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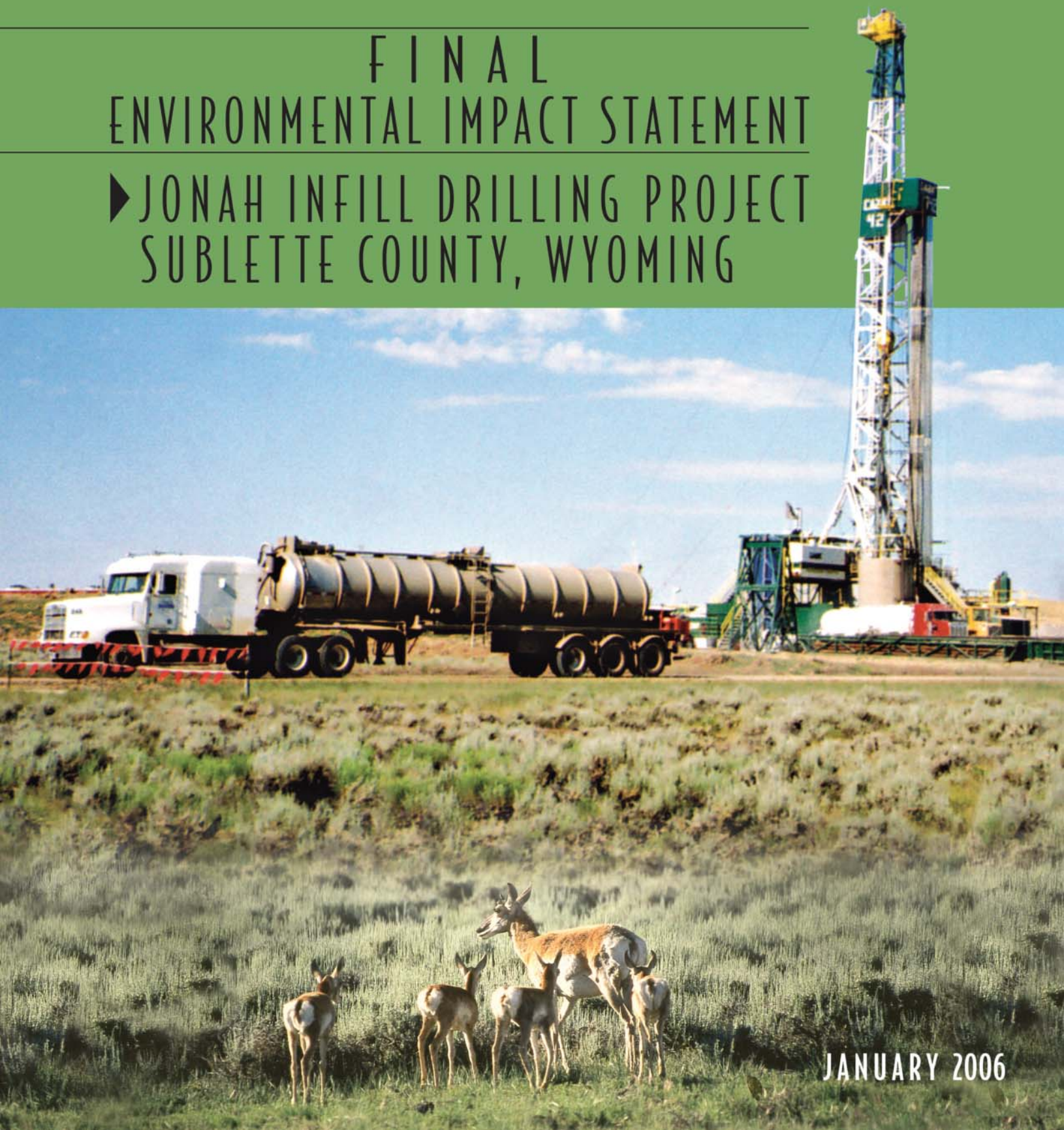


Bureau of Land Management
Pinedale and Rock Springs Field Offices

VOLUME 2 of 2
APPENDIX

FINAL ENVIRONMENTAL IMPACT STATEMENT

▶ JONAH INFILL DRILLING PROJECT SUBLETTE COUNTY, WYOMING



JANUARY 2006

BLM Document No.:
BLM/WY/PL-06/006+1310

**FINAL
ENVIRONMENTAL IMPACT STATEMENT
JONAH INFILL DRILLING PROJECT,
SUBLETTE COUNTY, WYOMING**

(Volume 2 of 2)

**Bureau of Land Management
Wyoming State Office
Cheyenne, Wyoming**

**Pinedale Field Office
Pinedale, Wyoming**

and

**Rock Springs Field Office
Rock Springs, Wyoming**

January 2006

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APPENDIX A — BLM STANDARD STIPULATION/ MITIGATION REQUIREMENTS

A.1 WYOMING BUREAU OF LAND MANAGEMENT (BLM) MITIGATION GUIDELINES FOR SURFACE-DISTURBING AND DISRUPTIVE ACTIVITIES

Introduction

These guidelines are primarily for the purpose of attaining statewide consistency in how requirements are determined for avoiding and mitigating environmental impacts and resource and land use conflicts. Consistency in this sense does not mean that identical requirements would be applied for all similar types of land use activities that may cause similar types of impacts. Nor does it mean that the requirements or guidelines for a single land use activity would be identical in all areas.

There are two ways the mitigation guidelines are used in the resource management plan (RMP) and environmental impact statement (EIS) process: (1) as part of the planning criteria in developing the RMP alternatives, and (2) in the analytical processes of both developing the alternatives and analyzing the impacts of the alternatives. In the first case, an assumption is made that any one or more of the mitigations will be appropriately included as conditions of relevant actions being proposed or considered in each alternative. In the second case, the mitigations are used (1) to develop a baseline for measuring and comparing impacts among the alternatives; (2) to identify other actions and alternatives that should be considered; and (3) to help determine whether more stringent or less stringent mitigations should be considered.

The EIS for the RMP does not decide or dictate the exact wording or inclusion of these guidelines. Rather, the guidelines are used in the RMP EIS process as a tool to help develop the RMP alternatives and to provide a baseline for comparative impact analysis in arriving at RMP decisions. These guidelines will be used in the same manner in analyzing activity plans and other site-specific proposals. These guidelines and their wording are matters of policy. As such, specific wording is subject to change primarily through administrative review, not through the RMP EIS process. Any further changes that may be made in the continuing refinement of these guidelines and any development of program-specific standard stipulations will be handled in another forum, including appropriate public involvement and input.

