

Bureau of Land Management
National Sage-Grouse Habitat Conservation Strategy

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I. Introduction

BLM developed this National Sage-grouse Habitat Conservation Strategy (National Sage-grouse Strategy) to guide future actions for conserving sage-grouse and associated sagebrush habitats and to enhance BLM's ongoing conservation efforts. The National Sage-grouse Strategy provides a framework for future conservation efforts by setting out broad goals and specific actions to meet the goals. For each action that BLM will take, the National Sage-grouse Strategy explains what the action is, when the action will be taken and who will be the responsible official or office for completing the action. Integral to the National Sage-grouse Strategy are various guidance documents that will help BLM ensure that it successfully incorporates sage-grouse conservation measures into all of its ongoing programs and activities, including land use planning, grazing and mineral leasing, and other programs.

BLM designed this National Sage-grouse Strategy around four main goals. Associated with each goal are specific strategies and actions that BLM will undertake to meet the goal. The four goals are:

- 1) Improve the effectiveness of the management framework for addressing conservation needs of sage-grouse on lands administered by the BLM.
- 2) Increase understanding of resource conditions in order to prioritize habitat maintenance and restoration.
- 3) Expand partnerships, available research and information that support effective management of sage-grouse habitat.
- 4) Ensure leadership and resources are adequate to continue ongoing conservation efforts and implement national and state-level sage-grouse habitat conservation strategies and/or plans.

BLM is not a newcomer to sage-grouse conservation. As the land manager of almost half of the remaining sagebrush habitat, BLM plays a key role in conserving sage-grouse and sagebrush habitat. BLM has been taking actions for years on its own and as an active partner in state and local led efforts that have benefited the species and associated habitats. For example, in July 2000, BLM signed a Memorandum of Understanding (MOU) with the Western Association of Fish and Wildlife Agencies (WAFWA), the U.S. Forest Service (FS), and the U.S. Fish and Wildlife Service (FWS) that provided for state and local cooperation to coordinate planning, habitat and population mapping, and evaluation and restoration of sage-grouse populations. However, conservation of sage-grouse habitat is complex. Effective conservation strategies must occur at a variety of scales, with a variety of partners (state, local and tribal governments), and be integrated into the daily activities of the BLM land management mission. Conservation of sage-grouse requires national level policy, national and local program commitment, and local and regional knowledge and support.

Sections I through IV contain background information about sage-grouse population and life history, habitat requirements, and threats or risks potentially affecting the species. The information comes from a large body of published scientific literature, which is provided in Section IX. Sections V through VII detail the guiding principles, goals, strategies, and actions that provide the fundamental themes and guidance for preparing and implementing national and

state-level strategies. Additional information on progress reporting and a list of major authorities used by the BLM in carrying out conservation efforts are provided in Sections VIII-IX.

II. Purpose

The purpose of this comprehensive National Sage-grouse Strategy is to set goals and objectives, assemble guidance and resource materials, and provide a comprehensive management direction for the BLM's contributions to the on-going multi-state sage-grouse conservation effort in cooperation with the WAFWA.

The Federal Land Policy and Management Act (1976) (FLPMA) provides the basic authority for BLM's multiple use management of all resources on the public lands. One of the BLM's many responsibilities under FLPMA is to manage public lands for the benefit of wildlife species and the ecosystems upon which they depend. However, habitat management is one of many provisions of the multiple-use mandate outlined in FLPMA. Because conserving sagebrush habitats involves managing many other public land uses, this National Sage-grouse Strategy includes guidance and existing regulations for a variety of BLM-administered programs. FLPMA gave BLM the legal authority and mandate to manage and regulate the uses on the public lands "so that their various resource values are utilized in a combination that will best meet the present and future needs of the American people" (Section 103 (c)). Consistency and coordination in identifying and addressing threats to sage-grouse and sagebrush habitat in context of the multitude of programs that BLM manages is required. Addressing these threats throughout the range of the sage-grouse is critical to achieving the mandate of FLPMA and threat reduction, mitigation, and elimination to sage-grouse and sagebrush habitats.

In July 2000, WAFWA, FS, FWS and BLM signed an MOU that provides for Federal, state and local cooperation to coordinate planning, habitat and population mapping, and evaluation and restoration of sage-grouse populations. In July 2002, WAFWA agreed to develop a Conservation Assessment (CA) for sage-grouse and sage-grouse habitat to be completed in two distinct phases. Phase 1 is a range-wide assessment of sage-grouse populations and habitat status, trends and threats across eleven Western states. It was completed in June 2004. Phase 2, a range-wide implementation plan, will outline specific actions for the conservation of sage-grouse and sage-grouse habitats. Phase 2 is scheduled for completion in mid to late 2005.

As an active partner in Federal, state and local sage-grouse conservation planning efforts and as the primary Federal manager of sage-grouse habitat, the BLM is in a key position to contribute to sage-grouse habitat conservation from the range-wide geographic scale to the local level. This National Sage-grouse Strategy will strengthen Federal, state and local efforts by addressing habitat needs and trends on the BLM-managed lands and by ensuring that sage-grouse habitat needs are addressed in BLM land use plans and through actions carried out at the site specific level. Implementation of BLM's National Sage-grouse Strategy and the state-level Sage-grouse Habitat Conservation Strategies will complement and expand the ongoing efforts to conserve sagebrush ecosystems on public lands administered by the BLM for the benefit of sage-grouse and other wildlife species.

III. Other Sage-Grouse Related Programs, Initiatives and Efforts

BLM program actions described in this National Sage-grouse Strategy focus on achieving coordinated conservation efforts on BLM-administered public land and are consistent with and support the following on-going efforts:

- 1) Conservation Planning Framework Team: The 2000 MOU between BLM, FWS, FS and WAFWA established a Conservation Planning Framework Team consisting of four (4) representatives from WAFWA member agencies (U.S. only) and one (1) each from BLM, FS, and FWS. The Team is responsible for developing the range-wide conservation planning framework, making recommendations and providing guidance to working groups on the contents of state and local conservation plans.
- 2) Nevada Ad Hoc Working Group: In 1999, the BLM, FS, FWS, and the Nevada Department of Wildlife formed an ad hoc working group to coordinate the development of planning tools and other resources to facilitate conservation of species of concern throughout the sagebrush biome.

The working group adopted a regional, multi-scale approach to conservation and restoration in the sagebrush biome in an attempt to manage overall efforts more effectively. Prototype processes and projects of regional importance are being developed or planned for the Great Basin, Columbia Plateau, Wyoming Basin, Northern Great Plains, and the Utah/Colorado Plateau. This approach will provide better information about sage-grouse and sagebrush habitats and improve conservation planning by prioritizing areas where conservation activities are most likely to be successful using existing and projected resources.

