and Great Basins in Oregon. The geographic planning area was identified based on the ecosystem issues that entities were attempting to manage jointly. At the time, this was the largest area for which landscape-scale assessments were being done.

An interagency management team, comprised of 3 regional foresters, 3 state directors, and representatives from the National Oceanic and Atmospheric Agency (NOAA), Environmental Protection Agency (EPA) and U.S. Fish and Wildlife Service (USFWS), was created to direct the effort. They engaged a team of scientists, primarily from the U.S. Forest Service (USFS) research stations and the U.S.

[6] U.S. Department of Agriculture, Forest Service; U.S. Department of the Interior, Bureau of Land Management. Interior Columbia Basin Ecosystem Management Project. The Interior Columbia Basin Strategy. 2003. Page 1.

Geological Survey (USGS), to collect and synthesize the science and data to produce an assessment, similar to the assessment created for the NWFP.

The managers and resource specialists were more involved in the development of the assessment than they had been in the NWFP, and they worked almost exclusively to develop the direction. The managers established two regional-level interdisciplinary, interagency teams, which interfaced with the scientists, managers, and the specialists in the field to prepare the environmental impact statement and the management and monitoring protocols.

The scale was generally viewed as too large and politically unwieldy to develop and implement a plan and Environmental Impact Statement (EIS) for the entire area. The dissonance between this broad-scale assessment and agency planning requirements was too great. Ultimately, each agency was left with the task of translating the assessment into individual agency land use and project plans; the interdisciplinary regional teams amended 72 land use plans. They also completed a draft EIS and a supplemental EIS. However, the EIS was never signed. Nevertheless, throughout the assessment process, the interdisciplinary, interagency teams were able to agree on management protocols and develop interim direction that was then sent to the field.

Interviewees report:

What worked well:

- More senior scientists were recruited, which was critical to the success of the effort because this process required a new way of thinking.
- The seniority of the scientists and their track record was also important because it increased the credibility of the science.
- The technical specialists significantly increased the understanding and ability to develop landscape scale geospatial data sets. They found ways to fill the gaps and holes in the existing geospatial data by developing standardized protocols for collection and integration. They also developed new geospatial data using remote sensing, and they developed new spatial estimates across the Columbia Basin.
- The interaction among scientists, managers, and resource specialists helped to create the mindset of thinking at an ecological landscape scale, which helped bring this perspective into planning and monitoring.
- Because of these interactions, there was much more engagement, learning and buy-in on the part of managers and specialists in the field.
- Even though the planning process was never fully completed as originally conceived, novel learning and direction came out of the process that confirmed a scientific assessment at the landscape scale provides a good context from disclosing and considering the implications of actions. It also provided a platform for better monitoring and adaptive management.
- The interdisciplinary, interagency teams were able to develop and distribute interim direction for the field that ensured greater management coordination.
- They also generated common standards, terminology, survey protocols, and monitoring protocols across agencies and jurisdictions in the area.

- The scientists produced the assessment with broad course-scale data, but they were also involved with helping the interagency teams scale it down for land use and project level planning.
- Overall, ICBEMP improved management of those issues that transcended ownership boundaries, such as water, anadromous fish, and wildland fire.

What did <u>not</u> work well:

- The disconnect between the broad-scale assessment and agency work processes was too great to support landscape-scale planning.
- The large geographic area for assessment and planning made collaboration and traditional public engagement difficult. Smaller counties or localized groups found it difficult to see their perspectives and concerns accounted for in the process. Some of the FACA groups were successful at engaging local constituents and linking local concerns with the landscape-scale issues, but in general, it was a poor fit.

Lessons Learned from the ICBEMP

1. The assessment should be based on key management questions.
2. These questions have to emerge from an ongoing dialogue between managers and the scientist, so they can shape or frame the key science questions together and test their utility of the data.
3. Scientists, managers, resource specialists, and the public need to be involved in developing both the assessment and the direction. The focus should be on the assessment as a process of learning about the system rather than the assessment as a product. The real value is developing this mindset as a foundational for managing dynamic, evolving ecosystem.
4. Assessments need to be appropriately scaled to the issues. The analysis has to address the dynamics of the system at different temporal and spatial scales to capture the evolving nature of these systems.
5. GIS modeling and decision support tools need to be used in developing the assessment and direction. They make it possible to visually represent dynamic temporal and spatial scales as a frame of analysis.
6. It is important to differentiate between those issues that need to be considered and managed across jurisdictional boundaries, and those issues that are broad in scale but do not require collaborative management.
7. An appropriate scale for assessing some of the management issues (such as anadromous fish and fire), is not necessarily an appropriate scale for joint planning. However, developing shared visions, shared goals and objectives, and shared monitoring and management protocols across large landscapes is critical to achieving these goals through coordinated management at more local levels.
8. It is important to use an interdisciplinary and interagency approach, with regional-level teams, for developing and implementing broad guidance and monitoring.
9. Agency work processes, such as land use planning, budgeting, and project design and implementation need to be revised to accommodate these broad-scale assessments.

10. Public engagement is most effective at the more local scales. Several interviewees suggested using FACA-type committees, since they can be effective at involving local stakeholders up front in the assessment and planning processes. However, the focus of the public engagement process should be on developing ecological landscape-scale thinking.

Greater Sage-grouse Initiative

As early as 1995 agencies saw the need for a landscape scale approach to sage-grouse management and were working together to develop action plans for addressing sage-grouse issues and management. Nevertheless, the real impetus for the Greater Sage-grouse Initiative to complete an assessment came from the threat of species listing under the Endangered Species Act. In 2003, there was general consensus among the key agencies that information on sage-grouse populations and habitats across the western states needed to be compiled and used as a foundation for coordinating management of the species, creating what is referred to as the Greater Sage-grouse Initiative.

The Greater Sage-grouse Initiative involves six federal agencies, eleven states and two Canadian provinces. The members created an Executive Oversight Committee and a technical group made up of representatives from each of the agencies/entities as the formal governing structure. The assessment considered a geographic area that ranges from western South Dakota, North Dakota and Alberta, Canada west to the Cascades and eastern California, and south to Arizona. This area was determined by sage-grouse range and habitats, including areas where sage-grouse still exist, as well as those areas where the species has been extirpated.

The Western Sage and Columbian Sharp-tailed Grouse Technical Committees took on the task of initiating the assessment. They assembled a team of about 40 scientists, which includes scientists from USGS and the USFS Pacific Northwest Research Station (PNWRS), who had strong backgrounds in shrub steppe and sage grouse conservation.

Most of the original work was pulled from existing publication literature and the experience of individuals on the team who had management experience on the ground. They sought to involve land managers; however, for the most part, the managers were not at the table throughout the assessment. Since ICBEMP, the agencies had been wary of forming large teams and committing large amounts of money for these efforts. The science team did organize a few face-to-face meetings with an interagency group of mid-level managers where they discussed the overall conceptual framework. They identified key questions, identified their management needs, and then the core group of the science team drafted the assessment document. The science team tiered the assessment at four scales:

1) Roughly 250,000 sq. miles – the full range of sage brush habitat
2) Roughly 100,000 sq. miles – across sage-grouse populations
3) Roughly 20,000 acres - part of the range – such as summer and winter range
4) Actual small on-the-ground populations – where the birds are

They developed different management questions to fit the particular scale. Even though the managers and resource specialists were not directly involved, the committee scientists developed the assessment and the conservation strategy through an iterative process. Drafts of the assessment and conservation strategy were circulated broadly through the BLM and the FWS agencies, which provided feedback to the

team. The team then revised the draft based on the feedback. After the assessment was completed, the BLM sent it out for peer review.