Purpose

The purposes of the “Wyoming BLM Mitigation Guidelines” are (1) to reserve, for the BLM, the right to modify the operations of all surface and other human presence disturbance activities as part of the statutory requirements for environmental protection, and (2) to inform a potential lessee, permittee, or operator of the requirements that must be met when using BLM-administered public lands. These guidelines have been written in a format that will allow for (1) their direct use as stipulations, and (2) the addition of specific or specialized mitigation following the

submission of a detailed plan of development or other project proposal, and an environmental analysis.

Those resource activities or programs currently without a standardized set of permit or operation stipulations can use the mitigation guidelines as stipulations or as conditions of approval, or as a baseline for developing specific stipulations for a given activity or program.

Because use of the mitigation guidelines was integrated into the RMP EIS process and will be integrated into the site-specific environmental analysis process, the application of stipulations or mitigation requirements derived through the guidelines will provide more consistency with planning decisions and plan implementation than has occurred in the past. Application of the mitigation guidelines to all surface and other human presence disturbance activities concerning BLM-administered public lands and resources will provide more uniformity in mitigation than has occurred in the past.

Mitigation Guidelines

1. Surface Disturbance Mitigation Guideline

Under 43 *Code of Federal Regulations* (CFR) 3101.1-2 and the terms of the lease (BLM Form 3100-11), the Authorized Officer may require reasonable measures to minimize adverse impacts to other resource values, land uses, and users not addressed in lease stipulations at the time operations are proposed. Such reasonable measures may include, but are not limited to, modification of siting or design of facilities, timing of operations, and specification of interim and final reclamation measures, which may require relocating proposed operations up to 200 meters, but not off the leasehold, and prohibiting surface disturbance activities for up to 60 days. Application of reasonable measures beyond 200 meters and longer than 60 days would require additional environmental analysis. The Jonah Infill Drilling Project Area (JIDPA) EIS suffices as the additional analysis for prohibiting surface disturbance for more than 60 days.

Land under lease within the JIDPA may include areas not specifically addressed by lease stipulations that may contain special values, may be needed for special purposes, or may require special attention to prevent damage to surface and/or other resources. Possible special areas are identified below. Any surface use or occupancy within such special areas will be strictly controlled or, if necessary, prohibited. Appropriate modifications to imposed restrictions will be made for the maintenance and operation of producing wells.

- a. Slopes in excess of 25 percent.
- b. Within important scenic areas (Class I and II Visual Resource Management Areas).
- c. Within 500 feet of surface water and/or riparian areas.
- d. Within 500 feet of Interstate highways and 200 feet of other existing rights-of-way (i.e., U.S. and State highways, roads, railroads, pipelines, power lines).
- e. Within either 0.25 mile or the visual horizon (whichever is closer) of historic trails.
- f. Within 0.25 mile of occupied dwellings.

- g. Construction with frozen material or during periods when the soil material is saturated or when watershed damage is likely to occur.

Guidance

The intent of the Surface Disturbance Mitigation Guideline is to inform interested parties (potential lessees, permittees, or operators) that when one or more of the seven (a through g) conditions exist, surface-disturbing activities will be prohibited unless or until a permittee or his designated representative and the surface management agency (SMA) arrive at an acceptable plan for mitigation of anticipated impacts. This negotiation will occur prior to development.

Specific criteria (e.g., 500 feet from water) have been established based upon the best information available. However, such items as geographical areas and seasons must be delineated at the field level.

Exception, waiver, or modification of requirements developed from this guideline must be based upon environmental analysis of proposals (e.g., activity plans, plans of development, plans of operation, applications for permit to drill) and, if necessary, must allow for other mitigation to be applied on a site-specific basis.

2. Wildlife Mitigation Guideline

- a. To protect important big game winter habitat, activities or surface use will not be allowed from November 15 to April 30 within certain areas encompassed by the authorization. The same criteria apply to defined big game birthing areas from May 1 to June 30.
 - Application of this limitation to operation and maintenance of a developed project must be based on environmental analysis of the operational or production aspects.
 - Exception, waiver, or modification of this limitation in any year may be approved in writing, including documented supporting analysis, by the Authorized Officer.
- b. To protect important raptor and/or greater sage-grouse and sharp-tailed grouse nesting habitat, activities or surface use will not be allowed from February 1 to July 31 within certain areas encompassed by the authorization. The same criteria apply to defined raptor and game bird winter concentration areas from November 15 to March 14.
 - Application of this limitation to operation and maintenance of a developed project must be based on environmental analysis of the operational or production aspects.
 - Exception, waiver, or modification of this limitation in any year may be approved in writing, including documented supporting analysis, by the Authorized Officer.
- c. No activities or surface use will be allowed on that portion of the authorization area identified within (legal description) for the purpose of protecting (e.g., greater sage-grouse/sharp-tailed grouse breeding grounds, and/or other species/activities) habitat.

- Exception, waiver, or modification of this limitation in any year may be approved in writing, including documented supporting analysis, by the Authorized Officer.
- d. Portions of the authorized use area legally described as (legal description), are known or suspected to be essential habitat for (name) which is a threatened or endangered species. Prior to conducting any onsite activities, the lessee/permittee will be required to conduct inventories or studies in accordance with BLM and U.S. Fish and Wildlife Service guidelines to verify the presence or absence of this species. In the event that (name) occurrence is identified, the lessee/permittee will be required to modify operational plans to include the protection requirements of this species and its habitat (e.g., seasonal use restrictions, occupancy limitations, facility design modifications).

Guidance

The Wildlife Mitigation Guideline is intended to provide two basic types of protection: seasonal restriction (2a and 2b) and prohibition of activities or surface use (2c). Item 2d is specific to situations involving threatened or endangered species. Legal descriptions will ultimately be required and should be measurable and legally definable. There are no minimum subdivision requirements at this time. The area delineated can and should be defined as necessary, based upon current biological data, prior to the time of processing an application and issuing the use authorization. The legal description must eventually become a part of the condition for approval of the permit, plan of development, and/or other use authorization.

The seasonal restriction section identifies three example groups of species and delineates three similar time frame restrictions. The big game species including elk, moose, deer, antelope, and bighorn sheep, all require protection of crucial winter range between November 15 and April 30. Elk and bighorn sheep also require protection from disturbance from May 1 to June 30, when they typically occupy distinct calving and lambing areas. Raptors include eagles, accipiters, falcons (peregrine, prairie, and merlin), buteos (ferruginous and Swainson's hawks), osprey, and burrowing owls. The raptors and greater sage-grouse and sharp-tailed grouse require nesting protection between February 1 and July 31. The same birds often require protection from disturbance from November 15 through April 30 while they occupy winter concentration areas.

Item 2c, the prohibition of activity or surface use, is intended for protection of specific wildlife habitat areas or values within the use area that cannot be protected by using seasonal restrictions. These areas or values must be factors that limit life-cycle activities (e.g., greater sage-grouse strutting grounds, known threatened and endangered species habitat).