- 3) SageMap: Regional Science Based Assessments: As a result of the ad-hoc working group's efforts, in 2002 the BLM, in cooperation with the FS, Pacific Northwest Research Station, and the U.S. Geological Survey (USGS), Biological Resources Division, Snake River Field Station (SRFS), developed science-based procedures that use existing information to conduct regional sagebrush habitat assessments for species of concern. The procedures are made available to the public through the USGS SageMap website and were used to develop the prototype Great Basin assessment. Information from that assessment is being used in support of sage-grouse conservation planning and the Great Basin Restoration Initiative (GBRI). These procedures are also being used to conduct or support prototype assessments in the Wyoming Basin.
- 4) SageMap Query and Data Analysis Modeling: The SageMap project, conducted by SRFS, is identifying and collecting spatial data layers needed to research and manage sage-grouse and shrubsteppe systems. The data sets, which can be queried, viewed, and downloaded from an FTP site, are important for understanding and managing shrubsteppe lands and associated wildlife. SageMap was created to share and disseminate information on sagebrush management, especially among resource managers and researchers interested in available literature and data from research within the sagebrush biome. SageMap contains over 3,000 data sets and currently is the most comprehensive source of spatial data related to sagebrush and associated studies in North America.
- 5) Great Basin Restoration Initiative: The GBRI was initiated by BLM in response to widespread habitat losses in the Great Basin from wildfires and other causes. Concern over the loss of habitats for sage-grouse and other sagebrush-dependent species was a significant and important factor in how GBRI evolved.

- 6) Plant Conservation Alliance: The Plant Conservation Alliance (PCA) is a public/private partnership among 10 Federal agencies and more than 200 non-Federal cooperators. In accord with Congressional direction, the PCA (through BLM) is leading an interagency native-plant material-development program for use in restoration and rehabilitation efforts on Federal lands. Funds have been provided for development of appropriate native plant materials within sagebrush ecosystems. This is critical to the development of seed sources for restoring native plant communities within sagebrush ecosystems.
- 7) Supportive BLM Programs: Numerous BLM programs, plans or initiatives provide additional guidance and resources to conserve and/or restore sagebrush and sage-grouse habitats as described in this National Sage-grouse Strategy. These include:
 - Department of the Interior (DOI) and BLM Strategic Plans
 - 95 BLM Land Use Plans covering the current occupied range of sage-grouse
 - Healthy Forests Initiative
 - BLM Special Status Species – Manual 6840
 - BLM 1601 Handbook Appendix C – *Land Use Planning, Special Status Species*
 - National Fire Plan – 10-year Implementation Plan
 - BLM Standards for Rangeland Health Handbook (H-4180-1)

IV. Overview of Sage-Grouse; Population and Life History and Threats to Sage-Grouse Habitat

Sage-grouse historically inhabited much of the sagebrush-dominated ecosystems of North America. Today, sage-grouse population abundance and extent have declined throughout most of their historical range. Population dynamics of sage-grouse are marked by strong cyclic behavior; however, in the last 30 years, the peak in the cycle of bird numbers has declined. Adult survival is high but is offset by low juvenile survival, resulting in low productivity. Habitat requirements for sage-grouse vary greatly depending on the season and life-history stage. Key habitat components include adequate canopy cover of tall grasses and medium height shrubs for nesting, abundant forbs and insects for brood rearing, and availability of herbaceous riparian species for late growing-season foraging.

No single factor can be identified as the cause of declines in sage-grouse populations. Since settlement of the West began, numerous activities have adversely affected the number of birds and the amount, distribution, and quality of sagebrush habitats. Historically, sagebrush-dominated vegetation was one of the most widespread habitats in the country. However, the majority of sagebrush ecosystems were lost or altered in some way by human activities and naturally occurring events. Some examples are large-scale conversions to cultivated croplands or pastures, altered fire frequencies resulting in conifer invasion at higher elevations and annual grass invasion at lower elevations, livestock grazing, herbicide use, mineral and energy development, and recreational activities related to urban growth and increased human populations. In many cases, the extent and significance of these effects or how sage-grouse populations will respond over time to cumulative effects caused by historical uses coupled with new activities is still unknown. Currently, the risk to sage-grouse comes from multiple sources across multiple scales. Thus, the BLM National Sage-grouse Strategy is comprehensive in its approach and address the risk to sage-grouse and habitat at appropriate scales.

A more detailed treatment of life history, threats and risks to sage-grouse is contained in the *Conservation Assessment of Greater Sage-grouse and Sagebrush Habitats* (Connelly, et al.

2004) produced by WAFWA and available at <http://sagemap.wr.usgs.gov/>.

V. Guiding Principles

The National Sage-grouse Strategy is the framework for conserving and managing sage-grouse habitats on lands administered by the BLM. In addition, this National Sage-grouse Strategy serves as the umbrella for BLM state-level strategies, which have been or are being developed in cooperation with state wildlife agencies and partners.

The following principles are the foundation of the National Sage-grouse Strategy.

- **Cooperative Integrated Approach:** The BLM recognizes the states' role in sage-grouse conservation planning as described in the 2000 MOU. The BLM National Sage-grouse Strategy complements state-led sage-grouse conservation planning efforts and provides consistent guidance for integration of range-wide, state and local-level conservation actions into existing BLM programs. This cooperation and coordination will ensure appropriate actions are identified at the appropriate scale for conserving sage-grouse and sagebrush habitat.
- **BLM's Roles as the Key Federal Sagebrush Habitat Manager:** Approximately half of the remaining sage-grouse habitat is under BLM jurisdiction and management; therefore, BLM land plays a significant role in the conservation of sage-grouse and other sagebrush-dependent wildlife species.
- **Best Available Science:** The BLM will use the best available science and other relevant information to develop conservation efforts for sage-grouse and sagebrush habitats.
- **Comprehensive Strategy:** Planned actions carried out under this National Sage-grouse Strategy will be fully consistent with laws, regulations, and policies.
- **Interdisciplinary Integrated Approach:** The use of interdisciplinary teams and specific analysis at the local and regional levels are key to the success of sage-grouse and sagebrush conservation.
- **National Goals, Local Solutions:** This National Sage-grouse Strategy contains clearly defined goals and measurable tasks. BLM land use plans will be an essential component in implementing local solutions and sage-grouse and sagebrush conservation. These plans will use science and information at the local and state level with input from agency partners, scientists and other planning participants to develop appropriate solutions at the appropriate scale.
- **Strategic Implementation:** Development and implementation of this National Sage-grouse Strategy is consistent with, and supports implementation of the Department of the Interior (DOI) Strategic Plans Resource Protection mission under the pillars of partnerships and management.
- **Land Use Plan Based:** BLM land use plans and associated implementation plans are the principal mechanisms for making decisions and conducting on the ground actions to conserve and restore sage-grouse habitats for lands administered by the BLM. Land use plans will be updated and amended when and where appropriate, to adequately

address sage-grouse and sagebrush conservation needs through full public participation.

- **Rangeland Health Program Based:** BLM Standards for Rangeland Health are the primary tool for evaluating the condition of sage-grouse and sagebrush habitats. BLM Resource Advisory Councils (RACs) will be consulted as additional program guidelines are developed.
- **Cooperative Conservation:** Communication, cooperation, and consultation among state and Federal agencies, tribes, stakeholders, BLM RAC's within states, and the conservation community are essential for achieving successful conservation results. Partnerships both inside and outside the BLM will be fostered at every opportunity and every organizational level.
- **Supportive to Current Initiatives:** The BLM will capitalize on existing national or regional initiatives, such as the GBRI, Seeds of Success, Partnership Against Weeds, and the Plant Conservation Alliance, that benefit sage-grouse and sagebrush habitat.
- **Open Collaborative Approach:** The BLM will collaborate and share, as appropriate and authorized all information that is pertinent and useful in conserving sage-grouse and sage-grouse habitat.
- **Adaptive:** The Bureau is committed to sage-grouse and sagebrush conservation and will continue to adjust and adapt our National Sage-grouse Strategy as new information, science and monitoring results evaluate effectiveness over time.
- **Implementation Commitment:** Successful implementation of this National Sage-grouse Strategy requires a long-term commitment from BLM managers and staff across all programs and at every level of the organization.