The resulting 2004 Conservation Assessment of Greater Sage-grouse and Sagebrush Habitat is a 610-page document, published by the Western Association of Fish and Wildlife Agencies (WAFWA). The original assessment data was provided to FWS to be used in their consideration on listing the sage-grouse. Based on the report, the FWS initially determined that listing was not warranted. Subsequent litigation forced the issue back to the courts, and the FWS was mandated to reassess their decision.

Some of the editors of the original assessment have completed an updated and expanded analysis, which is presently being published by University of California Press. In this version, they have used more recent, and more sophisticated techniques developed for trend analysis, broadened the science base, and taken into consideration new information.

Interviewees report:

What worked well:

- The Greater Sage-grouse Initiative went a long way toward developing a formal, scaled assessment process for species conservation planning that could be replicated.
- This initiative was also able to engage senior scientists with strong track records, which increased the credibility of the assessment.
- The scientists were able to assemble information that was relevant for decision-making range-wide; they collaborated in writing the assessment, created a cohesive vision, and kept the assessment informational rather than decisional.
- The assessment provided a good foundation and framework for restoration. Drawing on the assessment, the BLM Burned Area Rehab (BAER) plans for the 2006 Murphy Complex Fire laid a foundation for interagency on-the-ground work, for example, the BLM completed a plan which identified where on-the-ground treatments were needed for sage-grouse. Groups of private lands owners affiliated with some local collaborative groups came together to develop their own unit plan which was integrated with the BLM range management plan to provide consistency and support landscape level goals.
- The project was successful at engaging at least some of the public, particularly ranchers, in developing the assessments and conservation strategies and managing across public and private boundaries through coordinated management plans.

What did <u>not</u> work well:

- The contributors in the first publication were not identified or credited by chapter, so people could not tell who had done the work, which affected the report's credibility.
- Political realities threatened the work effort. Furthermore, the necessity to coordinate with states, and State Governors, made the project increasingly challenging.

- Because the managers and resource specialists were not fully engaged, this process was less successful than ICBEMP in gaining buy-in at the field level to accomplish coordinated management across units.
- In fact, according to those interviewed for this report, translating the assessment results into local management proved challenging for a number of reasons:
    - There is general resistance to institutional change that is top-down driven. There is a natural inclination for local managers, resource staff, and partners to feel they know what is best for the local area and to want to set their own priorities. In order to generate an ecoregional view and range-wide priorities, national and regional direction are required.
    - Trying to step down these assessments proved confusing for many people in the field. These processes are designed to be regional, so the assessments are at a coarse scale. Data developed at the regional level may not correlate well with local-level data. Therefore, local specialists and managers often doubted the validity of the data and viewed it as flawed.
    - The assessment data didn't appear to have much value to people in the field because it was developed to address broad-scale management objectives. Local data is more appropriate for making decisions and developing projects at the local level.
    - Managers resisted setting management objectives based from the assessments because the results suggested the need for change in the allocation of resources, which creates winners and losers and increase conflict.
- Management coordination did not work well across the ecoregion. There is no history or precedent for setting a national framework to coordinate and integrate programs to manage species that encompass large areas. Without that kind of framework, management at the local level will be ineffective.

Lessons Learned from the Greater Sage-grouse Initiative:

1. Engaging well recognized scientists and using a peer review process is critical to the credibility of the assessment.
2. It will be difficult to engage managers and field personnel throughout the process of developing the assessment and direction if agencies do not want to invest in creating large, interagency management and interdisciplinary resource teams.
3. Top-down, national direction is required to ensure coordinated management. Managing species that occupy large ranges at the local level is not effective because there is no shared focus and strategy for species across jurisdictions and geographical areas. Direction needs to be set at both the national and regional levels to provide consistency across entire ecoregions.
4. Top-down, national direction is generally not well received at the local level. Therefore, it is critical to engage managers, resource specialists, and stakeholders up front and develop an iterative approach for creating and refining the assessment and direction.
5. The step-down process from these regional assessments is not well understood or supported in the field. To be effective, it is important to develop both a top-down and bottom-up process, where the scientists engage with the managers, resource specialists and stakeholders to help translate the assessment into local decision-making and implementation and inform the refinement of the assessment.

6. Many managers will resist trying to integrate priorities through a top-down, bottom-up process because the results suggest the need for change in the allocation of resources. Buy-in and a voice in defining the process, which allows for effective integration of local expertise and leadership, is critical to building support for this ecoregional approach.
7. Budgeting and resource allocation must follow the national and regional-level strategy. There needs to be high-level buy-in at the department levels to ensure that all partners have the budgets they need to stay involved.
8. The move toward landscape-scale management must be well-funded and supported. There needs to be adequate and sustained funding to ensure the buy-in for landscape-scale management. Shrinking budgets will only sharpen the competition for already limited resources.

BLM Assumptions Analysis

Another objective of the interview and literature review process was to test BLMs assumptions about key factors that contribute to effective ecoregional assessments and direction against the experience of interviewees and analysis provided through the literature (see list of key assumptions in Appendix A). Factors, such as the time required to complete an assessment and the roles of scientists, managers, resource specialists, and the public in these processes, have been identified as critical to the success or failure of earlier landscape-scale efforts. Therefore, interviewees were asked to address the validity of each of the BLM assumptions regarding effective ecoregional assessment and direction processes based on their experience in landscape-scale assessment and planning. The literature reviewed did, in some instances, directly validate the BLM's assumptions, and it also provided general recommendations for landscape-style approaches to conservation that expand on the BLM's key assumptions.

Ecoregional Assessments must be:	True	False
1. Focused on key questions	✓	
2. Grounded in conceptual models linking key attributes and change agents	✓	
3. Focused on synthesizing existing information not on collecting new information or on conducting research	✓	✓
4. Transparent	✓	
5. Approached as an ongoing process not as a one-time ad hoc effort (regions and units of analysis must be systematically defined, data must be managed)	✓	✓
6. Scaled to address landscape issues but not too large to be politically unmanageable	✓	✓
7. Informative not decisional	✓	

1. *Focused on key questions:* ***true***

   Interviewees indicated that this is the most important assumption. They said that it is critical to gain agreement on the key questions because many agencies, key stakeholders and other partners have

different mandates and missions. It is important that those key questions address the driving issues, concerns and opportunities. Interviewees said these questions need to be developed through an iterative dialogue between the managers and scientists working together to frame the science questions.

2. *Grounded in conceptual models linking key attributes and change agents:* ***true***

   Interviewees said that assessments need to be grounded in science and include conceptual models, but pointed out the limitations of models. For example, it is not possible to know and model all the change agents and functions. They added that models are only as good as the people who make them and said that whoever is managing the assessment needs to ensure that the best models available are used. The conceptual models need to be able to capture and address the dynamism and fluidity at multiple temporal and spatial scales, which is inherent in an ecosystem, in order to address larger issues, such as resiliency and sustainability.

3. *Focused on synthesizing existing information not on collecting new information or on conducting research:* ***true and false***

   Interviewees clarified that synthesizing existing information as part of the assessment process *is* creating new data and information and *is* a form of research. It can be hard to differentiate between "existing" and "new" data. Aside from that clarification, interviewees agreed that it does make sense to start the process by synthesizing existing data and identifying gaps in the information. These gaps in the information should represent priorities for further research or data collection. However, the opportunity to collect new data or conduct research must exist if it will measurably improve the product.

   Interviewees said that cost would be prohibitive if the analysis depended on collecting all the information and, furthermore, it is impossible to wait until all the data is available. The agencies need to come to an agreement on how much they are willing to spend on the analysis. In addition, there needs to be a drop-dead date for beginning follow-through because at some point, what is available *is* the best available science. They added that the more informational the analysis is, the less time it will take to complete.