Exception, waiver, or modification of requirements developed from this guideline must be based upon environmental analysis of proposals (e.g., activity plans, plans of development, plans of operation, applications for permit to drill) and, if necessary, must allow for other mitigation to be applied on a site-specific basis.

3. Cultural Resource Mitigation Guideline

When a proposed discretionary land use has potential for affecting the characteristics which qualify a cultural property for the National Register of Historic Places (National Register), mitigation will be considered. In accordance with Section 106 of the National Historic Preservation Act, procedures specified in 36 CFR 800 will be used in consultation with the

Wyoming State Historic Preservation Officer and the Advisory Council on Historic Preservation in arriving at determinations regarding the need and type of mitigation to be required.

Guidance

The preferred strategy for treating potential adverse effects on cultural properties is “avoidance.” If avoidance involves project relocation, the new project area may also require cultural resource inventory. If avoidance is imprudent or unfeasible, appropriate mitigation may include excavation (data recovery), stabilization, monitoring, protection barriers and signs, or other physical and administrative measures.

Reports documenting results of cultural resource inventory, evaluation, and the establishment of mitigation alternatives (if necessary) shall be written according to standards contained in BLM Manuals, the cultural resource permit stipulations, and in other policy issued by the BLM. These reports must provide sufficient information for Section 106 consultation. Reports shall be reviewed for adequacy by the appropriate BLM cultural resource specialist. If cultural properties on, or eligible for, the National Register are located within these areas of potential impact and cannot be avoided, the Authorized Officer shall begin the Section 106 consultation process in accordance with the procedures contained in 36 CFR 800.

Mitigation measures shall be implemented according to the mitigation plan approved by the BLM Authorized Officer. Such plans are usually prepared by the land use applicant according to BLM specifications. Mitigation plans will be reviewed as part of Section 106 consultation for National Register eligible or listed properties. The extent and nature of recommended mitigation shall be commensurate with the significance of the cultural resource involved and the anticipated extent of damage. Reasonable costs for mitigation will be borne by the land use applicant. Mitigation must be cost effective and realistic. It must consider project requirements and limitations, input from concerned parties, and be BLM approved or BLM formulated.

Mitigation of natural history sites will be treated on a case-by-case basis. Factors such as site significance, economics, safety, and project urgency must be taken into account when making a decision to mitigate. Authority to protect (through mitigation) such values is provided for in Federal Land Policy and Management Act (FLPMA), Section 102(a)(8). When avoidance is not possible, appropriate mitigation may include excavation (data recovery), stabilization, monitoring, protection barriers and signs, or other physical and administrative protection measures.

4. Special Resource Mitigation Guideline

To protect (resource value), activities or surface use will not be allowed (i.e., within a specific distance of the resource value or between date to date) in (legal description).

Application of this limitation to operation and maintenance of a developed project must be based on environmental analysis of the operational or production aspects.

Exception, waiver, or modification of this limitation in any year may be approved in writing, including documented supporting analysis, by the Authorized Officer.

Example Resource Categories (Select or identify category and specific resource value):

- Recreation areas.
- Special natural history or paleontological features.
- Special management areas.
- Sections of major rivers.
- Prior existing rights-of-way.
- Occupied dwellings.
- Other (specify).

Guidance

The Special Resource Mitigation Guideline is intended for use only in site-specific situations where one of the first three general mitigation guidelines will not adequately address the concern. The resource value, location, and specific restrictions must be clearly identified. A detailed plan addressing specific mitigation and special restrictions will be required prior to disturbance or development and will become a condition for approval of the permit, plan of development, or other use authorization.

Exception, waiver, or modification of requirements developed from this guideline must be based upon environmental analysis of proposals (e.g., activity plans, plans of development, plans of operation, applications for permit to drill) and, if necessary, must allow for other mitigation to be applied on a site-specific basis.

5. No Surface Occupancy Mitigation Guideline

No Surface Occupancy will be allowed on the following described lands (legal description) because of (resource value).

Example Resource Categories (Select or identify category and specific resource value):

- Recreation areas (e.g., campgrounds, historic trails, national monuments).
- Major reservoirs/dams.
- Special management area (e.g., known threatened or endangered species habitat, areas suitable for consideration for wild and scenic rivers designation).
- Other (specify).

Guidance

The No Surface Occupancy (NSO) Mitigation Guideline is intended for use only when other mitigation is determined insufficient to adequately protect the public interest and is the only alternative to “no development” or “no leasing.” The legal description and resource value of concern must be identified and be tied to an NSO land use planning decision.

Waiver of, or exception(s) to, the NSO requirement will be subject to the same test used to initially justify its imposition. If, upon evaluation of a site-specific proposal, it is found that less restrictive mitigation would adequately protect the public interest or value of concern, then a waiver or exception to the NSO requirement is possible. The record must show that because conditions or uses have changed, less restrictive requirements will protect the public interest. An environmental analysis must be conducted and documented (e.g., environmental assessment, environmental impact statement, etc., as necessary) in order to provide the basis for a waiver or exception to an NSO planning decision. Modification of the NSO requirement will pertain only to refinement or correction of the location(s) to which it applied. If the waiver, exception, or modification is found to be consistent with the intent of the planning decision, it may be granted. If found inconsistent with the intent of the planning decision, a plan amendment would be required before the waiver, exception, or modification could be granted.

When considering the “no development” or “no leasing” option, a rigorous test must be met and fully documented in the record. This test must be based upon stringent standards described in the land use planning document. Since rejection of all development rights is more severe than the most restrictive mitigation requirement, the record must show that consideration was given to development subject to reasonable mitigation, including “no surface occupancy.” The record must also show that other mitigation was determined to be insufficient to adequately protect the public interest. A “no development” or “no leasing” decision should not be made solely because it appears that conventional methods of development would be unfeasible, especially where an NSO restriction may be acceptable to a potential permittee. In such cases, the potential permittee should have the opportunity to decide whether or not to go ahead with the proposal (or accept the use authorization), recognizing that an NSO restriction is involved.

A.2 STANDARDS FOR HEALTHY RANGELANDS FOR THE PUBLIC LANDS ADMINISTERED BY THE BUREAU OF LAND MANAGEMENT IN THE STATE OF WYOMING

Introduction

According to the Department of the Interior's final rule for grazing administration, effective August 21, 1995, the Wyoming Bureau of Land Management (BLM) State Director is responsible for the development of standards for healthy rangelands on 18 million acres of Wyoming's public rangelands. The development and application of these standards are to achieve the four fundamentals of rangeland health outlined in the grazing regulations (43 CFR 4180.1). Those four fundamentals are: (1) watersheds are functioning properly; (2) water, nutrients, and energy are cycling properly; (3) water quality meets State standards; and (4) habitat for special status species is protected.