VI. Vision, Goals, Strategies, and Actions

Vision: Manage BLM-administered public land to maintain, enhance and restore sagebrush habitats while ensuring multiple use and sustained yield goals of FLPMA.

The following table identifies the Goals, Strategies, Actions, Responsible Party, and Deadline for each Action.

Goal 1: Set forth the management framework for addressing conservation of sage-grouse on lands administered by the BLM.

Strategy 1.1: Provide needed coordinated policies and program direction at the National and the BLM State and Field Office levels.

Actions	Responsibilities	Deadline
1.1.1 Issue direction on completion of state-level strategies and BLM plans.	Director, WO-230 (Lead), WO-210 (Co-lead)	November 2004
1.1.2 Complete BLM coordination on State agency led strategies and/or plans.	State Directors	Ongoing, with final state submissions July 2005.
1.1.3 Issue off-site habitat mitigation policy. Identify limitations and opportunities for funding and implementation across programs.	WO-300 (Lead); WO-200 (Co-lead)	March 2005
1.1.4 Develop a resource guide to enhance partnership involvement in sage-grouse conservation efforts.	Director, WO-200, WO-300, WO-800	October 2004, Completed
1.1.5 Revise or develop fire management plans for each state to include sage-grouse habitat management guidance.	State Directors	October 2004
1.1.6 Report to the Director on progress towards implementation of this strategy.	WO-200 (Lead) (National Sage-grouse Strategy) State Directors (State-level strategies)	September 1, 2005, 2006, 2007

Strategy 1.2: Establish and maintain a data base to describe and track conservation efforts in sagebrush habitats.

Actions	Responsibilities	Deadline
1.2.1 Gather initial information on conservation effort from all states with current sage-grouse populations.	WO-200 (Lead), WO-300, WO-880	July 2004, Completed
1.2.2 Support the information gathered with a data base that allows assemblage across state lines and queries.	WO-200 (Lead), WO-300, WO-880, NSTC	July 2004, Completed
1.2.3 Expand the data base to include sagebrush habitat in states without current sage-grouse populations.	WO-880 (Lead), WO-200, WO-300	December 2005

Strategy 1.3: Provide guidance to ensure integration of sage-grouse habitat conservation measures for actions provided through the management in land use planning process.

Actions	Responsibilities	Deadline
1.3.1 Issue guidance to ensure land use plans and plan amendments adequately address sage-grouse habitat conservation needs.	Director, WO-200 (Lead)	October 2004, Completed
1.3.2 Develop standard terminology for sage-grouse habitats (e.g., stronghold areas, breeding, etc.) for consistent future use.	WO-200 (Lead), NSTC	January 2005
1.3.3 Complete preparation of Southeast Oregon RMP case history for applying multi-scale information.	WO-230 (Lead), DSDs, NSTC	March 2005
1.3.4 Develop a process and schedule to update deficient land use plans to address sage-grouse needs.	State Directors, WO-210	April 2005
1.3.5 Develop process for use of broad-, mid- and fine-scale assessments in land use planning efforts and incorporate into planning guidance.	WO-200 (Lead), NSTC	October 2005

Strategy 1.4: Issue mandatory guidance on management of sagebrush habitat for sage-grouse conservation.

Actions	Responsibilities	Deadline
1.4.1 Develop and issue "Guidance for the Management of Sagebrush Plant Communities for Sage-Grouse Conservation." National guidance must be adaptable to local variability provided sage-grouse conservation goals are maintained or enhanced by the local adaptations.	Director, WO-230 (lead)	October 2004, Completed
1.4.2 Develop additional management guidance as needed, to address specific future conservation needs.	WO-200 (Lead) and Fire	Ongoing
1.4.3 Develop and issue livestock grazing BMPs to restore, maintain or enhance the quality of sage-grouse and sagebrush habitat.	WO-220 (Lead), WO-200	December 2004
1.4.4 Develop and issue BMPs for oil and gas development.	WO-300 (Lead), WO-200	June 2004, Completed, WO-2004-194

Goal 2: Enhance knowledge of resource conditions and priorities in order to support habitat maintenance and restoration efforts.

Strategy 2.1: Complete and maintain eco-regional assessments of sagebrush and sage-grouse habitats across the sagebrush biome.

Actions	Responsibilities	Deadline
2.1.1 Develop national spatial data sets for multi-scale assessments.	WO-200 (Lead),WO-300, State Directors, NSTC	September 2006
2.1.2 Complete ecoregional assessments of the Wyoming Basin, Northern Great Plains, Colorado Plateau, and complete habitat connectivity analysis.	NSTC (Lead), WO-230, State Directors	September 2006 November 2006 for connectivity analysis
2.1.3 Update ecoregional assessments for the Columbia Basin and Great Basin.	WO-230 (Lead), State Directors	September 2008
2.1.4 Complete state-level mapping of sage-grouse/sagebrush habitats and disturbance regimes.	State Directors (Lead), NSTC	May 2004, Completed
2.1.5 Participate in preparation of the WAFWA range-wide sage-grouse conservation assessment phase I and phase II.	WO-230 (Lead), State Directors	June 2004, phase I completed Phase II, 2005

Strategy 2.2: Provide a consistent and scientifically based approach for collection and use of monitoring data for sagebrush habitats, sage-grouse and other components of the sagebrush community.

Actions	Responsibilities	Deadline
2.2.1 Develop, cooperatively with our partners, appropriate monitoring strategies and protocols at the appropriate scale for sage-grouse habitat in conjunction with the development of the range-wide conservation action plan.	WO-200 (Lead)	August 2005
2.2.2 Develop, cooperatively with our partners, a sage-grouse habitat assessment methodology in conjunction with development of the range-wide conservation action plan.	WO-200	November 2005

Actions	Responsibilities	Deadline
2.2.3 Incorporate the sage-grouse habitat assessment framework into the land health assessment process for evaluating indicators of healthy rangelands.	WO-200	December 2006
2.2.4 In conjunction with the development of the range-wide conservation action plan, issue guidance for collecting fine-scale monitoring and assessment information and incorporating requirements into implementation projects and plans.	WO-200 (Lead), NSTC	April 2005

Strategy 2.3: Identify, prioritize and facilitate needed research to develop relevant information for sage-grouse and sagebrush habitat conservation in coordination with WAFWA.

Actions	Responsibilities	Deadline
2.3.1 In cooperation with partners, establish an national interagency, interdisciplinary technical team to: <ul style="list-style-type: none"> • receive research questions from local and regional managers and working groups; • sort priority information needs and identify sources of research information (e.g. West Nile virus); and • serve as clearinghouse for research funding proposals. 	WO-200	July 2005

Goal 3: Expand partnerships, available research, and information that support effective management of sage-grouse and sagebrush habitats.

Strategy 3.1: Maintain, develop and expand partnerships to promote cooperation and support for all activities associated with sage-grouse and sagebrush conservation.