   In addition, interviewees said that the key partners need to agree to continue with the analysis, even if all of the information is not available. They stressed that the focus should be on the process, rather than the product, and conflicting information provides an opportunity for everyone to come together and model and discuss the system. They encouraged using and discussing all of the available information, but discouraged arguing over who decides the 'right' science.

4. *Transparent:* ***true***

   Interviewees identified both transparency and involvement as critical to ecoregional assessments. They said as part of this, engaging politicians and getting their support, as well as engaging the public, is essential. More meaningful public engagement up front will help work out issues and is better for building buy-in. It is important to ensure that the public has the opportunity to be involved in and review both how the assessment is developed, and how it will be used in management. They suggested extending cooperating agency status to local governments and tribes to get their involvement. They also suggested forming a Federal Advisory Committee Act (FACA) group at the local level to help further engage the public and ensure accountability.

5. *Approached as an ongoing process not as a one-time ad hoc effort:* ***true and false***

   Interviewees said that having an ongoing process is critical because the assessments concern dynamic systems that cannot be appropriately assessed with a one-time effort. Monitoring for effectiveness with a feedback loop to respond to changing conditions is also important.

   However, they conceded that the reality is that while it would be good if the process is done systematically, like ICBEMP, this can be overwhelming. The big emphasis will be on the first assessment, which should be used to prioritize conservation efforts. The direction established by the assessment is then applied through management and outlines where the identified opportunities and challenges are. Interviewees said that this should be followed up with monitoring. Some of the biggest issues will include identifying the data stewards, ensuring the protocols are followed at the local level, and ensuring that the data is sent to the stewards.

   One interviewee also mentioned that sometimes the best science work might be done ad hoc. In his words, "Sometimes you need to be able to pursue something where you do not know where you are going and what you are going to get." That creativity allows you to explore and build a foundation for a more systematic approach. All of this has to be done over periods of decades or longer so a long-term commitment is crucial.

6. *Scaled to address landscape issues but not too large to be politically unmanageable:* ***true and false***

   Interviewees said that this is one of the most difficult things to assess. Scale really depends on the issue at hand, and the scale for that particular issue needs to be large enough to address the major drivers and trends. Different issues lead to different boundaries, drivers and secondary issues. Interviewees explained that this results in multiple scales for analysis and implementation. The scales have to be interconnected, with a scaled hierarchical sub-analysis that goes from basin-wide all the way down to the watershed. One needs to be able to use the data to address multiple issues at multiple scales.

   In addition, there are politics regardless of how large the landscape. If it is too large, with too many jurisdictions, it will be unwieldy. However, even at the local level, there are politics, even when you have people at the table who are willing to work together. Further, the national and state administrations can change, or there can be problems higher up, at the national/regional scales. You have to be willing to address the political issues that come with each scale. It is politically difficult, no matter what the size.

7. *Informative not decisional:* ***true***

   Interviewees agreed that this is true and said that there should be an understanding in doing an assessment that the science is not going to tell the managers what to do. It is understood that the scientists should not be decision makers; they are only providing the information on which decisions can be made, such as the key management questions, shared goals, principles and protocols. However, the scientists can provide some sideboards and programmatic direction. For example, in conservation strategies, scientists can bring forward already existing direction such as the Endangered Species Act (ESA) direction.

   Some interviewees felt that assessments are meant to be strictly informational, so they can be done without other input and then used in management. There are no *requirements* to conduct assessments with more input but added that it is more effective to develop the foundational

questions collaboratively and share the information as the assessment progresses. It may take longer, but in the end, it is more effective because people understand when they see the results of the assessment, and they can use it.

Ecoregional Direction must be:	True	False
1. Developed through an iterative process involving multiple organizational levels	✓	
2. Developed through a collaborative process to the extent cross-jurisdictional action is required	✓	
3. Consistent with the public disclosure, public participation, and interagency coordination requirements associated with planning and environmental impact assessments	✓	
4. Grounded in agency mission and authority	✓	✓
5. Built on existing agency work processes such as land use planning, use authorization, budgeting, and project design and implementation	✓	✓

1. *Developed through an iterative process involving multiple organizational levels:* ***true***

   Interviewees said that the Northwest Forest Plan operated through an iterative process involving multiple organizational levels. It is important that the direction be tested at the field level and results be shared with the field to get buy-in on the findings. They recommended developing and using regional interagency, interdisciplinary teams to help with the iterative process, if needed.

2. *Developed through a collaborative process to the extent cross-jurisdictional action is required:* ***true***

   Interviewees agreed that the process needs to be collaborative to the greatest extent possible, both at the assessment level and in developing the direction in order for it to be effective. In addition, high level staff from both federal and state agencies need to be proponents of the process. Interviewees recommended using FACA-type groups at the local level to help engage the public and participate in monitoring and evaluations.

3. *Consistent with the public disclosure, public participation, and interagency coordination requirements associated with planning and environmental impact assessments:* ***true***

   Interviewees said that the direction needs to be collaborative and the process needs to be focused on the decision context. The public needs to know what direction and decisions are being made, how, and how it all fits together. Interviewees said that the law must be followed, but warned not to confuse public participation with scientific rigor. They recommended asking for the public input at the front end to help frame the assessment and ensure that the assessment covers key issues, and then continue through the National Environmental Policy Act (NEPA) process.

4. *Grounded in agency mission and authority:* ***true and false***

   Interviewees agreed that the direction needs to be grounded in the agency authority and said that all key participants need to understand the authorities – both external and internal. They said the biggest problem is when people do not understand the mission and they try to change it. The agencies need to be clear about the sideboards and decision space up front.

However, some interviewees did not agree that the direction should be grounded in agency mission. They said that the agency policy needs to change to emphasize the larger, ecoregional assessments. The direction should be grounded in agency procedures only if the agency procedures are efficient and effective. The process should be developed through the best available science rather than dogma or standard procedure.

5. *Built on existing agency work processes such as land use planning, use authorization, budgeting, and project design and implementation:* ***true and false***

   Interviewees said that this is a huge tension. The way the agencies make decisions does not lend itself to moving from assessment into implementation. The existing processes are not very effective for translating these assessments into the land use plans and application. The planning process should be flexible, context driven, and should set out a framework for how decisions are made. One interviewee recommended using a web-based decision-support framework and to use modeling to do the step-down. All reiterated that the more transparent the process is for both resource managers and the public, the better.

   Interviewees emphasized the need for change – specifically in setting national direction, in establishing budgets, and in coordinating across units. They said this process requires a lot more coordination across agencies for budgets and said there needs to be high level buy-in at the department level to make sure all the partners will have the budgets they need to stay involved. Monitoring processes need to be evaluated, as well, and key processes post implementation must be budgeted and funded.

   Interviewees said that a shared vision needs to be developed across agencies for those key management issues that need to be managed across boundaries. A significant amount of cross agency coordination is required for joint monitoring, managing joint databases and assessments, and plan evaluations.

Management must have the opportunity to:	True	False
1. Identify the key management questions the assessment will answer	✓	
2. Participate in critical decision points during the assessment process and in the development of ecoregional direction	✓	

1. *Identify the key management questions the assessment will answer:* ***true***

   Interviewees agreed that managers must be involved in identifying the management questions. They said that scientists, resource specialists, and the public should also be involved in identifying the key management questions. The field has to have influence in order to get buy-in; ultimately they will be the ones using the information. Furthermore, the field needs to understand what is in the assessment and have some accountability for its content.