Standards address the health, productivity, and sustainability of the BLM administered public rangelands and represent the minimum acceptable conditions for the public rangelands. The standards apply to all resource uses on public lands. Their application will be determined as use-specific guidelines are developed. Standards are synonymous with goals and are observed on a landscape scale. They describe healthy rangelands rather than important rangeland by-products. The achievement of a standard is determined by measuring appropriate indicators. An indicator is a component of a system whose characteristics (e.g., presence, absence, quantity, and distribution) can be measured based on sound scientific principles.

Quantifiable resource objectives and specific management practices to achieve the standards will be developed at the BLM Field Office level and will consider all reasonable and practical options available to achieve desired results on a watershed or grazing allotment scale. The objectives shall be reflected in site-specific activity or implementation plans as well as in livestock grazing permits/leases for the public lands. Interdisciplinary activity or implementation plans will be used to maintain or achieve the Wyoming standards for healthy rangelands. These plans may be developed formally or informally through mechanisms available and suited to local needs (such as Coordinated Resource Management [CRM] efforts).

The development and implementation of standards will enable on-the-ground management of the public rangelands to maintain a clear and responsible focus on both the health of the land and its dependent natural and human communities. This development and implementation will ensure that any mechanisms currently being employed or that may be developed in the future will maintain a consistent focus on these essential concerns.

These standards are compatible with BLM's three-tiered land use planning process. The first tier includes the laws, regulations, and policies governing BLM's administration and management of the public lands and their uses. The previously mentioned fundamentals of rangeland health specified in 43 CFR 4180.1, the requirement for BLM to develop these state (or regional) standards, and the standards themselves, are part of this first tier. Also part of this first tier are the specific requirements of various federal laws and the objectives of 43 CFR 4100.2 that require BLM to consider the social and economic well-being of the local communities in its management process.

These standards will provide for statewide consistency and guidance in the preparation, amendment, and maintenance of BLM land use plans, which represent the second tier of the

planning process. The BLM land use plans provide general allocation decisions concerning the kinds of resource and land uses that can occur on the BLM administered public lands, where they can occur, and the types of conditional requirements under which they can occur. In general, the standards will be the basis for development of planning area-specific management objectives concerning rangeland health and productivity.

The third tier of the BLM planning process, activity or implementation planning, is directed by the applicable land use plan and, therefore, by the standards. The standards, as BLM statewide policy, will also directly guide development of the site-specific objectives and the methods and practices used to implement the land use plan decisions.

Activity or implementation plans contain objectives which describe the site-specific conditions desired. Grazing permits/leases for the public lands contain terms and conditions which describe specific actions required to attain or maintain the desired conditions. Through monitoring and evaluation, the BLM, grazing permittees, and other interested parties determine if progress is being made to achieve activity plan objectives.

Wyoming rangelands support a variety of uses which are of significant economic importance to the state and its communities. These uses include oil and gas production, mining, recreation and tourism, fishing, hunting, wildlife viewing, and livestock grazing. Rangelands also provide amenities which contribute to the quality of life in Wyoming such as open spaces, solitude, and opportunities for personal renewal. Wyoming's rangelands should be managed with consideration of the state's historical, cultural, and social development and in a manner which contributes to a diverse, balanced, competitive, and resilient economy in order to provide opportunity for economic development. Healthy rangelands can best sustain these uses.

To varying degrees, BLM management of the public lands and resources plays a role in the social and economic well-being of Wyoming communities. The National Environmental Policy Act (part of the above-mentioned first planning tier) and various other laws and regulations mandate the BLM to analyze the socioeconomic impacts of actions occurring on public rangelands. These analyses occur during the environmental analysis process of land use planning (second planning tier), where resource allocations are made, and during the environmental analysis process of activity or implementation planning (third planning tier). In many situations, factors that affect the social and economic well-being of local communities extend far beyond the scope of BLM management or individual public land users' responsibilities. In addition, since standards relate primarily to physical and biological features of the landscape, it is very difficult to provide measurable socioeconomic indicators that relate to the health of rangelands. It is important that standards be realistic and within the control of the land manager and users to achieve.

Implementation of the Wyoming standards will generally be done in the following manner. Grazing allotments or groups of allotments in a watershed will be reviewed based on the BLM's current allotment categorization and prioritization process. Allotments with existing management plans and high-priority allotments will be reviewed first. Lower priority allotments will then be reviewed as time allows. The permittees and interested publics will be notified when allotments are scheduled for review and encouraged to participate in the review. The review will first determine if an allotment meets each of the six standards. If it does, no further action will be necessary. If any of the standards are not being met, rationale explaining the contributing factors will be prepared. If livestock grazing practices are found to be among the contributing factors, corrective actions will be developed and implemented. If a lack of data prohibits the reviewers from determining if a standard is being met, a strategy will be developed to acquire the data in a timely manner.

Standard 1

Within the potential of the ecological site (soil type, landform, climate, and geology), soils are stable and allow for water infiltration to provide for optimal plant growth and minimal surface runoff.

THIS MEANS THAT:

The hydrologic cycle will be supported by providing for water capture, storage, and sustained release. Adequate energy flow and nutrient cycling through the system will be achieved as optimal plant growth occurs. Plant communities are highly varied within Wyoming.

INDICATORS MAY INCLUDE, BUT ARE NOT LIMITED TO:

- Water infiltration rates;
- Soil compaction;
- Erosion (rills, gullies, pedestals, capping);
- Soil microorganisms;
- Vegetative cover (gully bottoms and slopes); and
- Bare ground and litter.

Standard 2

Riparian and wetland vegetation has structural, age, and species diversity characteristic of the stage of channel succession and is resilient and capable of recovering from natural and human disturbance in order to provide forage and cover, capture sediment, dissipate energy, and provide for groundwater recharge.

THIS MEANS THAT:

Wyoming has highly varied riparian and wetland systems on public lands. These systems vary from large rivers to small streams and from springs to large wet meadows. These systems are in various stages of natural cycles and may also reflect other disturbance that is either localized or widespread throughout the watershed. Riparian vegetation captures sediments and associated materials, thus enhancing the nutrient cycle by capturing and utilizing nutrients that would otherwise move through a system unused.

INDICATORS MAY INCLUDE, BUT ARE NOT LIMITED TO:

- Erosion and deposition rate;
- Channel morphology and flood plain function;
- Channel succession and erosion cycle;
- Vegetative cover;

- Plant composition and diversity (species, age class, structure, successional stages, desired plant community, etc.);
- Bank stability;
- Woody debris and instream cover; and
- Bare ground and litter.

The above indicators are applied as appropriate to the potential of the ecological site.

Standard 3

Upland vegetation on each ecological site consists of plant communities appropriate to the site which are resilient, diverse, and able to recover from natural and human disturbance.