Actions	Responsibilities	Deadline
3.1.1 Participate in the local, regional and national conservation efforts established under the agreement with Western Association of Fish and Wildlife Agencies.	State Directors; WO-200	Ongoing
3.1.2 Expand partnerships at all levels to support development and implementation of the National Sage-grouse Strategy.	Director, State Directors, Field Managers	Ongoing
3.1.3 Maintain and expand state and local partnerships to implement the tasks outlined in the cooperatively developed state-level strategies and/or plans.	State Directors, Field Managers	Ongoing

Strategy 3.2: Effectively communicate throughout BLM and with current and prospective partners on steps BLM will take to conserve sage-grouse and sage-grouse and sagebrush habitats.

Actions	Responsibilities	Deadline
3.2.1 Complete a communications plan for the National Sage-grouse Strategy, including internal and external audiences.	WO-610 (Lead), WO-200, WO-300, WO-880	August 2004, Completed and Ongoing
3.2.2 Complete a communications plan for state-level sage-grouse strategies/plans, including internal and external audiences. Ensure that the BLM National, State and Field Office communication strategies support the comprehensive National Sage-grouse Strategy and ensure each level of the BLM organization knows how their strategies implement goals and enhance sage-grouse and sagebrush conservation goals.	State Directors (Lead), Public Affairs, Field Managers	December 2004

Strategy 3.3: Facilitate the collection, transfer and sharing of information among all BLM partners and cooperators, as well as BLM program personnel.

Actions	Responsibilities	Deadline
3.3.1 Continuously improve interagency data and mapping efforts such as SageMap	WO-200 (lead)	Ongoing
3.3.2 Improve web-based tools available to support sagebrush conservation efforts (e.g. links to literature, project and studies maps, decision support models)	WO-200 (lead)	2005; Ongoing
3.3.3 Develop and distribute publications that support field-level conservation efforts	WO-200 (lead)	Ongoing; 2005 and beyond
3.3.4 Develop minimum standards for data collection, data dictionary and reporting at state, regional and national levels that are compatible with data developed by state agencies and other partners	WO-200 (Lead), WO-880	December 2006
3.3.5 Provide training to ensure Bureau-wide understanding of sage-grouse habitat requirements and Best Management Practices (BMPs) across all disciplines	WO-230 (Lead), NTC	December 2005
3.3.6 Host a biennial workshop with partners to share understanding and knowledge of sagebrush ecology and management, including use of BMPs	WO-200	Biennial
3.3.7 Identify cooperative funding and/or other mechanisms for data collection, reporting and dissemination related to sagebrush and sage-grouse habitats	WO-200	November 2004
3.3.8 Enhance and accelerate, through partnerships, technical and scientific support to the field for sagebrush conservation efforts	WO-200/WO-170	June 2005

Goal 4: Ensure leadership and resources are adequate to implement national and state-level sage-grouse and sagebrush habitat conservation strategies and/or plans.

Strategy 4.1: Develop BLM state-level strategies and/or plans for sage-grouse and sagebrush conservation on BLM-administered public lands.

Actions	Responsibilities	Deadline
4.1.1 Establish BLM state-level interdisciplinary teams to prepare strategies.	State Directors (Lead), Field Managers	Ongoing; November 2004
4.1.2 Consult with States, RACs, Councils, tribes, other agencies, stakeholders, and interested publics in preparation of draft BLM state-level strategy/plan.	State Directors (Lead), Field Managers	Ongoing; annual meetings
4.1.3 Incorporate sage-grouse/sagebrush conservation measures into all applicable land use plans.	State Directors (Lead), Field Managers	Ongoing, as scheduled per Action 1.3.4

Strategy 4.2: Formulate budgets necessary to support continued implementation of the National Sage-grouse Strategy.

Actions	Responsibilities	Deadline
4.2.1 Prioritize needs for sage-grouse and sagebrush conservation in Strategic Budget Plan (FY+2).	Director, State Directors, Field Committee and the Budget Strategy Team	Ongoing; annual
4.2.2 Include priority needs for sage-grouse and sagebrush conservation in Budget Justifications (FY+1).	State Directors, Field Managers, WO-200, WO-300, WO-800 (Lead)	Ongoing; annual
4.2.3 Prioritize needs for sage-grouse and sagebrush conservation in Annual Work Plan.	State Directors, Field Managers, WO-200, WO-300, WO-800 (Lead)	Ongoing; annual
4.2.4 Give priority to sage-grouse and sagebrush conservation in CCS, CCI and NFWF funding proposals.	State Directors, Field Managers, WO-200	Ongoing; annual

VII. Progress Reporting

Implementation of the actions outlined in this BLM National Sage-grouse Strategy and the cooperative state agency led sage-grouse habitat conservation strategies will be monitored and progress reported to the Director annually. The effectiveness of implementing actions outlined in both the national and state strategies will require an assessment process that includes ‘before and after’ project evaluation of habitat conditions. This assessment process is currently being developed (see Action 2.2.2). The assessment process will be incorporated into BLM’s land health assessment process for evaluating indicators of healthy rangelands.

VIII. Authorities and Responsibilities

The BLM has broad authority to manage the public lands. BLM management of the public lands is guided by Federal laws, regulations, policies and handbooks. Collectively, these frame BLM’s “regulatory mechanisms” for sage-grouse conservation as discussed in Section 4 of the Endangered Species Act. Many of these authorities have a bearing on sage-grouse conservation, but only the most relevant ones are discussed below.

1) Laws

Several major Federal laws provide the authority and framework for this National Sage-grouse Strategy:

Federal Land Policy and Management Act of 1976 (43 U.S.C. 1701 *et seq.*), as amended

This is the primary Federal law governing most land uses on BLM-administered lands. It directs BLM to develop and maintain land use plans based on inventories of these lands and the resources they support. Among other things, this Act gave fish and wildlife resources equal standing with the other traditional public uses of BLM-administered lands. Section 102(a)(8) states: “The Congress declares that it is the policy of the United States that the public lands be managed in a manner that will....provide food and habitat for fish and wildlife....”

National Environmental Policy Act (NEPA), 1969, Title II (42 U.S.C. 4321 *et seq.*), as amended

NEPA requires that land-management planning be conducted in the public arena, using an interdisciplinary process for evaluating and disclosing resource information that considers physical, cultural, and biological resources in conjunction with social and economic factors to explore alternatives; consider impacts, including cumulative impacts; mitigate impacts; and decide appropriate public land uses.

Public Rangelands Improvement Act 1978, Title II (43 U.S.C. 1901 *et seq.*), as amended

The Public Rangelands Improvement Act provides that “[e]xcept where the land use planning process required pursuant to Section 202 of [FLPMA] determines otherwise or the Secretary determines, and sets forth his reasons for this determination, that grazing uses should be discontinued (either temporarily or permanently) on certain lands, the

goal of ...management shall be to improve the range conditions of the public rangelands so that they become as productive as feasible in accordance with the rangeland management objectives established through the land use planning process, and consistent with the values and objectives listed in sections 2(a) and (b)(2) of this Act.”

Sikes Act of 1974, Title II (16 U.S.C. 670 et seq.), as amended

This Act directs the Secretaries of Interior and Agriculture to, in cooperation with the State agencies, develop plans to “... develop, maintain, and coordinate programs for the conservation and rehabilitation of wildlife, fish and game. Such conservation and rehabilitation programs shall include, but not be limited to, specific habitat improvement projects, and related activities and adequate protection for species considered threatened or endangered.”