2. *Participate in critical decision points during the assessment process and in the development of ecoregional direction:* ***true***

   Interviewees said that this is fundamental. Managers need to be a partner to help frame the issues and provide input on the utility of potential management application of the results. Managers need to participate all the way through to the direction, including giving input at critical decision points in the assessment and direction. Interviewees said it is critical that line managers in particular stay

involved and have a resource background or at least a firm understanding of ecosystem planning because they will need to understand the issues. However, managers need to provide collaborative leadership, making decisions through a more collaborative approach.

Additionally, interviewees said it is important for managers to use a decision process incorporated at their scale. For example, at the higher level, policy makers need to make the decision pertinent to their scale. At a project level, there will be a different set of decisions that will have to be made. Interviewees warned that there can be problems with managers' participation, such as managers clinging to old methods they were taught 30 years ago. Managers need to be encouraged to participate openly and embrace the current science, and to pay diligent attention to building an internal process and culture that can support an effective external process.

Field Resource specialists must have the opportunity to:	True	False
1. Validate and supplement the assessment information with finer- scalec local information	✓	✓
2. Help define how assessment information may be used in day-to-day management activities	✓	

1. *Validate and supplement the assessment information with finer- scaled local information:* ***true and false***

   Interviewees said that in some parts of the assessment, the resource specialists need to play a major role, since they have the knowledge and are the experts. If the field does not support the process and have a chance to give input, the assessment will not get anywhere. There at least needs to be a representative from across the spectrum of disciplines to develop and use the protocols and processes to get this field-level buy-in.

   However, interviewees said the idea of resource specialists "validating" the assessment information at a more local scale is inaccurate. Information or data developed under one set of objectives cannot be "validated" with information or data that was designed to meet a different set of objectives. The usefulness and accuracy of data can only be validated relative to the objectives that drove the assessment and how well it meets management prescriptions. Interviewees did agree that it is important that assessment information be collected in an unbiased fashion because information is considered valid if it is rigorous and unbiased.

2. *Help define how assessment information may be used in day-to-day management activities:* ***true***

   Interviewees said that field resources must have the opportunity to help define how assessment information may be used in day-to-day management activities. Part of the reason the Northwest Forest Plan was developed was because the administration did not trust the managers. The resource specialists need to be at the table, and interviewees pointed out that they generally *want* to be at the table.

   Once the information is provided, the scientist's job is done. Resource specialists, using an interdisciplinary team approach, can help define the application of the assessment in day-to-day management and use the assessment to support management decisions. Monitoring and feedback is key to the appropriate adaptive management decisions on an ongoing basis. Local work groups are an effective way to communicate and generate complimentary practices at the community level.

Partners must have the opportunity to:	True	False
1. Help identify the key management questions the assessment will answer	✓	
2. See their work incorporated into the assessment where appropriate	✓	
3. Help develop ecoregional direction	✓	✓

1. *Help identify the key management questions the assessment will answer:* ***true***

   Interviewees said that partners should help identify the key management questions and pointed out that this is part of the sage-grouse management zone team concept. They said management questions should be discussed with the public, other state and federal agency partners, and all constituencies. Interviewees stressed the need for the process to be fully transparent. They said to be clear up front about what is expected to come out of the assessment and the next steps following the assessment.

   However, the public's role needs to be clearly defined so the public understands how they are going to help. Interviewees said that the public scoping process can also be used to get information. They added it is important to get buy-in and support at the local level, as well as determine the level of interest.

2. *See their work incorporated into the assessment where appropriate:* ***true***

   Interviewees agreed that this is important and said that it all goes back to transparency. The public needs to know where the process is headed and the expectations up front. Interviewees emphasized the importance of being clear about the sideboards, being clear about who is making the decisions, and how those decisions are being made (with what information). The level of involvement and type of involvement will be related to the scale and process, but partners have to see how their information will be used. Additionally, there has to be some discussion up front about how conflicting information will be used.

3. *Help develop ecoregional direction:* ***true and false***

   Interviewees said that the partners do not have a role in developing the direction, in as much as the agencies have ultimate decision authority. Partners can be on a FACA committee that makes recommendations, but the responsible agencies ultimately need to make the decisions. Ideally, all the agencies will have similar missions and can have common agendas. The reality is that all the agencies have difference cultures, bottom lines and decision processes. However, interviewees said that partners can be involved through identifying issues and concerns, which the managers compile, to develop direction. They can be involved in developing coordinated plans, and they also can help implement the conservation actions.

Other suggestions for an effective process and use:

1. *Engage the public*

   Public involvement is an essential part of all planning processes and key to generating a sound and meaningful result. Still, sustaining public and stakeholder engagement can be challenging in good times, and more so when time and resources are short. Clearly articulated issues, an understanding

of pressing needs, and a focused and streamlined process are essential to supporting involvement. The benefit of the process must be clear so as to maintain involvement, credibility and integrity.

2. *Engage the field*

   Ultimately, the real benefit of the ecoregional approach happens on the ground. A shared understanding at all levels (Washington office through field offices) of the value of the approach and its application is essential to generating the most meaningful outcomes. Attention to the internal understanding and culture, and empowerment of personnel to do things differently in this context is required to generate an effective process from assessment through practice.

Literature Review Analysis

Additional observations about the goals of each of the products and some conclusions about the integration of BLM's assumptions and their effectiveness in the assessment and direction processes can be drawn from a review of the planning documents themselves. In summary, the literature review indicates the following:

1. *Focused on key questions*

   While the Sage-grouse and Northwest Forest plan clearly defined their goals and objectives, the Interior Columbia Basin Plan suffered from a lack of specific policy directions and questions. Instead, a team of scientists composed a long list of questions that failed to give clear guidance. According to Thomas Quigley, "A shorter list, generated directly by the executives, could have simplified the assessment process and resulted in more focused, and useful, products" (Bioregional Assessments 274). The literature indicates that targets, goals, and the objectives that comprise those goals, should be defined. Doing so provides an objective basis for monitoring and adaptive management techniques, as well as improving communication and efficiency among people working toward those goals. Groves and Valutis (*Guidelines for Representing Ecological Communities in Ecoregional Conservation Plans)* go so far as to list five key questions that must be answered to create a foundation for an ecoregional assessment. Lindenmayer (*A Checklist for Ecological Management of Landscapes for Conservation)* speaks specifically to defining clear, quantifiable objectives. Johnson (*Biological Assessments*) adds that assessments need to address original questions in a way that policy makers can understand.

2. *Grounded in conceptual models*

   The NWFP provided a foundation for ecosystem management by integrating data and generating a reliance on GIS, which has evolved over time as needed for the issue, geography and complexity of subsequent assessment efforts. The ICBEMP assessment covered a significantly larger geographic area, and much work was done to integrate data across systems and develop new spatial elements. Conceptual models are considered key to understanding and projecting influences on habitat and other factors. Johnson (*Bioregional Assessments*) proposes a model of how bioregions work that is based on an integration of scientific specialties that enables policy makers to "understand, comprehensively, the likely effects of alternative policies). Key to this model is a framework that addresses bioregional problems through existing research and expert opinion. Williams (*The Conservation Success Index*), describes how this index, specifically used for fish populations, integrates existing data with a geographical information system to determine priority areas for protection, monitoring, restoration and reintroduction, which can be used to inform local decision-making when informed by localized expertise and research. Williams point out that a similar framework can be adopted to analyze data for other species and habitats.

3. *Focused on synthesizing existing information*

   All of the plans focused on synthesizing existing information, some with more gaps and assumptions drawn to address them and others with specific initiatives for new research. New research extends the timeline and the intent to get the assessment finished (ICBEMP). The literature indicates that the assessment should focus on synthesizing existing information and that, in combination with expert opinion, can form the initial assessment and inform the ecoregional direction. Local context and adaptive management practices can provide for additional refinement. Groves and Valutis

(*Guidelines for Representing Ecological Communities in Ecoregional Conservation Plans)* point out that plans should take less than 1.5 years to produce. As such, they must rely on existing data, and it must be iterative. Johnson (*Bioregional Assessments*) points out assessments must be conducted within a limited timeframe and funding; otherwise, they risk being bogged down. Thomas and Dombeck (*Ecosystem Management*) also advocate using the best applicable and available science.