THIS MEANS THAT:

In order to maintain desirable conditions and/or recover from disturbance within acceptable timeframes, plant communities must have the components present to support the nutrient cycle and adequate energy flow. Plants depend on nutrients in the soil and energy derived from sunlight. Nutrients stored in the soil are used over and over by plants, animals, and microorganisms. The amount of nutrients available and the speed with which they cycle among plants, animals, and the soil is a fundamental component of rangeland health. The amount, timing, and distribution of energy captured through photosynthesis are fundamental to the function of rangeland ecosystems.

INDICATORS MAY INCLUDE, BUT ARE NOT LIMITED TO:

- Vegetative cover;
- Plant composition and diversity (species, age class, structure, successional stages, desired plant community, etc.);
- Bare ground and litter;
- Erosion (rills, gullies, pedestals, capping); and
- Water infiltration rates.

The above indicators are applied as appropriate to the potential of the ecological site.

Standard 4

Rangelands are capable of sustaining viable populations and a diversity of native plant and animal species appropriate to the habitat. Habitats that support or could support threatened species, endangered species, species of special concern, or sensitive species will be maintained or enhanced.

THIS MEANS THAT:

The management of Wyoming rangelands will achieve or maintain adequate habitat conditions that support diverse plant and animal species. These may include listed threatened or endangered species (U.S. Fish and Wildlife Service-designated), species of special concern (Wyoming Game and Fish Department-designated), and other sensitive species (BLM-designated). The intent of this standard is to allow the listed species to recover and be delisted, and to avoid or prevent additional species becoming listed.

INDICATORS MAY INCLUDE, BUT ARE NOT LIMITED TO:

- Noxious weeds;
- Species diversity;
- Age class distribution;
- All indicators associated with the upland and riparian standards;
- Population trends; and
- Habitat fragmentation.

The above indicators are applied as appropriate to the potential of the ecological site.

Standard 5**Water quality meets State standards.****THIS MEANS THAT:**

The State of Wyoming is authorized to administer the Clean Water Act. BLM management actions or use authorizations will comply with all Federal and State water quality laws, rules, and regulations to address water quality issues that originate on public lands. Provisions for the establishment of water quality standards are included in the Clean Water Act, as amended, and the Wyoming Environmental Quality Act, as amended. Regulations are found in Part 40 of the Code of Federal Regulations and in *Wyoming's Water Quality Rules and Regulations*. The latter regulations contain Quality Standards for Wyoming Surface Waters.

Natural processes and human actions influence the chemical, physical, and biological characteristics of water. Water quality varies from place to place with the seasons, the climate, and the kind of substrate through which water moves. Therefore, the assessment of water quality takes these factors into account.

INDICATORS MAY INCLUDE, BUT ARE NOT LIMITED TO:

- Chemical characteristics (for example, pH, conductivity, dissolved oxygen);
- Physical characteristics (for example, sediment, temperature, color); and
- Biological characteristics (for example, macro- and micro-invertebrates, fecal coliform, and plant and animal species).

Standard 6

Air quality meets State standards.

THIS MEANS THAT:

The State of Wyoming is authorized to administer the Clean Air Act. BLM management actions or use authorizations will comply with all Federal and State air quality laws, rules, regulations, and standards. Provisions for the establishment of air quality standards are included in the Clean Air Act, as amended, and the Wyoming Environmental Quality Act, as amended. Regulations are found in Part 40 of the Code of Federal Regulations and in *Wyoming Air Quality Standards and Regulations*.

INDICATORS MAY INCLUDE, BUT ARE NOT LIMITED TO:

- Particulate matter;
- Sulfur dioxide;
- Photochemical oxidants (ozone);
- Volatile organic compounds (hydrocarbons);
- Nitrogen oxides;
- Carbon monoxide;
- Odors; and
- Visibility.

Definitions

Activity Plans: Allotment Management Plans (AMPs), Habitat Management Plans (HMPs), Watershed Management Plans (WMPs), Wild Horse Management Plans (WHMPs), and other plans developed at the local level to address specific concerns and accomplish specific objectives.

Coordinated Resource Management (CRM): A group of people working together to develop common resource goals and resolve natural resource concerns. CRM is a people process that strives for win-win situations through consensus-based decision making.

Desired Plant Community: A plant community which produces the kind, proportion, and amount of vegetation necessary for meeting or exceeding the land use plan/activity plan objectives established for an ecological site(s). The desired plant community must be consistent with the site's capability to produce the desired vegetation through management, land treatment, or a combination of the two.

Ecological Site: An area of land with specific physical characteristics that differs from other areas both in its ability to produce distinctive kinds and amounts of vegetation and in its response to management.

Erosion: (v.) Detachment and movement of soil or rock fragments by water, wind, ice, or gravity. (n.) The land surface worn away by running water, wind, ice, or other geological agents, including such processes as gravitational creep.

Indicator: An indicator is a component of a system whose characteristics (for example, presence, absence, quantity, and distribution) can be observed, measured, or monitored based on sound scientific principles. An indicator can be evaluated at a site- or species-specific level. Monitoring of an indicator must be able to show change within timeframes acceptable to management and be capable of showing how the health of the ecosystem is changing in response to specific management actions. Selection of the appropriate indicators to be observed, measured, or monitored in a particular allotment is a critical aspect of early communication among the interests involved on-the-ground. The most useful indicators are those for which change or trend can be easily quantified and for which agreement as to the significance of the indicator is broad based.

Litter: The uppermost layer of organic debris on the soil surface, essentially the freshly fallen or slightly decomposed vegetal material.

Management Actions: Management actions are the specific actions prescribed by the BLM to achieve resource objectives, land use allocations, or other program or multiple use goals.

Objective: An objective is a site-specific statement of a desired rangeland condition. It may contain either or both qualitative elements and quantitative elements. Objectives frequently speak to change. They are the focus of monitoring and evaluation activities at the local level. Monitoring of the indicators would show negative changes or positive changes. Objectives should focus on indicators of greatest interest for the area in question.

Rangeland: Land on which the native vegetation (climax or natural potential) is predominantly grasses, grass-like plants, forbs, or shrubs. This includes lands revegetated naturally or artificially when routine management of that vegetation is accomplished mainly through manipulation of grazing. Rangelands include natural grasslands, savannas, shrublands, most deserts, tundra, alpine communities, coastal marshes, and wet meadows.

Rangeland Health: The degree to which the integrity of the soil and ecological processes of rangeland ecosystems are sustained.

Riparian: An area of land directly influenced by permanent water. It has visible vegetation or physical characteristics reflective of permanent water influence. Lakeshores and stream banks are typical riparian areas. Excluded are such sites as ephemeral streams or washes that do not have vegetation dependent on free water in the soil.

Standards: Standards are synonymous with goals and are observed on a landscape scale. Standards apply to rangeland health and not to the important by-products of healthy rangelands. Standards relate to the current capability or realistic potential of a specific site to produce these by-products, not to the presence or absence of the products themselves. It is the sustainability of the processes, or rangeland health, that produces these by-products.