Wild Horse and Burro Act of 1971 (16 U.S.C. 1331), as amended

The Wild Horse and Burro Act gives BLM statutory authority for management of wild horses and burros and responsibility to provide for a thriving ecological balance on public rangelands. At 43 CFR 4700.0-6 is the policy of the BLM that: “Wild horses and burros shall be managed as self-sustaining populations of healthy animals in balance with other uses and the productive capacity of their habitat.”

2) Regulations

Once a law is enacted, the administering Federal agency promulgates rules and regulations, as appropriate, to guide implementation. These regulations set the framework for national policy and can in some instances provide implementation direction. Regulations are a very important “regulatory mechanism” for administering land uses on public lands. For the BLM, there are several sets of regulations associated with implementing FLPMA and other laws. Most of the regulations that may affect BLM guidance on sage-grouse management are found in 43 CFR, although some, such as the Council on Environmental Quality regulations, are found in other portions of the CFR.

43 CFR Subpart C, Minerals Management 3000 Series,

The Minerals Management regulations contain regulatory authority for BLM operations, enforcement and reclamation of mineral actions on public lands.

43 CFR Subpart 4120, Grazing Management

The Grazing Management regulations contain the regulatory authority for grazing administration, use authorizations, permit terms, and conditions for achieving resource-condition objectives. Subparts 4140-4170 outline prohibited acts, enforcement, and penalties. Subpart 4180 is an example of how regulations provide direction for sage-grouse conservation. Within the scope of these grazing regulations, are included specific direction to the BLM State Directors to develop standards that among other things would address:

(43 CFR 4180.2(d)):

(4) Habitat for endangered, threatened, proposed, candidate, or special status species; and (5) Habitat quality for native plant and animal populations and communities.

In addition, Subpart 4180.2(e) requires development of guidelines to address:

(9) Restoring, maintaining or enhancing habitats of Federal proposed, Federal candidate, and other special status species to promote their conservation.

43 CFR 4180, Fundamentals of Rangeland Health

The Fundamentals of Rangeland Health require the BLM to develop, in consultation with Resource Advisory Councils, rangeland health standards. The Fundamentals of Rangeland Health combine the basic precepts of physical function and biological health with elements of law relating to water quality and plant and animal populations and communities to provide the basis for the standards for land health.

3) BLM National Policy Guidance

National policy guidance further defines or clarifies how laws and regulations will be administered. This direction comes either in the form of a policy statement or as manuals or handbooks. National policy establishes what basic policy is to be achieved. BLM State and local policies can provide more specific guidance on how the national policy objectives are to be accomplished. BLM State and local field offices have discretion to adapt national policy to local situations, but do not have authority to override national policy for local situations.

Policies are particularly useful in avoiding conflicts with laws and regulations. Federal agency policies concerning sensitive species are a good example. The ESA only applies to proposed and listed species and designated or proposed critical habitat, but it is in the interest of the Federal government, consistent with other laws such as FLPMA, to conserve sensitive species with the intent to avoid a need to list. There are no regulations associated with FLPMA that specifically address fish and wildlife management or, more specifically, conservation of sensitive species at risk of being listed in the future. Agency policy provides this direction for sensitive species conservation and fills this regulatory gap. Two main sets of policy guidance currently provide direction for sage-grouse conservation efforts.

BLM Special Status Species Management – Manual 6840

Policy guidance for sage-grouse habitat conservation is summarized in this manual. It provides national-level policy direction, consistent with appropriate laws, for the conservation of special-status species of animals and plants and the ecosystems on which they depend. *Conservation* in this National Sage-grouse Strategy, and consistent with 6840 policy, means the use of all methods and procedures necessary to improve the condition of special status species and their habitats to a point where their special status recognition is no longer warranted.

Land Use Planning Handbook - H-1601-1

All program actions (allocations, authorizations, objectives, standards, conditions and implementation priorities) taken on the public land are guided by land use plans. These plans ensure that the public lands are managed in accordance with the intent of Congress as stated in FLPMA (43 U.S.C. 1701 *et seq.*) under the principles of multiple use and sustained yield. The BLM Land Use Planning Handbook provides more detailed direction for land use planning consistent with planning regulations found in 43 CFR 1600.

The Handbook states that, as required by FLPMA, the public lands must be managed in a manner that protects the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archaeological values; that, where appropriate, will preserve and protect certain public lands in their natural condition; that will provide food and habitat for fish and wildlife and domestic animals; and that will provide for outdoor recreation and human occupancy and use by encouraging collaboration and public participation throughout the planning process. In addition, the public lands must be managed in a manner that recognizes the nation's need for domestic sources of minerals, food, timber, and fiber from the public lands.

Land use plans are the primary mechanisms for guiding BLM program activities. Land use plans guide management actions on public lands in the planning area. Land use plan decisions establish goals and objectives for resource management,; measures needed to achieve these desired future conditions, and the parameters for using BLM-administered public land. These plans identify lands that are open or available for certain uses, including any applicable restrictions, and lands that are closed to certain uses.

IX. Literature Relevant to the BLM Sage-Grouse Habitat Conservation Strategy

- Anonymous. 1997. Gunnison sage grouse conservation plan. Gunnison Basin, Colorado. Bureau of Land Management, Gunnison, Colorado. 108 p.
- Apa, A. D. 1998. Habitat use and movements of sympatric sage and Columbian sharp-tailed grouse in southeastern Idaho. Ph.D. dissertation, Univ. of Idaho, Moscow.
- Asher, J. 1994. Crushing the wilderness spirit: Alien plant invasions. Unpublished report on file with: U.S. Department of the Interior, Bureau of Land Management, Oregon State Office, P.O. Box 2965, Portland, Oregon 97201.
- Autenrieth, R. E. 1981. Sage grouse management in Idaho Wildlife Bulletin Number 9. Idaho Department of Fish and Game. Boise. 239 p.
- Baker, H.G. 1986. Patterns of plant invasion in North America. Mooney, H.A. and J.A. Drake, editors, Ecology of biological invasions of North America and Hawaii. Springer-Verlag, New York. 44-57.
- Barnett, J. F., and J. A. Crawford. 1994. Pre-laying nutrition of sage grouse hens in Oregon. Journal of Range Management. 47:114-118.
- Barney, M.A., and N. C. Frischknecht. 1974. Vegetation changes following fire in the pinyon-juniper type of west-central Utah. Journal of Range Management 27:91-96.
- Bay, K. G. 1989. Writing rules of progress - A look at oil and gas development in the midwest. Proceedings of the 43rd Midwest Fish and Wildlife Conference. Wichita, KS. 8 p.
- Bazzaz, F.A. 1986. Life history of colonizing plants: Some demographic, genetic, and physiological features. H.A. and J.A. Drake, editors, Ecology of biological invasions of North America and Hawaii. Springer-Verlag, New York. 96-110.
- Beck, J. L., and D. L. Mitchell. 2000. Influences of livestock grazing on sage grouse habitat. Wildlife Society Bulletin 28:993-1002.
- Beck, T. D. I. 1977. Sage grouse flock characteristics and habitat selection during winter. Journal of Wildlife Management 41:18-26.
- Beck, T. D. I. 1975. Attributes of a wintering population of sage grouse, North Park, Colorado. M.S. thesis. Colorado State University, Fort Collins. 49 p.
- Bergerud, A. T. 1988. Population ecology of North American grouse. A.T. Bergerud and M. W. Gratson, eds. *Adaptive strategies and population ecology of northern grouse*. University of Minnesota Press, Minneapolis. 578-648.
- Berry, J. D., and R. L. Eng. 1985. Interseasonal movements and fidelity to seasonal use areas by female sage grouse. Journal of Wildlife Management 49:237-240.
- Blus, L. J., C. S. Staley, C. J. Henny, G. W. Pendleton, T. H. Craig, E. H. Craig, and D. K. Halford. 1989. Effects of organophosphorus insecticides on sage grouse in southeastern Idaho. Journal of Wildlife Management 53:1139-1146.
- Braun, C. E. 1986. Changes in sage grouse lek counts with advent of surface coal mining. Proceedings of Issues and Technology in the Management of Impacted Western Wildlife. Thorne Ecological Institute. 2:227-231.
- Braun, C. E. 1987. Current issues in sage-grouse management. Proceedings, Western Association of Fish and Wildlife Agencies. 67:134-144.
- Braun, C. E. 1998. Sage grouse declines in western North America: what are the problems? Proceedings of the Western Association of State Fish and Wildlife Agencies. 78:139-156.
- Braun, C. E., O. O. Oedekoven, and C. L. Aldridge. 2002. Oil and Gas development in western North America: effects on sagebrush steppe avifauna with particular emphasis on sage-grouse. Transactions of the North American Wildlife and Natural Resources Conference: in press.