4. *Transparent*

   All of the plans promoted open correspondence among the scientists and managers directly involved in developing them. However, the Sage-grouse and Interior Columbia Basin plans did a better job of reaching in through their organizations and out to the public. The Northwest Forest Plan was pushed through without the same amount of internal and external involvement; due in part, according to K. Norman Johnson, to the short timetable established by President Clinton for the completion of the report (*Bioregional Assessments*). This may have speeded the implementation process; however, it also fostered resentment among managers, resource specialists and the public.

5. *Approached as an ongoing process*

   The plans propose an adaptive management approach that includes on-going monitoring to ensure that objectives are being met. However, as the ICBEMP document notes, success of adaptive management will require a continued commitment by the agencies involved. Successful efforts depend on altering management techniques to meet new understanding of the environment from scientific research. Authors who advocate using existing information and completing assessments in a stated, short timeframe also point to adaptive management as a key element of implementing assessment results.

6. *Scaled to address landscape issues*

   Conservation targets, whether they are core habitats or species, should be addressed within the greater context of biodiversity (Ament, Groves & Valutis, Groves, et. al, Lindenmayer, K.N. Johnson, Margules and Pressey, Redford, Thomas and Dombeck, Wisdom). Magee and Carroll (*Using Tiered Assessments*) look specifically at the benefits of using a step-down approach, describing how the process shows relationships among different parts of an ecosystem, allows managers to prioritize areas for protection and restoration, informs decision-making, and more effectively meet local and broad scale needs. Still, the large scale of these plans means they require collaboration across numerous jurisdictional boundaries. The potential political ramifications are immense, and the plans risk becoming bogged down by litigation, bureaucracy and political opposition. The Sage-grouse plan apparently found some success by laying the groundwork for more individualized, site specific plans. The Northwest Forest Plan succeeded, according to K. Norman Johnson, because of strong leadership. It remains to be seen how the Interior Columbia Basin Plan succeeds, but Quigley suggests that it would have been implemented more efficiently if it had been based on existing information and specific policy questions.

7. *Informative not decisional*

   These plans offer several potential alternatives for policy makers. Alternatives are based on the available science, and they present the possible ecological outcomes of different management approaches. Specifically, the Northwest Forest Plan presents 10 options for meeting the President's objectives, with a section describing "policy conclusions" intended as guidance on how to interpret the findings in order to implement them into successful policy. The literature advocates for a broad

scale assessment that informs local decision-making; Magee and Carroll (*Using Tiered Assessments*) address that process specifically and discuss how the broad scale work provides for more informed decision-making on the local level.

Further Recommendations

Recommendations for the BLM as it seeks to further describe and refine its process, include:

1. Continue to build an internal commitment within the agency to the ecoregional approach, using internal experience to help guide and refine the process.

2. Continue to work with stakeholders at landscape-scale and local levels to generate a shared understanding of the ecoregional approach, and generate meaningful cooperation across agencies' missions and functions.

3. Continue to work to develop the ecoregional assessment and direction templates based on the key assumptions, with consideration to the nuances of the assumptions that interviewees challenged.

4. Within the context of the ecoregional assessment and direction process, ensure that:
    a. A systematic framework includes clearly articulated goals and objectives, accompanied by clearly delineated targets, threats and potential mitigation actions. This can be done by relying on existing data and expert opinion.
    b. The current practice of synthesizing existing data and expert opinion to develop an initial assessment is continued. Subsequent data and adaptive management processes can fill gaps identified in the initial work.
    c. Assessment and planning processes are built on principles of engagement and nested collaboration.
    d. Assessments are appropriately scaled for specific issues, and hierarchically scaled at different levels to address multiple, interrelated issues.
    e. Management direction occurs from the top-down and bottom-up to secure coordinated management that is relevant at the appropriate scales.
    f. The latest technology and research for conservation planning and management are used. Management choices should be presented using best science for potential outcomes.
    g. Budgets and resources follow the national or regional-level strategies.
    h. Agencies integrate large, ecoregional-level assessments and the associated management direction into their planning processes.
    i. Adaptive management is well conceived and instituted; plans should be flexible to change based on evolving research and monitoring. A monitoring component ensures that the objectives of the plan are being achieved, while management practices should allow change based on the evolving research.

5. Continue to invest in effective internal and external communications. By providing a common basis for understanding, a systematic framework can help improve communication among scientists, land managers, policy makers, and others involved in the process. This is especially important for successful implementation across jurisdictional lines. The plan should seek to contribute to a greater understanding of the bioregion, increased coordination of strategic efforts, and measurable results on the ground.

APPENDIX A

Assumptions

In order to focus the interview and literature review process, the BLM prepared a list of assumptions to test for their applicability to an effective process. Those assumptions included the following:

Ecoregional Assessments must be:

1. Focused on key questions
2. Grounded in conceptual models linking key attributes and change agents
3. Focused on synthesizing existing information not on collecting new information or on conducting research
4. Transparent - conducted and produced in a way that is open and clear to all
5. Approached as an ongoing process not as a one-time ad hoc effort (regions and units of analysis must be systematically defined, data must be managed)
6. Scaled to address landscape issues but not too large to be politically unmanageable
7. Informative not decisional

Ecoregional Direction must be:

1. Developed through an iterative process involving multiple organizational levels
2. Developed through a collaborative process to the extent cross-jurisdictional action is required
3. Consistent with the public disclosure, public participation, and interagency coordination requirements associated with planning and environmental impact assessments
4. Grounded in agency mission and authority
5. Built on existing agency work processes such as land use planning, use authorization, budgeting, and project design and implementation

Management must have the opportunity to:

1. Identify the key management questions the assessment will answer
2. Participate in critical decision points during the assessment process and in the development of ecoregional direction

Field Resource specialists must have the opportunity to:

1. Validate and supplement the assessment information with finer-scaled local information
2. Help define how assessment information may be used in day-to-day management activities

Partners must have the opportunity to:

1. Help identify the key management questions the assessment will answer
2. See their work incorporated into the assessment where appropriate
3. Help develop ecoregional direction

APPENDIX B

Interviews

Process

Seven individuals were interviewed about their experience in one or more of the three identified landscape-scale assessment and planning processes: Northwest Forest Plan, Interior Columbia Basin Ecosystem Management Plan, and Greater Sage-grouse Initiative. Interviewees were selected based on their knowledge of the assessment and/or planning processes, and their role as a scientist, manager, or resource specialist. They broadly represent the multiple agencies and geography involved in these efforts. Interviewees offered first-hand perspectives based on their experience with previous landscape-scale approaches. Interviewees (who in some cases are retired from the positions they had at the time of the assessment) include:

- **Christine Anderson**, U.S. Forest Service (Northwest Fire Plan)
- **Jack Connelly**, Idaho Fish and Game (Sage-grouse Initiative)
- **Bob Devlin**, U.S. Forest Service (Northwest Fire Plan)
- **Susan Gianettino**, Bureau of Land Management (Interior Columbia Basin Ecosystem Management Plan)
- **Ed Shepard**, Bureau of Land Management (Northwest Fire Plan/Western Oregon Plan Revision and Interior Columbia Basin Ecosystem Management Plan)
- **San Stiver**, Western Association of Fish and Wildlife Agencies (Sage-grouse Initiative)
- **Mike Wisdom**, U.S. Forest Service (Interior Columbia Basin Ecosystem Management Plan)

Interviewees were asked:

1. Why was the landscape-scale assessment process initiated and, generally, how was it conducted?
2. What was the scale of the assessment?
3. What was the role of scientists, managers and resource specialists in the planning process?
4. What was the public's role?
5. How were assessment and planning results translated into day-to-day management activities?
6. What worked well?
7. What did not work well?
8. What would you do next time?