Terms and Conditions: Terms and conditions are very specific land use requirements that are made a part of the land use authorization in order to assure maintenance or attainment of the standard. Terms and conditions may incorporate or reference the appropriate portions of activity plans (for example, Allotment Management Plans). In other words, where an activity plan exists

that contains objectives focused on meeting the standards, compliance with the plan may be the only term and condition necessary in that allotment.

Upland: Those portions of the landscape which do not receive additional moisture for plant growth from run-off, stream flow, etc. Typically these are hills, ridge tops, valley slopes, and rolling plains.

A.3 SUMMARY TABLE BY SPECIES OF STANDARD STIPULATIONS FOR ALL SURFACE-DISTURBING ACTIVITIES THAT APPLY IN THE JONAH INFILL DRILLING PROJECT AREA

Affected Areas/Species	Restriction	Restricted Dates	Restricted Area
Greater Sage-grouse Leks	No surface occupancy	Year-round	Within 0.25 mile of occupied lek boundary
Greater Sage-grouse Leks	No surface-disturbing activity	March 1–May 15	Within 0.25 mile of occupied lek boundary
Greater Sage-grouse Nesting Habitat	No surface-disturbing activity	March 15–July 15	Up to 2-mile radius of active lek OR within suitable nesting habitat
Winter Greater Sage-grouse Habitat	No surface-disturbing activity	Nov. 15–March 14	Within identified winter habitat
Greater Sage-grouse Leks/Strutting Grounds	Surface occupancy or use restricted or prohibited	March 1–May 15 between 8pm and 8am	Within 0.25 mile of lek/strutting ground boundary
Mountain Plover	No surface-disturbing activity (including reclamation activities) until two surveys (done no earlier than 4/20 and 5/4) show no nesting activity; activity must begin within 72 hours after surveys completed	April 10–July 10	Within potential mountain plover habitat
Bald Eagle Nest	No surface occupancy	Year-round	Within 0.5 mile of active nest
Bald Eagle Nest	No surface-disturbing activity	February 1–August 15	Within 1-mile radius
Bald Eagle Winter Use Areas	No surface-disturbing activity; disruptive activities restricted	November 15–April 30	Within 1-mile radius
Ferruginous Hawk Nest	No surface occupancy	Year-round	Within 1,000 feet of active nest
Ferruginous Hawk Nest	No surface-disturbing activity	February 1–July 31	Within 1.0-mile radius
Other Raptors	No surface occupancy	Year-round	Within 825 feet of active nest
Other Raptors	No surface-disturbing activity	February 1–July 31	Within 0.5-mile radius
National Register of Historic Places Cultural Resource Sites	No surface occupancy	Year-round	Within site boundaries
Riparian Areas	No surface occupancy	Year-round	Within 500 feet
HUD-designated Zone A (100-yr flood hazard area) on intermittent watercourses	Surface occupancy or use restricted or prohibited	Year-round	Within Zone A boundaries

A.4 INSTRUCTION MEMORANDUM NO. WY-2004-057, STATEMENT OF POLICY REGARDING SAGE-GROUSE DEFINITIONS AND USE OF PROTECTIVE STIPULATIONS AND CONDITIONS OF APPROVAL



United States Department of the Interior

BUREAU OF LAND MANAGEMENT

Wyoming State Office
P.O. Box 1828
Cheyenne, Wyoming 82003-1828

In Reply Refer To:
6500 (930) P

August 16, 2004

Instruction Memorandum No. WY-2004-057
Expires: 9/30/05

To: Field Managers and Deputy State Directors

From: State Director, Wyoming

Subject: Statement of Policy Regarding Sage-Grouse Management Definitions, and Use of Protective Stipulations, and Conditions of Approval (COAs)

The management of the greater sage-grouse (sage-grouse) and its habitat on western rangelands has become a matter of high public interest in recent years. Since much of the sage-grouse's habitat occurs on Public Lands managed by the Bureau of Land Management (BLM), this species' welfare and management is also of significant concern to our agency. The purpose of this Instruction Memorandum is to provide general guidance and consistency for BLM (Wyoming) Field Offices for the conservation of sage-grouse and their habitats on Public Lands administered by the BLM in Wyoming.

BASIC SAGE-GROUSE HABITAT COMPONENTS AND TERMINOLOGY

To effectively manage for sage-grouse and their habitat it is necessary to have a basic, common, understanding of general sage-grouse biology and their habitat needs.

The following seasonal use periods and habitat components have been identified as important to sage-grouse and contribute to their productivity and conservation. The policy described herein relies heavily on these sage-grouse habitat components and definitions. Breeding and wintering habitats have been identified as limiting factors in sage-grouse populations across their range.

BREEDING HABITATS – Breeding habitats are composed of leks, nesting and early broad rearing habitats.

Leks - A lek (also known as a strutting, or breeding ground) is a traditional courtship display area attended by male sage-grouse in, or adjacent to, sagebrush dominated habitat, and is the location where breeding of females occurs. The lek is typically an open area surrounded by potential nesting habitat. The common feature is that leks have less shrub and herbaceous cover than surrounding habitats. The sagebrush cover that

surrounds the lek provides important hiding cover from predators for both the male sage-grouse and particularly the hen while attending the lek. Sagebrush cover immediately adjacent to the lek may, or may not, meet the following definition of productive, high quality, nesting habitat. The currently accepted Wyoming lek definitions can be found in Attachment 1.

Nesting/Early Brood-Rearing Habitat - Nesting habitat for sage-grouse in Wyoming is generally described as sagebrush that has canopy cover between 15 and 30 percent and heights between 11 and 32 inches. Herbaceous plant height (6 inches or greater) and canopy cover (>15 percent) provide important cover and food for sage-grouse using these habitats. Early brood-rearing habitat generally has 10 to 25 percent sagebrush canopy cover and has slightly higher canopy cover of grasses and forbs than nesting habitat. Early brood-rearing habitat is generally used by sage-grouse hens with chicks when chicks range in age from 1 to 21 days of age.

WINTER HABITATS – During winter, sage-grouse feed almost exclusively on sagebrush leaves and buds. Suitable winter habitat requires sagebrush above snow. Sage-grouse tend to select wintering sites where sagebrush is 10-14 inches above the snow. Sagebrush canopy cover utilized by sage-grouse above the snow may range from 10 to 30 percent. Foraging areas tend to be on flat to generally southwest facing slopes and windswept ridges.

BACKGROUND

Sage-grouse were once abundant and widespread throughout western North America and are highly dependant upon sagebrush habitats. These populations have decreased significantly range wide, including in Wyoming, during the past 40 years. Land use or habitat management decisions made by BLM directly influence the future of sage-grouse.