- Call, M. W., and C. Maser. 1985. Wildlife habitats in managed rangelandsBthe Great Basin of southeastern Oregon. Sage Grouse (*Centrocercus urophasianus*). U. S. Forest Service, General Technical Report PNW-GTR-187. 31 p.
- Coggins, K. A. 1998. Sage grouse habitat use during the breeding season on Hart Mountain National Antelope Refuge. M.S. thesis, Oregon State University, Corvallis. 61 p.
- Connelly, J. W., Jr. 1982. An ecological study of sage grouse in southeastern Idaho. Ph.D. dissertation, Washington State University, Pullman. 84 p.
- Connelly, J. W., and L. J. Blus. 1991. Effects of pesticides on upland game: a review of herbicides and organophosphate and carbamate insecticides. M. Marsh, editor. Proceedings, Pesticides in Natural Systems - how can their effects be monitored? U. S. Environmental Protection Agency, Seattle, Washington. 92-97.
- Connelly, J. W., and C. E. Braun. 1997. Long-term changes in sage grouse *Centrocercus urophasianus* populations in western North America. *Wildlife Biology* 3:123-128.
- Connelly, J. W., and O. D. Markham. 1983. Movements and radionuclide concentrations of sage grouse in southeastern Idaho. *Journal of Wildlife Management* 47:169-177.
- Connelly, J. W., W. J. Arthur, and O. D. Markham. 1981. Sage grouse leks on recently disturbed sites. *Journal of Range Management* 52:153-154.
- Connelly, J. W., H. W. Browsers, and R. J. Gates. 1988. Seasonal movements of sage grouse in southeastern Idaho. *Journal of Wildlife Management* 52:116-122.
- Connelly, J. W., W. L. Wakkinen, A. D. Apa, and K. P. Reese. 1991. Sage grouse use of nest sites in southeastern Idaho. *Journal of Wildlife Management* 55:521-524.
- Connelly, J. W., R. A. Fischer, A. D. Apa, K. P. Reese, and W. L. Wakkinen. 1993. Renesting of sage grouse in southeastern Idaho. *Condor* 95:1041-1043.
- Connelly, J. W., K. P. Reese, W. L. Wakkinen, M. D. Robertson, and R. A. Fischer. 1994. Sage grouse ecology report. Idaho Department of Fish and Game Job Completion Report. W-160-R-19. Subproject 9. 91 p.
- Connelly, J. W., M. A. Schroeder, A. R. Sands, C. E. Braun. 2000. Guidelines for management of sage grouse populations and habitats. *Wildlife Society Bulletin* 28(4): 967-985.
- Connelly, J. W., S. T. Knick, M. A. Schroeder, and S. J. Stiver. 2004. Conservation Assessment of Greater Sage-grouse and Sagebrush Habitats. Western Association of Fish and Wildlife Agencies. Unpublished Report. Cheyenne, Wyoming.
- Cottam, W. P. and G. Stewart. 1940. Plant succession as a result of grazing and of meadow desiccation by erosion since settlement in 1892. *Journal of Forestry* 38: 613-626.
- Dalke, P. D., D. B. Pyrah, D. C. Stanton, J. E. Crawford, and E. F. Schlatterer. 1963. Ecology, productivity, and management of sage grouse in Idaho. *Journal of Wildlife Management* 27:810-841.
- Delong, A. K., J. A. Crawford, and D. C. Delong, Jr. 1995. Relationships between vegetational structure and predation of artificial sage grouse nests. *Journal of Wildlife Management* 59:88-92.
- DePuit, E. J., and J. G. Coenenberg. 1979. Methods for establishment of native plant communities on top soiled coal strip-mine spoils in the northern Great Plains. *Reclamation Review* 2:75-83.
- Drut, M. S., W. H. Pyle, and J. A. Crawford. 1994. Diets and food selection of sage grouse chicks in Oregon. *Journal of Range Management* 47:90-93.
- Drut, M. S., W. H. Pyle, and J. A. Crawford. 1994. Diets and food selection of sage grouse chicks in Oregon. *Journal of Range Management* 47:90-93.
- Eddleman, L. E. 1987. Establishment of western juniper in central Oregon. R. L. Everett, compiler. ProceedingsBpinyon-juniper conference 1986, U.S. Forest Service General Technical Report INT-GTR-215. Intermountain Research Station, Ogden, Utah. 255-259.