Interviewees were also asked to respond to each of the BLM assumptions, and to discuss whether the assumption was an important factor in ecoregional assessment and direction processes.

APPENDIX C

Literature Review

Process

The literature search to test BLM's assumptions about developing rapid ecoregional assessments and ecoregional direction involved compiling a broad bibliography of relevant publications, and then working with the BLM to identify the literature most relevant and informative to this process.
A synopsis of 15 of these reports follows, including information that can be applied to future assessment and planning efforts. While this literature may not necessarily or directly serve to validate the BLM's assumptions, it does offer general recommendations for landscape-style approaches to conservation. The complete bibliography is listed at the end of this document.

Literature Summaries

Ament, Rob

"Protecting Ecological Connectivity on Public Lands." *Center for Large Landscape Conservation.* (February 2010).

Ament offers a plan for evaluating and conserving lands that link habitats managed by federal agencies. The purpose is to conserve corridors for animals and plants to "move within a landscape as needed for migration, gene flow, dispersal, or as a response to climate change" (1). Establishing connections among wildlife habitats would require cooperation with state, tribal and private land owners. Ament proposes three planning recommendations:

1. **Pre-Planning:** Delineate and assess geographical areas of interest. This requires identifying target species, core habitats, and areas of connectivity between core habitats.
2. **Plan Development:** Determine species requirements and describe the desired future condition on public lands. This includes a monitoring plan that incorporates adaptive management.
3. **Project Development and Implementation:** Adhere to the management plan direction and requirements. This includes follow-up monitoring and reporting to assess whether the project meets the plans objectives and goals.

Gordon, Elizabeth A., Oscar E. Franco, and Mary L. Tyrell

Protecting Biodiversity: A Guide to Criteria Used by Global Conservation Organizations. New Haven: Global Institute of Sustainable Forestry/Yale School of Forestry and Environmental Studies, 2005.

This study compares eight different conservation planning approaches used by five global environmental non-governmental organizations. It aims to clarify these approaches to promote better understanding and collaboration among conservationists, policy makers and industry. The organizations include: Alliance for Zero Extinction, BirdLife International, Conservation International, Wildlife Conservation Society, and the World Wildlife Fund.

The report concludes that although each of the approaches has distinguishing elements, the similarities "seem more prominent than the differences" (15). For example:

- Global-scale planning targets areas with distinct similarities, such as the forest region of eastern Brazil, the Mesoamerican forests, the Philippines, etc. There is a great amount of overlap and cooperation in planning among conservation organizations working in these regions.
- Different conservation approaches tend to operate from common principles, such as the principal that nature or wildlife has intrinsic value beyond its utilitarian value or the importance of efficiency of resource expenditure.
- Six of the eight approaches emphasize the importance of retaining functionality of conservation targets and the ecosystems that support them. Maintaining this functionality is more important than merely maintaining the structure or number of conservation targets.

Other commonalities include valuing expert opinion, emphasizing supra-organismal units (a system of multiple organisms that may be considered a single organism), focusing on habitat, using endemism (the ecological state of being unique to a particular geographic location) as a top scientific criterion, emphasizing threatened/degraded landscapes and intact/low-threatened areas, and emphasizing vulnerable and irreplaceable targets.

Groves, Craig and Laura Valutis

Guidelines for Representing Ecological Communities in Ecoregional Conservation Plans. Arlington, Va.: The Nature Conservancy, 1999. 74 pp. Print.

The Nature Conservancy seeks to provide planning guidelines for plant communities within selected bioregions or ecoregions. The report is the culmination of a workshop organized by The Nature Conservancy that was attended by scientists and conservationists in 1998. The purpose was to devise a framework to ensure the health of diverse species of plants and animals within recognized regions; this bioregional approach aims to complement the traditional species-based approach to conservation.

Groves lists five key questions that must be answered to create a foundation for an ecoregional assessment and plan:

1. What are the community targets, or populations/species one is working to affect?
2. What are the sources of information and analyses that allow us to identify on-the-ground occurrences of these community targets?
3. How do we establish quantitative goals for replication of communities in portfolios of conservation sites?
4. What criteria do we use to select occurrences of community targets for inclusion in the portfolio?
5. How do we best configure a network of conservation sites or reserves so that it will have the greatest chance of achieving the conservation goals for communities?

Groves outlines a set of assumptions that should be considered during this process. An assessment should define ecological communities primarily through their biological components, although abiotic components, such as geography, are also considered. Where these communities are found, the assessment should identify "core areas" where the biological components of the community have the highest likelihood of persistence. Likewise, it should determine the viability of a community – its potential for persistence and integrity inside and outside of the core areas. The methodology should assume measurable and repeatable community units to document the progress within those units toward the

established goals, and it should use a "coarse filter" approach that focuses on species communities most likely to rely on a broad range of other species. Finally, he suggests that the plan should take less than 1.5 years to produce; as such it will rely on existing data and be iterative.

Groves, Craig R, et al.

"Planning for Biodiversity Conservation: Putting Conservation Science into Practice." *BioScience* 52.6 (June 2002): 499-512.

This article outlines a seven-step framework for "practical yet science-based planning" to conserve biodiversity within large, biologically diverse regions. Groves argues that this framework answers the need for a new approach to protecting endangered species by helping conservationists identify habitats that need to be protected or restored. The novelty of this framework derives from four ideas:

1. It should offer a proactive approach that complements existing reactive conservation plans;
2. It should recognize the underlying ecological processes that support biodiversity;
3. It should consider biodiversity at a variety of levels and scales; and
4. It should approach conservation planning systematically by:
    - Identifying conservation targets (the population or species one is trying to affect),
    - Collecting information and identify information gaps,
    - Establishing conservation goals,
    - Assessing existing conservation areas,
    - Evaluating ability of conservation targets to persist,
    - Assembling a portfolio of conservation areas, and
    - Identifying priority conservation areas.

According to Groves, the framework offers several benefits for conservation planners: it sets biological goals based on the needs of species, communities, and ecosystems; it complements single-species approaches; it can be accomplished with relatively little money or time; it provides an explicit means of gauging whether the plan is meeting its goals; and it considers the underlying ecological processes and functions that support long-term persistence of biodiversity.

Lindenmayer, D., et al.

"A Checklist for Ecological Management of Landscapes for Conservation." *Ecology Letters* 11 (2008): 78-91.

This study responds to a premise that there is little consensus in the scientific literature about principles that could guide landscape conservation. It assesses themes and approaches that should be considered in the conservation of landscapes. It concludes that "two crucial overarching issues are: (1) a clearly articulated vision for landscape conservation and (2) quantifiable objectives that offer unambiguous signposts for measuring progress" (78). Important elements that should be considered in landscape conservation planning include:

- **Setting goals:** It is important to define clear, quantifiable objectives. Various approaches for reaching these objectives should be considered and evaluated.

- **Spatial issues:** Patches of landscape should be considered as part of a larger mosaic. Within these mosaics, identify species and landscape elements that are particularly important – for example, those elements that are rare or have a greater influence on an ecosystem. Further integrate the aquatic and terrestrial environments. The landscape should be classified through a landscape model that addresses the objectives of the conservation approach.
- **Temporal issues:** Conservation approaches must consider how the landscape will recover from disturbances, recognizing that natural disturbances can be valuable for ecosystems and biodiversity. To this end, landscapes should be managed as dynamic systems that change over time.
- **Management approaches:** Management solutions can be viewed as "adaptive management experiments" that implement experimental design, monitoring and adaptation to continuously improve ecosystem understanding. This should include an integration of both species and ecosystem management adopted at various spatial scales.