Sage-grouse are considered a high priority management species for the Wyoming Game and Fish Department (WGFD) in Wyoming. They are also listed as a sensitive species by BLM (Wyoming). The intent of the BLM (Wyoming) sensitive species designation is to ensure that actions on BLM administered lands consider the welfare of these species and do not contribute to the need to list any sensitive species under the provisions of the Endangered Species Act. This includes avoiding or minimizing adverse impacts and maximizing potential benefits to the species. During the past 5 years, seven petitions have been submitted to the U.S. Fish and Wildlife Service to list sage-grouse as threatened or endangered.

In 1976, the Western Association of Fish and Wildlife Agencies (WAFWA) directed the Sage-Grouse Working Group of this association to establish guidelines for vegetation manipulation of sage-grouse habitat throughout the sage-grouse's range. One of the guidelines promulgated by the group identified the need to protect nesting habitat within 2 miles (3.2 km) of a lek. This

assumption was based on studies that indicated between 59 and 87 percent of sage-grouse nests were located within 2 miles (3.2 km) of a lek. These studies were conducted in Montana and Idaho. These guidelines also identified that some sage-grouse nested further than 2 miles from the lek.

Following the development of the 1977 WAFWA Sage Grouse Working Group sage-grouse guidelines, BLM (Wyoming) originally identified a 2-mile radius circle as a flagging device to identify potential sage-grouse nesting habitat that may be impacted by surface disturbance and disruptive activities occurring on public land. This flagging device resulted in the placement of stipulations on oil and gas leases or became part of the COAs of a permit, plan of development, and/or other use authorization that occurred on public lands administered by the BLM in Wyoming. These same use restrictions eventually were incorporated into Land Use Plans (LUPs). This procedure was standardized and directed in BLM (Wyoming) with the adoption of the "*Wyoming BLM Mitigation Guidelines for Surface-Disturbing and Disruptive Activities*" through the development and maintenance of LUPs since 1990. The BLM (Wyoming) mitigation guidelines also allow for other mitigation to be applied for sage-grouse and other species following a site-specific NEPA analysis, if found appropriate.

BLM Field Offices have normally utilized No Surface Occupancy (NSO), Controlled Surface Use (CSU), and Timing Limitation (TLS) lease stipulations, or COAs on specific actions to protect sage-grouse and their habitat within ¼ mile of leks for above ground facilities such as power lines, oil and gas wells, storage tanks, fences, etc. Some disturbances such as low-traffic roads, pipelines, seismic activity, etc., may have been granted exceptions, depending upon site-specific characteristics and type of activity.

Since its inception, many BLM Field Offices in Wyoming have applied conditions of approval to the permit, plan of development, and/or other use authorization for sage-grouse nesting habitat only within the 2-mile radius circle of a lek, regardless of the suitability of nesting habitat both within and outside of that circle. This has usually occurred due to lack of adequate knowledge of sage-grouse nesting habitat requirements, or simply lack of time or manpower to gather onsite information.

Some BLM Field Offices have utilized CSU and TLS lease stipulations or COAs for the protection of winter habitats.

In 1998, the Wyoming Audubon and another individual appealed to the Interior Board of Land Appeals (IBLA) contesting the BLM's use of the ¼ mile NSO or no surface disturbance restrictions for protection of sage-grouse leks. The administrative law judge ruled affirming the BLM's use of the ¼ mile restrictions in the absence of any better compelling science which would warrant other protective measures.

Studies since 1977 indicate that many populations of sage-grouse contained birds nesting much further than 2 miles from the lek of breeding. Studies conducted in Wyoming since 1994 indicate 52 percent of sage-grouse hens nest within 2 miles (3.2 km) of the lek, 67 percent nest

within 3 miles (4.8 km), and 78 percent of nests are located within 4 miles (6.4 km) of the lek. Nests are placed independent of lek location, and nest location is based on availability of suitable nesting habitat.

Based on this more recent information, the sage-grouse population and habitat management guidelines were reexamined and revised by the WAFWA in the late 1990s. The newly revised *Guidelines for Management of Sage-grouse Populations and Habitats* (Connelly et al. 2000) also identify the need to determine if sage-grouse populations are migratory or non-migratory in nature. These guidelines also recommend the need to determine if suitable nesting habitat is generally distributed uniformly or irregularly around the lek. As habitats become distributed less uniformly around the lek, sage-grouse hens travel greater distances from the lek to locate nests within suitable nesting habitat. In the event of migratory populations, sage-grouse hens may nest up to 12 to 15 miles (18 to 25 km) from the lek.

STATEMENT OF POLICY

Based on the last 4 decades of research, management experience, and legal outcomes and trends, it has become necessary for BLM (Wyoming) to establish some consistent policy and management direction for sage-grouse management on BLM administered Public Lands in the state. For this reason, the following policy is now presented:

- 1.) Identification and refined mapping of sagebrush ecosystems and sage-grouse seasonal habitats are a high priority for Field Offices to complete. Coordination with the WGFD is critical in the identification of seasonal habitats.
- 2.) Coordination with WGFD biologists shall be utilized to determine if sage-grouse populations are migratory or non-migratory.
- 3.) The definitions found in Attachment 1 are adopted by BLM Wyoming to standardize terminology associated with sage-grouse leks in Wyoming. These definitions have also been adopted by the WGFD and should result in improved consistency and communication between the two agencies.
- 4.) Field Offices shall incorporate recommended management practices from the Wyoming Greater Sage-Grouse Conservation Plan, as appropriate into their LUPs. LUPs should also address the outcome of future local sage-grouse working group plans that are expected to commence this year, to the extent possible. LUPs will develop objectives for maintenance and improvement of sage-grouse habitats and habitats for other BLM (Wyoming) sensitive species. These objectives and associated management practices will be designed to limit loss, degradation, and fragmentation of habitats. Monitoring of sage-grouse habitats and effectiveness of habitat conservation measures will also be addressed in LUPs.
- 5.) Field offices will continue to utilize the “NSO”, “CSU”, and “TLS” lease stipulations, where appropriate, as identified in the *Wyoming BLM Mitigation Guidelines for Surface-Disturbing and Disruptive Activities*.

6.) The following distances, and timeframes will hereafter be utilized in all new land use and activity plan development (including revisions), and other resource management implementation actions (authorizations and projects) that involve activities that may impact sage-grouse or their habitats on BLM administered Public Lands in Wyoming. These distances and timeframes are based on current information, and may be subject to change in the future based upon new information.

Sage-grouse leks: 1) Avoid surface disturbance or occupancy within ¼ mile of the perimeter of occupied sage-grouse leks. 2) Avoid human activity between 8 p.m. and 8 a.m. from March 1 – May 15 within ¼ mile of the perimeter of occupied sage-grouse leks.