- Edelmann, F. B., M. J. Ulliman, M. J. Wisdom, K. P. Reese, and J. W. Connelly. 1998. Assessing habitat quality using population fitness parameters: a remote sensing/GIS-based habitat-explicit population model for sage grouse (*Centrocercus urophasianus*). Technical Report 25. Idaho Forest, Wildlife and Range Experiment Station, Moscow.
- Edminster, F. C. 1954. American game birds of field and forest. Charles Scribner's Sons, New York, New York, USA.
- Ellis, K. L. 1987. Effects of a new transmission line on breeding male sage grouse at a lek in northwestern Utah. Abstract in J. Roberson, editor. Transactions of the 15th Sage Grouse Committee. Western Association of Fish and Wildlife Agencies, July 1987, Midway, Utah. 28-30.
- Eng, R. L. 1963. Observations on the breeding biology of male sage grouse. Journal of Wildlife Management 27:841-846.
- Eng, R. L., and P. Schladweiler. 1972. Sage grouse winter movements and habitat use in central Montana. Journal of Wildlife Management 36:141-146.
- Enyeart, G. 1956. Responses of sage grouse to grass reseeding in the Pines area, Garfield County, Utah. M.S. thesis, Utah State Agricultural College, Logan. 55 p.
- Fischer, R. A. 1994. The effects of prescribed fire on the ecology of migratory sage grouse in southeastern Idaho.
- Fischer, R. A., A. D. Apa, W. L. Wakkinen, K. P. Reese, and J. W. Connelly. 1993. Nesting-area fidelity of sage-grouse in southeastern Idaho. Condor 95: 1038-1041.
- Fischer, R. A., K. P. Reese, and J. W. Connelly. 1996a. An investigation on fire effects within xeric sage grouse brood habitat. Journal of Range Management 49:194-198.
- Fischer, R. A., K. P. Reese, and J. W. Connelly. 1996b. Influence of vegetal moisture content and nest fate on timing of female sage grouse migration. Condor 98:868-872.
- Fischer, R. A., K. P. Reese, and J. W. Connelly. 1997. Effects of prescribed fire on movements of female sage grouse from breeding to summer ranges. Wilson Bulletin 109:82-91.
- Gates, R. J. 1983. Sage grouse, lagomorph, and pronghorn use of a sagebrush grassland burn site on the Idaho National Engineering Laboratory. M. S. thesis, Montana State University, Bozeman. 135 p.
- Gates, R. J. 1985. Observations of the formation of a sage grouse lek. Wilson Bulletin 97:219-221.
- Gill, R. B. 1965. Distribution and abundance of a population of sage grouse in North Park, Colorado. M. S. thesis, Colorado State University, Fort Collins. 187 p.
- Gray, G. M. 1967. An ecological study of sage grouse broods with reference to nesting movements, food habits and sagebrush strip spraying in the Medicine Lodge drainage, Clark County, Idaho. M.S. thesis, University of Idaho, Moscow. 200 p.
- Gregg, M. A. 1991. Use and selection of nesting habitat by sage grouse in Oregon. M.S. thesis, Oregon State University, Corvallis. 46 p.
- Gregg, M. A., J. A. Crawford, M. S. Drut, and A. K. DeLong. 1994. Vegetational cover and predation of sage grouse nests in Oregon. Journal of Wildlife Management 58:162-166.
- Hanf, J. M., P. A. Schmidt, and E. B. Groshens. 1994. Sage grouse in the high desert of central Oregon: results of a study, 1988-1993. U. S. Department of Interior, Bureau of Land Management Series P-SG-01, Prineville, OR. 56 p.
- Heath, B. J., R. Straw, S. H. Anderson, and J. Lawson. 1998. Sage grouse productivity, survival, and seasonal habitat among 3 ranches with different livestock grazing, predator control, and harvest management practices. Completion Report. Wyoming Game and Fish Department. 66 p.
- Higby, L. W. 1969. A summary of the Longs Creek sagebrush control project. Proceedings Biennial Western States Sage Grouse Workshop. 6:164-168.

- Hill, E. F., R. G. Heath, J. W. Spann, and J. D. Williams. 1975. Lethal dietary toxicities of environmental pollutants to birds. U. S. Fish and Wildlife Service Special Scientific Report No. 191. Washington, D.C. 61 p.
- Holloran, M. J. 1999. Sage grouse (*Centrocercus urophasianus*) seasonal habitat use near Casper, Wyoming. M.S. thesis, University of Wyoming, Laramie. 130 p.
- Hupp, J. W. and C. E. Braun. 1989. Topographic distribution of sage grouse foraging in winter. *Journal of Wildlife Management* 53:823-829.
- Johnson, G. D. and M. S. Boyce. 1990. Feeding trials with insects in the diet of sage grouse chicks. *Journal of Wildlife Management* 54(1) 89-91.
- Johnson, G. D., and M. S. Boyce. 1991. Survival, growth, and reproduction of captive-reared sage grouse. *Wildlife Society Bulletin* 19:88-93.
- Keister, G. P., and M. J. Willis. 1986. Habitat selection and success of sage grouse hens while nesting and brooding. Oregon Department of Fish and Wildlife, Progress Report W-87-R-2, Subproject 285, Portland.
- Klebenow, D. A. 1969. Sage grouse nesting and brood habitat in Idaho. *Journal of Wildlife Management* 33:649-661.
- Klebenow, D. A. and G. M. Gray. 1968. Food habitats of juvenile sage grouse. *Journal of Range Management* 21:80-83.
- Klebenow, D. A. 1982. Livestock grazing interactions with sage grouse. J. M. Peek and P. D. Dalke, editors. *Wildlife-livestock relationships symposium: Proceedings 10*. University of Idaho, College of Forestry, Wildlife, and Range. Moscow. 113-123.
- Klebenow, D. A. 1985. Habitat management for sage grouse in Nevada. *World Pheasant Association Journal* 21:80-83.
- Lyon, A. G. 2000. The potential effects of natural gas development on sage grouse (*Centrocercus urophasianus*) near Pinedale, Wyoming. M. S. thesis, University of Wyoming, Laramie. 120 p.
- Mack, R. N. and J. N. Thompson 1982. Evolution in steppe with few large, hoofed mammals. *American Naturalist* 119:757-773.
- Mack, R.N. 1986. Alien plant invasion into the Intermountain West: A case history. Mooney, H.A. and J.A. Drake, editors, *Ecology of biological invasions of North America and Hawaii*. Springer-Verlag, New York. 191-213
- Martin, N. S. 1970. Sagebrush control related to habitat and sage grouse occurrence. *Journal of Wildlife Management* 34:313-320.
- Miller, R.F., and J.A. Rose. 1995. Historic expansion of *Juniperus occidentalis* (western juniper) in southeastern Oregon. *Great Basin Naturalist* 55:37-45.
- Oakleaf, R. J. 1971. The relationship of sage grouse to upland meadows in Nevada. Nevada Department of Fish and Game and the Renewable Resources Center, University of Nevada, Reno. W-48-2. 64 p.
- Patterson, R. L. 1952. *The sage grouse in Wyoming*. Sage Books, Inc. Denver, CO. 341 p.
- Pellant, M. 1990. The cheatgrass-wildfire cycle--are there any solutions? In: McArthur, E. Durant; Romney, Evan M.; Smith, Stanley D; Tueller, Paul T. , comps. *Proceedings -- symposium on cheatgrass invasion, shrub die-off, and other aspects of shrub biology and management: 1989 April 5-7; Las Vegas, NV*. Gen. Tech. Rep. INT-276. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station: 11-17.
- Pellant, M. 1996. Use of indicators to qualitatively assess rangeland health. *Rangelands in a Sustainable Biosphere*. (Ed. N.E. West), Proc. 5th International Rangeland Congress. Society for Range Management. Denver, CO. 434-435