Johnson, K.N.

Bioregional Assessments: Science at the Crossroads of Management and Policy. Washington, D.C: Island Press, 1999. 398 pp. Print.

This study identifies four main stages that are important to consider in evaluating bioregional assessments.

1. What is the bioregional context? That is, what are the conditions within the ecological and social systems that created the need for an assessment?
2. How is the assessment conducted? How much time and money was spent? Who contributed to the assessment?
3. What were the results of the assessment and how were those results used by land managers and policy makers?
4. How did this assessment contribute to a greater understanding of bioregional ecology, management and policy, and how did it build capacity for change?

Considering these questions, the report synthesizes seven bioregional assessments to determine what lessons can be drawn from them to improve future assessments. These are their conclusions:

- **Bioregional context:** Most assessments are "crisis driven," based on a conflict between human short-term development and long-term conservation of natural resources. While these conflicts may arise over specific issues, they are often connected to larger social issues. It is important that policy makers give the assessment team clear questions that need to be answered for example, "What decisions do they face and what information will improve those decisions?" (369).
- **Conducting assessments:** Johnson identifies three essential questions that assessments should answer:
    1. What resources do we have?
    2. What is happening to what we have?
    3. What might we do to fix any apparent problems, and what are the effects of those alternatives?

In order to address these questions, Johnson is developing and applying a model of how bioregions work. The model should be based on an integration of scientific specialties that enables policy makers to "understand, comprehensively, the likely effects of alternative policies" (370). Key to this model is a framework that addresses bioregional problems through existing research and expert opinion. Finally, Johnson suggests that assessments should be conducted within a limited timeframe and with limited money; otherwise, they risk being bogged down. "When successful, these assessments answer the questions posed and contribute to broader regional understanding, while the policy makers are still in power and can use the information and before the manager must take action" (346).

- **Results and outcomes:** An assessment needs to address the original question in a way that policy makers can understand; a clear, concise response is more useful than an unwieldy report full of scientific jargon. That said, the results are not simple – they should aggregate the understanding developed through local research into a "big picture" of regional trends. Likewise, they should provide a strategy for addressing large-scale problems through local action. Johnson notes that the potential outcomes of an assessment should draw from "full participation of scientists, managers, policy makers, and the public" (372). Bringing together diverse viewpoints requires a strong leader who can lead the assessment towards it goals while facilitating communication and gaining the trust of the various shareholders. Without public support of proposed actions, policy makers will have a difficult time securing necessary funding.
- **Building capacity:** Future bioregional assessments will likely rely on collaboration among scientists from different fields answering increasingly complex questions. This will demand more research institutions that will need to devote more resources to bioregional assessments. State and regional authorities, rather than federal agencies, will need to take a leadership role in bioregional assessments by providing oversight for coordinating local plans. However, it may be more effective for existing government bodies to take on new responsibilities rather than establishing new institutions over the existing ones. The assessment is successful if it contributes to a "sense of place" for the inhabitants of a bioregion, bringing together their diverse experiences to negotiate a shared vision for the future. According to Johnson, the scientists who conduct the assessments will play a leadership role by providing a framework for bringing this shared vision to reality.

Finally, Johnson identifies three criteria for measuring the success of a bioregional assessment:

1. Was it pragmatic? Did it lead to the solution of the problem?
2. Was it contextual? Did it significantly improve understanding in the bioregion about the resources being studied?
3. Was it integrated? Was the understanding integrated into managers' thinking to guide future action?

Johnson's conclusions and recommendations match the key assumptions listed by the BLM for ecoregional assessments. For example, he emphasizes the importance of focusing on key questions that can be answered through compilation and analysis of existing information. This focus will provide policy makers with answers they can use in making decisions; it will also keep the assessment on track for completion in a timely fashion. Johnson notes the importance of transparency, keeping the public involved in the process, and suggests that an ecoregional plan cannot succeed unless it has the public's trust and support. His call for strong leadership and greater institutional commitment echoes the BLM's call for an ongoing process, as opposed to a one-time ad hoc effort.

Magee, Jerry and Patricia Carroll

"Using Tiered Assessments to Focus Land Use Plans and Management Investments on the Highest Priorities." *Environmental Practice* 8.4 (December 2006): 218-227.

Magee's article focuses on the benefits of using a "step-down" approach to assessing landscapes. This "tiered assessment strategy" looks at the landscape from a variety of scales – from the wide-scale perspective of a large geographic area (the Columbia River basin, for example) down to the small-scale perspective of a local site (a particular stretch of a tributary of a river). This approach aims to "ensure that broad-scale management objectives are applied to appropriate landscapes and influence design of on-the-ground projects to meet broad scale (as well as local) goals and objectives" (219).

The knowledge gained from a wide-scale assessment can provide context for small-scale assessments, and vice-versa. The assessments inform and complement each other; they show the relationships among different parts of an ecosystem, allowing managers to prioritize areas for protection and restoration. This helps them to invest "their limited resources in the highest priorities – thus maximizing effectiveness, meeting local and broad scale needs, and more successfully informing decisions at all levels" (226).

Margules, C.R. and R.L. Pressey

Systematic Conservation Planning. Nature 405 (2000): 243-253.

Margules and Pressey identify two overarching goals for conservation reserves:

1. They should represent a variety of biodiversity.
2. They should provide for the persistence of viable populations of species that comprise the biodiversity of the reserve.

To achieve these goals, Margules and Pressey promote a systematic approach to conservation planning through six stages. The stages are:

1. Measure and map biodiversity;
2. Identify conservation goals for the planning region;
3. Review existing reserves;
4. Select additional reserves;
5. Implement conservation actions on the ground; and
6. Manage and monitor.

These stages are based on the notion that "the effectiveness of systematic conservation planning comes from its efficiency in using limited resources to achieve conservation goals, its defensibility and flexibility in the face of competing land uses, and its accountability in allowing decisions to be critically reviewed" (243).

Improved communication among conservation groups, in particular, articulation of goals and assumptions in conservation planning, is crucial for successfully conserving landscapes. Margules and Pressey's framework could help conservationists define their goals and collaborate towards reaching them. Additionally, the authors warn that conservation groups must improve their methods: they suggest increasing precision in mapping and measuring the features of biodiversity, applying more precise

management decisions based on solid research, and involving biologists and ecologists in planning processes.

Redford, Kent H, et al.

"Mapping the Conservation Landscape." *Conservation Biology* 17.1 (February, 2003): 116-131.

According to Redford, conservation groups have taken widely different approaches to conserving biodiversity. He suggests that the "resulting uncertainty about the objective of many conservation initiatives has bedeviled conservation and its supporters in recent decades" (117). To promote collaboration among conservationists, Redford examines 21 different approaches to conserving biodiversity. He considers how those approaches might be drawn together to establish a "broadly based mandate built on a clearly articulated set of principles, actions, and measurable results" (127).

Two questions are key to this analysis of conservation approaches:

1. What exactly do we want to conserve?
2. How do we propose accomplishing that?

The approaches include an array of conservation targets, that is, "what" is to be conserved including species, ecosystems, scenery, biodiversity, landscape, and human activities. This study concludes that although conservation approaches are diverse, they are not necessarily incompatible; indeed, they can often complement each other. Among the principles that these approaches share:

1. **Representation:** A portfolio of targeted areas represents all ecosystems in the area of concern.
2. **Efficiency:** Efforts are focused on the fewest high-quality sites possible.
3. **Functionality:** Successful conservation targets are measured by their functionality, not simply their size.
4. **International recognition:** The focus of the international community will help the success of goals.
5. **Ensuring benefits for people:** This underlies the landscape and ecosystems approaches.