Sage-grouse nesting/early brood-rearing habitat: Avoid surface disturbing and disruptive activities in suitable sage-grouse nesting and early brood-rearing habitat within two miles of an occupied lek, or in identified sage-grouse nesting and early brood-rearing habitat outside the 2-mile buffer from March 15 – July 15.

Sage-grouse winter habitat: Avoid disturbance and disruptive activities in sage-grouse winter habitat from November 15 – March 14.

Disruptive activities will include, but not be limited to, the following examples: resource surveys that require that personnel be in nesting habitats for longer than 1 hour (e.g., excavation of cultural sites, land surveys, project construction, geophysical activities, permitted or organized recreational activities, prescribed fires, noise, etc.). Field Offices should determine if these guidelines apply to future maintenance and operation of facilities and clearly address maintenance and operation in their LUPs.

Exceptions to control surface use and timing restrictions will continue to be considered on a case-by-case basis. Exception criteria will be established and included in new LUPs and revisions.

7.) BLM (Wyoming) offices will continue to utilize the 2-mile radius circle as a flagging device for applying stipulations or COAs to all disturbance and disruptive activities, where appropriate. Not all sagebrush habitats within this 2-mile radius circle may be suitable as nesting habitat or other seasonal habitats for sage-grouse. Biologists and resource specialists should make management recommendations on sage-grouse habitat characteristics both inside and outside the 2-mile radius circle that involves these seasonal habitats. Upon identification and mapping of nesting habitat, Field Offices will apply appropriate stipulations or conditions of approval for these habitats beyond the 2-mile radius. Site specific evaluations will be conducted. Field Offices will strive to delineate these seasonal habitats regardless of distances from leks. Upon completion of site specific evaluations of projects affecting nesting and early brood-rearing habitats beyond 2 miles from leks, biologists and other resource specialists shall identify and recommend protective and conservation measures for sage-grouse populations and their habitat. These protective and conservation measures may include timing restrictions and reduction, relocation, or elimination of disturbances. These types of protective measures will also be considered for winter habitats.

8.) Biologists and other resource specialists will also work with the project proponents (including those within BLM) to relocate site-specific activities that may be detrimental to leks, nesting/early brood-rearing and winter habitats. These activities should be located to less sensitive habitats wherever necessary and possible. It should be noted that in some circumstances a project may not be re-locatable due to the uniformity of the habitat. In these situations the project should be located in the least sensitive habitat as possible.

9.) Other mitigation/conservation measures should be developed, if appropriate. This effort should be accomplished in conjunction with the WGFD. These measures should be developed to protect, conserve, improve, or mitigate impacts to productive sage-grouse habitat.

10.) All recommendations/mitigation/conservation measures will be analyzed in a site-specific NEPA document, and be incorporated, as appropriate, into conditions of approval of the permit, plan of development, and/or other use authorizations including distances and timeframes identified in item number 6 above for all resource authorizations and actions.

11.) Rehabilitation of surface disturbance activities in nesting/early brood-rearing habitats and winter habitats will include sagebrush (including locally adapted species and subspecies) for rehabilitation activities. Field Offices will include a minimum of one to two species of appropriate forb species in seed mixtures for nesting and early brood-rearing habitats. Appropriate amounts and species will be determined by site potential.

If you have questions concerning this issue or this memorandum, please contact Tom Rinkes of at (307) 332-8404.

Literature Cited: Connelly, J. W., M. A. Schroeder, A. R. Sands, and C. E. Braun. 2000. Guidelines to manage sage grouse populations and their habitats. Wildlife Society Bulletin 28:1-19.



1 Attachment:

1 – Sage-Grouse Lek Definitions (2 pp.)

Distribution

Director (230), Room 204, LS
CF

1 (w/o atch.)
2 (w/atc.)

Sage-Grouse Lek Definitions

Lek. A traditional courtship display area attended by male sage-grouse in or adjacent to sagebrush dominated habitat. Designation of the site as a lek requires observation of two or more male sage-grouse engaged in courtship displays. In addition new leks must be confirmed by a survey conducted during the appropriate time of day and during the strutting season. Observation of sign of strutting activity can also be used to confirm a suspected lek.

Lek Complex. A group of leks in close proximity between which male sage-grouse may be expected to interchange from one day to the next. A specific distance criteria does not yet exist.

Lek Count. A census technique that documents the actual number of male sage-grouse observed on a particular lek or complex of leks using the methods described below.

Lek Survey. A monitoring technique designed primarily to determine whether leks are active or inactive and obtaining accurate counts of the numbers of males attending is secondary.

Annual status – Each year a lek will be determined to be in one of the following status categories:

Active. Any lek that has been attended by male sage-grouse during the strutting season. Presence can be documented by observation of birds using the site or by signs of strutting activity.

Inactive. Leks where it is known that there was no strutting activity through the course of a strutting season. A single visit, or even several visits, without strutting grouse being seen is not adequate documentation to designate a lek as inactive. This designation requires either an absence of birds on the lek during multiple ground visits under ideal conditions throughout the strutting season or a ground check of the exact lek site late in the strutting season that fails to find any sign (droppings/feathers) of strutting activity.

Unknown. Leks that have not been documented either active or inactive during the course of a strutting season.

Based on annual status a lek may be put into one of the following categories for management purposes:

Occupied Lek. A lek that has been active during at least one strutting season within the last 10 years. Management protection will be afforded to occupied leks.

Unoccupied Lek. (Formerly termed “historical lek”). There are two types of unoccupied leks, “destroyed” or “abandoned”. Management protection will not be afforded to unoccupied leks.

Destroyed lek: A formerly active lek site and surrounding sagebrush habitat that has been destroyed and no longer capable of supporting sage-grouse breeding activity. A lek site that has been strip-mined, paved, converted to cropland or undergone other long-term habitat type conversion is considered destroyed. Destroyed leks do not require monitoring unless the site is reclaimed to suitable sage-grouse habitat.

Abandoned lek: A lek in otherwise suitable habitat that has not been active during a consecutive ten-year period. Before a lek is designated “abandoned” it must be confirmed as “inactive” (see above criteria) in at least four non-consecutive strutting seasons spanning the 10 years. Once designated “abandoned,” the site should be surveyed at least once every 10 years to determine whether or not the lek has been reoccupied.

Undetermined Lek. Any lek that has not been documented as being active in the last 10 years but does not have sufficient documentation to be designated unoccupied. Management protection will be afforded to undetermined leks until their status has been documented as unoccupied.

A.5 NATIONAL SAGE-GROUSE HABITATION CONSERVATION STRATEGY

**Bureau of Land Management
National Sage-Grouse Habitat Conservation Strategy**

U.S. Department of the Interior

November 2004

**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 a 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 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 rangelands of the 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. Proceedings of Pinyon-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.
- Thurow, 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.