- Pellant, M., and S. B. Monsen. 1993. Rehabilitation on public rangelands in Idaho, USA: a change in emphasis from grass monocultures. *Proceedings of the International Grassland Congress* 17:778-779.
- Petersen, B. E. 1980. Breeding and nesting ecology of female sage grouse in North Park, Colorado. M.S. thesis, Colorado State University, Fort Collins, CO. 86 p.
- Peterson, J. G. 1970. The food habits and summer distribution of juvenile sage grouse in central Montana. *Journal of Wildlife Management* 34:147-155.
- Quigley, T.M., and S.J. Arbelbide, technical editors. 1997. Volume II of: An assessment of ecosystem components in the interior Columbia Basin and portions of the Klamath and Great Basins. General Technical Report PNW-GTR-405. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, Portland, OR.
- Rasmussen, D. I., and L. A. Griner. 1938. Life history and management studies of sage grouse in Utah, with special reference to nesting and feeding habitats. *Transactions of the North American Wildlife Conference* 3:852-864.
- Redente, E. F., T. B. Doerr, C. E. Grygiel, and M. E. Biondini. 1984. Vegetation establishment and succession on disturbed soils in northwest Colorado. *Reclamation and Revegetation Research* 3:153-165.
- Remington, T. E., and C. E. Braun. 1985. Sage grouse food selection in winter, North Park, Colorado. *Journal of Wildlife Management* 49:1055-1061.
- Robertson, M. D. 1991. Winter ecology of migratory sage grouse and associated effects of Prescribed fire in southeastern Idaho. M.S. thesis, University of Idaho, Moscow, ID. 88 p.
- Rowland, M. M., M. J. Wisdom. 2002. Research problem analysis for greater sage-grouse in Oregon. Final report. Oregon Department of Fish and Wildlife; U.S. Department of Interior, Bureau of Land Management, Oregon/Washington State Office; and U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 75 p.
- Savage, D. E. 1969. Relation of sage grouse to upland meadows in Nevada. Nevada Fish and Game Commission Job Completion Report, Project W-39-R-9. Job 12. Reno. 101 p.
- Schroeder, M. A. 1997. Unusually high reproductive effort by sage grouse in a fragmented habitat in north-central Washington. *Condor* 99:933-941.
- Schroeder, M. A., J. R. Young and C. E. Braun. 1999. Sage Grouse (*Centrocercus urophasianus*). In *The Birds of North America*, No. 425 (A. Poole and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA.
- Schuman, G. E., F. Rauzi, and D.T. Booth. 1982. Production and competition of crested wheatgrass-native grass mixtures. *Agronomy Journal* 74:23-26.
- Skoog, F. E., F. T. Cowan, and K. Messenger. 1965. Ultra-low-volume aerial spraying of dieldrin and malathion for rangeland grasshopper control. *Journal of Economic Entomology* 66:1267-1268.
- Sveum, C. M., J. A. Crawford, and W. D. Edge. 1998. Use and selection of brood-rearing habitat by sage grouse in south central Washington. *Great Basin Naturalist* 58:344-351.
- Swenson, J. E. 1986. Differential survival by sex in juvenile sage grouse and gray partridge. *Ornis Scandinavica* 17:14-17.
- Swenson, J. E., C. A. Simmons, and C. D. Eustace. 1987. Decrease of sage grouse *Centrocercus urophasianus* after ploughing of sagebrush steppe. *Biological Conservation* 41:125-132.
- Thurrow, T. L., and C. A. Taylor. 1999. The role of drought in range management. *Journal of Range Management* 52:413-419.
- Trueblood, R. W. 1954. The effect of grass reseeding in sagebrush lands on sage grouse populations. M.S. thesis, Utah State Agricultural College, Logan, UT.

- Tyser, R.W., and C.H. Key. 1988. Spotted knapweed in natural area fescue grasslands: An ecological assessment. *Northwest Science* 62:151-160.
- USDI, U.S. Fish and Wildlife Service. 2004. Connelly, J. C., S. T. Knick, M. A. Schroeder and S. J. Stiver. Conservation Assessment of Greater Sage-grouse and Sagebrush Habitats.
- USDI, Bureau of Land Management. 2003. Fish, Wildlife, Botany and Special Status Species Program Evaluation: Final Report on Evaluation Findings and Recommendations for Action Plan Development. March 31, 2003. 52 p.
- USDI and USDA 1995. Federal wildland fire management policy and program review. 45 p.
- Valentine, J. F. 1990. Grazing management. Academic Press, Incorporated. San Diego, CA. 553 p.
- Wakkinen, W. L. 1990. Nest site characteristics and spring-summer movements of migratory sage grouse in southeastern Idaho. M. S. thesis, University of Idaho, Moscow. 57 p.
- Wakkinen, W. L., K. P. Reese, and J. W. Connelly. 1992. Sage grouse nest locations in relation to leks. *Journal of Wildlife Management* 56:381-383.
- Wallestad, R. O. 1971. Summer movements and habitat use by sage grouse broods in central Montana. *Journal of Wildlife Management* 35:129-136.
- Wallestad, R. O. 1975. Life history and habitat requirements of sage grouse in central Montana. Montana Fish and Game Department Technical Bulletin. 66 p.
- Wallestad, R. O., and D. B. Pyrah. 1974. M Wallestad, R. O., and D. B. Pyrah. 1974. Movement and nesting of sage grouse hens in central Montana. *Journal of Wildlife Management* 38:630-633.
- Wallestad, R. O., and P. Schladweiler. 1974. Breeding season movements and habitat selection of male sage grouse. *Journal of Wildlife Management* 38:634-637.
- Wallestad, R. O., J. G. Peterson, and R. L. Eng. 1975. Foods of adult sage grouse in central Montana. *Journal of Wildlife Management* 39:628-630.
- Wambolt, C. L., A. J. Harp, B. L. Welch, N. Shaw, J. W. Connelly, K. P. Reese, C. E. Braun, D., A. Klebenow, E. D. McArthur, J. G. Thompson, L. A. Torell, and J. A. Tanaka. 2002. Conservation of greater sage-grouse on public lands in the western U.S.: implications of recovery and management policies. Policy Analysis Center for Western Public Lands, Policy Paper SG-02-02. Caldwell, Idaho. 41 p.
- West, N. E. 1999. Managing for biodiversity of rangelands. W. W. Collins and C. O. Qualset, editors. *Biodiversity in agroecosystems*. CRC, Boca Raton, Florida. 101-126.
- Whisenant, S. G. 1990. Changing fire frequencies of Idaho's Snake River plains: ecological and management implications. E. D. McArthur, E. M. Romney, S. D. Smith, and P. T. Tueller. (Comps.) Proc.- Symposium on cheatgrass invasion, shrub die off, and other aspects of shrub biology and management. April 5-7, 1989. Las Vegas, NV. Gen. Tech. Rep. INT-276. U.U. Dep. Of Agr., For. Service, Intermountain Res. Stat. Ogden, UT. 4-10.
- Wisdom, M. J., R. S. Holthausen, B. C. Wales, D. C. Lee, C. D. Hargis, V. A. Saab, W. J. Hann, T. D. Rich, M. M. Rowland, W. J. Murphy, and M. R. Eames. 2000. Source habitats for terrestrial vertebrates of focus in the interior Columbia Basin: Broad-scale trends and management implications. General Technical Report PNW-GTR-485. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, Portland, OR.
- Willis, M. J., G. P. Keister, Jr. 1984. Sage grouse ecology (research plan - 1984). Unpublished file report. Oregon Department of Fish and Wildlife, Wildlife Research, Portland.
- Wright, H.A., L.F. Neuenschwander, and C.M. Britton. 1979. The role and use of fire in sagebrush-grass and pinyon-juniper plant communities: A state-of-the-art review. General Technical Report INT-GTR-58. U.S. Department of Agriculture, Forest Service, Intermountain Research Station, Ogden, UT.
- Zablan, M. A. 1993. Evaluation of sage grouse banding program in North Park, Colorado. M.S. thesis, Colorado State University, Fort Collins, CO. 59 p.