Salafsky, Nick, et al.

"Improving the Practice of Conservation: a Conceptual Framework and Research Agenda for Conservation Science." *Conservation Biology* 16.6 (December 2002): 1469-1479.

Salafsky proposes a new adaptive management model for conservation science. This model aims to:

1. Define clear and practical measures of conservation success,
2. Determine sound guiding principles for using conservation strategies and tools, and
3. Develop the knowledge and skills in individuals and organizations for practicing adaptive management.

Central to the idea of adaptive management is creating a research agenda for conservation science. This agenda would focus on meeting challenges through conservation techniques that meld research and implementation. "The challenge is to develop conservation practitioners with adaptive-management knowledge and skills who can serve as the applied researchers for conservation science" (1477).

The article outlines a conceptual model that can be used for conservation projects. The model is intended to help conservationists "both understand and efficiently change the system" by providing a common language and framework "through which people with different perspectives can discuss the situation" (1471). The model uses "biodiversity" as the conservation target, linking the target to potential threats, actions for mitigating those threats, and practitioners – the people and organizations who "value conservation and have the skills and knowledge to make it happen" (1474).

Thomas, Jack Ward, et al.

"The Northwest Forest Plan: Origins, Components, Implementation Experience, and Suggestions for Change." *Conservation Biology:* 20.2 (Apr., 2006): 277- 287. Stable URL: http://www.jstor.org/stable/3591336

Thomas presents the successes and shortcomings of the Northwest Forest Plan, which was implemented in 1994. Thomas, who was the leader of the panel directed by President Clinton to produce the NWFP, concludes that the plan has succeeded in conserving old-growth forests and aquatic systems, but that it has not reached its intended goals for habitat restoration and implementation of adaptive management practices. Further, Thomas concludes that social and economic policies have not been adequately adopted to meet the plan's goals.

Thomas offers three recommendations for improvement to the plan:

1. **Recognize that the NWFP has evolved into an integrative conservation strategy.** This strategy brings together two management philosophies; the traditional notion that forests should be used for their resources, and the newer notion that they should be managed for wildlife habitat and biodiversity. Thomas suggests that forest managers should "look outward" at the ways federal forests connect with private and state lands, and with communities. He calls for a focus on activities that contribute to sustainability, such as fuels reduction and forest thinning, through engaging public support.
2. **Conserve old-growth trees and forests wherever they occur.** Thomas considers the protection of old-growth forests one of the great successes of the NWFP, and he calls for a reaffirmation of the principles that led to that success. He calls for continued protection, with more active management, including thinning new trees within old-growth forests, to ensure forest health.
3. **Manage federal forests as dynamic ecosystems.** Thomas argues that bureaucratic inaction threatens the success of the NWFP, and he calls for a better balance of short-term vs. long-term risk; that is, managers need to understand that in attempting to minimize short-term risks, they may fail to achieve long-term goals. Further, he argues that managers should recognize the value of all "structural stages" across the landscape, instead of focusing too heavily on old-growth stages. He recommends that wildlife protection should focus on endangered, threatened and at-risk species; this approach will place monetary and human resources where they are needed most.

Thomas, Jack Ward and Dombeck, Mike.

"Ecosystem Management in the Interior Columbia River Basin." *Wildlife Society Bulletin* 24.2 (Summer, 1996): 180-186. Stable URL: http://www.jstor.org/stable/3783105

Thomas and Dombeck describe the joint effort between the Bureau of Land Management and the Forest Service to establish ecosystem-based strategies for land management in the Interior Columbia River Basin.

They consider the challenges of developing an ecological approach to forest management that serves long-term forest health while still achieving mandates for multiple uses of public lands. Thomas and Dombeck report that an over-arching goal is to integrate the best available ecological science and technology with the needs of the human community. The operating objectives include: maintain ecosystem health, as well as the viability of social and economic systems; recommend procedures for relations between the biophysical and social realms; consider expectations, management capabilities, and available science; provide framework for planning, risk assessments, monitoring and evaluations; and identify principles for procedures, planning and management.

This plan calls for a shift from species-by-species management, which Thomas and Dombeck say is ineffective for long-term forest sustainability, towards landscape-scale management. This broader focus takes into account an increased scientific understanding of how ecosystems work, and it will contribute to long-term health of at-risk species, as well as other species and their habitat. Key to this plan is a scientific assessment that presents a "comprehensive description of ecosystem structures, processes, and functions that were critical to understand present conditions and project future trends" (184). The assessment should not attempt to resolve issues or provide direct answers to problems; it provides a scientific foundation to help make informed planning decisions.

The authors emphasize the importance of considering the unpredictable, changing nature of ecosystems and our scientific understanding of them by employing dynamic assessment and planning processes. The frameworks for assessment and planning should be flexible enough to accommodate potential changes. Thomas and Dombeck propose the following framework:

- **Ecological approach**: Use ecosystem planning and management concepts to promote ecosystem sustainability by ensuring ecosystem health, diversity, and productivity.
- **Forging partnerships**: Actively form and encourage partnerships to achieve shared goals.
- **Grass-roots participation**: Promote grass-roots participation in Forest Service decisions and activities.
- **Using best science**: Strive to use the best applicable science available for decision making and the most appropriate technologies for land management. Ecosystem management calls for integrated resource information.

Williams, Jack E., et al.

"The Conservation Success Index: Synthesizing and Communicating Salmonid Condition and Management Needs." *Fisheries* 32.10 (October 2007): 477-492.

Williams describes a framework that can be used to synthesize and evaluate data from environmental assessments. This particular framework, the Conservation Success Index, was developed by Trout Unlimited, and it addresses the broad-scale needs of trout and char fisheries in the United States. It suggests rivers and streams that would be candidates for protection and restoration. However, the authors suggest that a similar framework can be adopted to analyze data for other species and habitats.

The Conservation Success Index integrates existing data on fish populations with a geographical information system (GIS) to determine priority areas for protection, monitoring, restoration, and reintroduction. These priority areas are defined through an analytical framework of 20 indicators grouped into four categories: range-wide condition, population integrity, habitat integrity, and future security. The

results provide guidance for Trout Unlimited on a subwatershed scale, but the report notes that smaller-scale decisions will require localized expertise and research.

Wisdom, Michael, et al.

"Procedures for Regional Assessment of Habitats for Species of Conservation Concern in the Sagebrush Ecosystem." March 2003 Report. La Grande: Pacific Northwest Research Station, 2003.

This report suggests procedures for carrying out a regional assessment of the sagebrush ecosystem. These procedures are important because of the prospect of habitat and population losses for species associated with the sagebrush ecosystem. In particular, this report suggests ways to address, "in a holistic manner," the threats to the ecosystem, providing guidance for efforts to protect and restore habitats. In this case, holistic refers to the dynamic ecosystem approach, with links among species and habitats, and it also refers to the interaction between regional and local planning efforts. It proposes an assessment that complements, and is complemented by, localized evaluations, a combination of the top-down and bottom-up approaches.

Wisdom stresses the importance of establishing over-arching goals, along with clear objectives. The procedures he recommends to attain the goal consist of analytical steps. He lists 10 important steps, such as "identify the ecoregion" and "identify regional threats," noting that these steps are offered as a starting point for other complementary analyses. Further, the steps are not necessarily applied in a particular order; they can be adapted to fit the needs of each regional assessment.

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